METRO VANCOUVER REGIONAL DISTRICT (MVRD)
BOARD OF DIRECTORS

REGULAR BOARD MEETING
Friday, November 26, 2021
9:00 A.M.
28th Floor Boardroom, 4515 Central Boulevard, Burnaby, British Columbia

Membership and Votes

A G E N D A[1]

ELECTION

1. Election of Board Chair
Designated Speaker: Chris Plagnol, Corporate Officer

2. Election of Board Vice Chair
Designated Speaker: Board Chair

3. Election of Alternate Board Chair and/or Alternate Board Vice Chair
Designated Speaker: Board Chair
Note: In the event the elected Board Chair or Vice Chair is not a member of the Greater Vancouver Water District and/or the Greater Vancouver Sewerage and Drainage District, an Alternate Board Chair or Alternate Board Vice Chair must be separately elected for that District.

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A. ADOPTION OF THE AGENDA

1. November 26, 2021 Regular Meeting Agenda
That the MVRD Board adopt the agenda for its regular meeting scheduled for November 26, 2021 as circulated.

B. ADOPTION OF THE MINUTES

1. October 29, 2021 Regular Meeting Minutes *pg. 7*
That the MVRD Board adopt the minutes for its regular meeting held October 29, 2021 as circulated.

C. DELEGATIONS

[1] *Note: Recommendation is shown under each item, where applicable. All Directors vote unless otherwise noted.*

D. INVITED PRESENTATIONS

E. CONSENT AGENDA

Note: Directors may adopt in one motion all recommendations appearing on the Consent Agenda or, prior to the vote, request an item be removed from the Consent Agenda for debate or discussion, voting in opposition to a recommendation, or declaring a conflict of interest with an item.

1. REGIONAL PLANNING COMMITTEE REPORTS

1.1 Final Report of the Canada-British Columbia Expert Panel on the Future of Housing Supply and Affordability *pg. 26*

That the MVRD Board send a letter to the Minister of Municipal Affairs, the Attorney General and Minister Responsible for Housing, and the Minister of Finance expressing support for the overall goals of the Final Report of the Canada-British Columbia Expert Panel on the Future of Housing Supply and Affordability, and requesting that the Province engage with Metro Vancouver member jurisdictions, and other BC municipalities and regional districts, before advancing any of the policy issues and recommendations that have implications for local governments.

1.2 *Metro Vancouver 2040: Shaping our Future* — 2020 Annual Performance Monitoring Report *pg. 48*

That the MVRD Board receive for information the report dated October 5, 2021, titled "*Metro Vancouver 2040: Shaping our Future* - 2020 Annual Performance Monitoring Report", and direct staff to forward a copy to the Province of BC's Ministry of Municipal Affairs, Local Government Division.

1.3 *Metro Vancouver 2040: Shaping our Future* — 2020 Procedural Report *pg. 56*

That the MVRD Board receive for information the report dated October 5, 2021, titled "*Metro Vancouver 2040: Shaping our Future* - 2020 Procedural Report".

1.4 Metro Vancouver Growth Projections Methodology Report *pg. 70*

That the MVRD Board receive for information the report dated October 7, 2021, titled, "Metro Vancouver Growth Projections Methodology Report".

2. CLIMATE ACTION COMMITTEE REPORTS

2.1 Metro Vancouver's Climate 2050 Buildings Roadmap *pg. 100*

That the MVRD Board:

a) endorse the *Climate 2050 Buildings Roadmap* as attached to the report dated October 8, 2021, titled "Metro Vancouver's *Climate 2050 Buildings Roadmap*" as the initial Roadmap towards achievement of the *Climate 2050* vision, goals, and targets for greenhouse gas reduction and resilience in the buildings sector;

b) direct staff to continue working with member jurisdictions and other partners to implement the actions in the *Climate 2050 Buildings Roadmap*; and

c) direct staff to update the Roadmap, as needed, in response to changes in science, technology and policy.

2.2 Metro Vancouver's Climate 2050 Transportation Roadmap *pg. 161*

That the MVRD Board:

a) endorse the *Climate 2050 Transportation Roadmap* as attached to the report dated October 8, 2021, titled "Metro Vancouver's *Climate 2050 Transportation Roadmap*" as the initial Roadmap towards achievement of the *Climate 2050* vision, goals, and targets for greenhouse gas reduction and resilience in the transportation sector, with the amendments proposed by the Climate Action Committee, <u>including amending:</u>
   <u>i) Section 1.10 and Section 2.4 to explicitly include various types of e mobility;</u>
   <u>ii) Section 4.2 to include the impacts on high volume active transportation routes;</u>

b) direct staff to continue working with member jurisdictions and other partners to implement the actions in the *Climate 2050 Transportation Roadmap*; and

c) direct staff to update the Roadmap, as needed, in response to changes in science, technology and policy.

2.3 Draft Climate 2050 Agriculture Roadmap *pg. 230*

That the MVRD Board authorize staff to proceed with engagement on the draft *Climate 2050 Agriculture Roadmap*, as presented in the report dated October 13, 2021, titled "Draft *Climate 2050 Agriculture Roadmap*".

2.4 Board Appointment of Enforcement Officers *pg. 277*

That the MVRD Board:

a) pursuant to the *Greater Vancouver Regional District Air Quality Management Bylaw 1082, 2008* and the *Environmental Management Act*:
   i. appoint Metro Vancouver employees Matt Brinkworth and Toby Gritten as officers; and
   ii. rescind the appointments of Rick Laird, Robert Kemp and Corey Pinder as officers; and

b) pursuant to section 28 of the *Offence Act*:
   i. appoint Metro Vancouver employees Matt Brinkworth and Toby Gritten for the purpose of serving summons under section 28 of the *Offence Act* for alleged violations under the *Greater Vancouver Regional District Air Quality Management Bylaw 1082, 2008*; and
   ii. rescind the appointments for the purpose of serving summons of Rick Laird, Robert Kemp and Corey Pinder.

3. FINANCE AND INTERGOVERNMENT COMMITTEE REPORTS

3.1 TransLink Application for Federal Gas Tax Funding for 2023 Depot Infrastructure, Fleet Replacement, and Fleet Design *pg. 279*

That the MVRD Board approve $358.48 million in funding from the Greater Vancouver Regional Fund for the following transit projects proposed by TransLink in its Application for Federal Gas Tax Funding as attached to the report dated September 29, 2021, titled "TransLink Application for Federal Gas Tax Funding for 2023 Depot Infrastructure, Fleet Replacement, and Fleet Design":

1. Marpole Transit Centre – Implementation
2. 2023 Conventional Bus – Replacement
3. 2023 HandyDART Vehicle Purchase – Replacement
4. 2023 Community Shuttle Purchase – Replacement
5. Next Generation SeaBus Design

4. REGIONAL ECONOMIC PROSPERITY COMMITTEE REPORTS

4.1 Clean Transportation: Findings and Actions to Strengthen the Sector in the Metro Vancouver Region *pg. 361*

That the MVRD Board receive for information the report dated November 1, 2021, titled "Clean Transportation: Findings and Actions to Strengthen the Sector in the Metro Vancouver Region."

4.2 Communications and Social Media Update *pg. 390*

That the MVRD Board receive for information the report dated October 29, 2021, titled "Communications and Social Media update."

4.3 Strategic Investment Operations Update *pg. 396*

That the MVRD Board receive for information the report dated November 1, 2021, titled "Strategic Investment Operations Update."

F. ITEMS REMOVED FROM THE CONSENT AGENDA

G. REPORTS NOT INCLUDED IN CONSENT AGENDA

1. CLIMATE ACTION COMMITTEE REPORTS

1.1 MVRD Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1332, 2021 *pg. 399*

[Recommendation a): simple weighted majority vote.] and
[Recommendation b): 2/3 weighted majority vote.]

That the MVRD Board:

a) give first, second and third reading to *Metro Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1332, 2021*; and

b) pass and finally adopt *Metro Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1332, 2021*.

1.2 MVRD Ticket Information Utilization Amending Bylaw No. 1333, 2021 *pg. 409*

[Recommendation a): simple weighted majority vote.] and
[Recommendation b): 2/3 weighted majority vote.]

That the MVRD Board:

a) give first, second and third reading to *Metro Vancouver Regional District Ticket Information Utilization Amending Bylaw No. 1333, 2021*; and
b) pass and finally adopt *Metro Vancouver Regional District Ticket Information Utilization Amending Bylaw No. 1333, 2021*.

2. REGIONAL PARKS COMMITTEE REPORTS

2.1 MVRD Regional Parks Regulation Amending Bylaw No. 1335, 2021 – Amends Bylaw 1177, 2012 *pg. 420*

[Recommendation a): simple weighted majority vote.] and
[Recommendation b): 2/3 weighted majority vote.]

That the MVRD Board:

a) give first, second and third reading to *Metro Vancouver Regional District Regional Parks Regulation Amending Bylaw No. 1335, 2021*; and
b) pass and finally adopt *Metro Vancouver Regional District Regional Parks Regulation Amending Bylaw No. 1335, 2021*.

2.2 MVRD Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw 1334, 2021 – Amends Bylaw 1117, 2010 *pg. 438*

[Recommendation a): simple weighted majority vote.] and
[Recommendation b): 2/3 weighted majority vote.]

That the MVRD Board:

a) give first, second and third reading to *Metro Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1334, 2021*; and
b) pass and finally adopt *Metro Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1334, 2021*.

2.3 MVRD Ticket Information Utilization Amending Bylaw 1336, 2021 – Amends Bylaw 1050, 2006 *pg. 448*

[Recommendation a): simple weighted majority vote.] and
[Recommendation b): 2/3 weighted majority vote.]

That the MVRD Board:

a) give first, second and third reading to *Metro Vancouver Regional District Ticket Information Utilization Amending Bylaw No. 1336, 2021;* and
b) pass and finally adopt *Metro Vancouver Regional District Ticket Information Utilization Amending Bylaw No. 1336, 2021*.

H. MOTIONS FOR WHICH NOTICE HAS BEEN GIVEN

I. OTHER BUSINESS

1. MVRD Board Committee Information Items and Delegation Summaries *pg. 456*

J. BUSINESS ARISING FROM DELEGATIONS

K. RESOLUTION TO CLOSE MEETING

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

That the MVRD Board close its regular meeting scheduled for November 26, 2021 pursuant to the *Community Charter* provisions, Section 90 (1) (c) and 90 (2) (b) as follows:

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

(c) labour relations or other employee relations; and

90 (2) A part of a meeting must be closed to the public if the subject matter being considered relates to one or more of the following:

(b) the consideration of information received and held in confidence relating to negotiations between the regional district and a provincial government or the federal government or both, or between a provincial government or the federal government or both and a third party."

L. RISE AND REPORT (Items Released from Closed Meeting)

M. ADJOURNMENT/CONCLUSION

That the MVRD Board adjourn/conclude its regular meeting of November 26, 2021.

METRO VANCOUVER REGIONAL DISTRICT
BOARD OF DIRECTORS

Minutes of the Regular Meeting of the Metro Vancouver Regional District (MVRD) Board of Directors held at 9:00 a.m. on Friday, October 29, 2021 in the 28th Floor Boardroom, 4730 Kingsway, Burnaby, British Columbia.

MEMBERS PRESENT:

Burnaby, Chair, Director Sav Dhaliwal
North Vancouver City, Vice Chair Director Linda Buchanan*
Anmore, Director John McEwen*
Belcarra, Director Jamie Ross*
Bowen Island, Director David Hocking*
Burnaby, Director Pietro Calendino*
Burnaby, Director Mike Hurley*
Coquitlam, Director Craig Hodge
Coquitlam, Director Richard Stewart*
Delta, Director George Harvie*
Delta, Director Dylan Kruger*
Electoral Area A, Director Jen McCutcheon*
Langley City, Director Gayle Martin*
Langley Township, Director Jack Froese*
Langley Township, Director Kim Richter*
Lions Bay, Director Ron McLaughlin*
Maple Ridge, Director Mike Morden*
New Westminster, Director Jonathan Coté* (departed at 2:32 p.m.)
North Vancouver District, Director Lisa Muri*
Pitt Meadows, Director Bill Dingwall*
Port Coquitlam, Director Brad West*
Port Moody, Director Rob Vagramov*
Richmond, Director Malcolm Brodie*
Richmond, Director Harold Steves*
Surrey, Director Linda Annis*
Surrey, Director Doug Elford*
Surrey, Director Laurie Guerra*
Surrey, Director Doug McCallum*
Surrey, Director Mandeep Nagra*
Surrey, Director Allison Patton*
Tsawwassen, Director Ken Baird*
Vancouver, Director Christine Boyle*
Vancouver, Director Adriane Carr*
Vancouver, Director Melissa De Genova* (arrived at 9:07 a.m.)
Vancouver, Director Lisa Dominato* (arrived at 9:10 a.m.)
Vancouver, Director Colleen Hardwick* (arrived at 9:02 a.m.)
Vancouver, Alternate Director Pete Fry* for Kennedy Stewart
Vancouver, Director Michael Wiebe*
West Vancouver, Director Mary-Ann Booth*
White Rock, Director Darryl Walker*

MEMBERS ABSENT:

None

STAFF PRESENT:

Jerry W. Dobrovolny, Chief Administrative Officer
Chris Plagnol, Corporate Officer
Amelia White, Legislative Services Supervisor, Board and Information Services

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

A. ADOPTION OF THE AGENDA

1. October 29, 2021 Regular Meeting Agenda

It was MOVED and SECONDED

That the MVRD Board:

a) amend the agenda for its regular meeting scheduled for October 29, 2021 by adding the following delegations:

i) Item C 1. Delegation – Preet Heer and Yonatan Yohannes;
ii) Item C 2. Delegation – Joshua Kuepfer;
iii) Item C 3. Delegation – Sofi Hindmarch;
iv) Item C 4. Delegation – Raj Hundal;
v) Item C 5. Delegation – Peter Stepney;
vi) Item C 6. Delegation – Kim Stepney;
vii) Item C 7. Delegation – Greg D'Avignon and Jock Finlayson;
viii) Item C 8. Delegation – Chris Gardner;
ix) Item C 9. Delegation – Jonathan Burke;
x) Item C 10. Delegation – Barry Smith;
xi) Item C 11. Delegation – Todd Yuen;
xii) Item C 12. Delegation – Tom Parsons and Wendy Parsons;
xiii) Item C 13. Delegation – Scott Wheatley;
xiv) Item C 14. Delegation – Terry Holland;
xv) Item C 15. Delegation – Tegan Smith;
xvi) Item C 16. Delegation – Ryan Bruce;
xvii) Item C 17. Delegation – David Riley;
xviii) Item C 18. Delegation – Andrew Schulz;
xix) Item C 19. Delegation – Harrison Rush;
xx) Item C 20. Delegation – Heidi Greco;
xxi) Item C 21. Delegation – Myles Lamont;
xxii) Item C 22. Delegation – Mary Lynn Baker;
xxiii) Item C 23. Delegation – Christine Bishop;
xxiv) Item C 24. Delegation – Sarah Rush;
xxv) Item C 25. Delegation – John Elliott;
xxvi) Item C 26. Delegation – Christy Juteau;
xxvii) Item C 27. Delegation – David Anderson;
xxviii) Item C 28. Delegation – Deb Jack;
xxix) Item C 29. Delegation – Deborah Carlson;
xxx) Item C 30. Delegation – Chief Harley Chappell; and
xxxi) Item C 31. Delegation – Naty King;
xxxii) Item C 32. Delegation – Shawn Low and Luciana Moraes; and
xxxiii) Item C 33. Delegation – Chief Harley Chappell;
xxxiv) Item C 34. Delegation – Christa Brown; and
xxxv) Item C 35. Delegation – Chief Harley Chappell;
xxxvi) Item C 36. Delegation – Ken Carrusca; and

b) adopt the agenda as amended.

CARRIED

9:02 a.m. Director Hardwick arrived at the meeting.

B. ADOPTION OF THE MINUTES

1. September 24, 2021 Regular Meeting Minutes

It was MOVED and SECONDED
That the MVRD Board adopt the minutes for its regular meeting held September 24, 2021 as circulated.

CARRIED

2. October 20, 2021 Regular Joint Board Meeting Minutes

It was MOVED and SECONDED
That the MVRD Board adopt the minutes for the joint meeting of the MVRD, MVHC, GVWD and GVS&DD Boards held October 20, 2021 as circulated.

CARRIED

C. DELEGATIONS

1. Preet Heer, Manager, Community Planning, City of Surrey and Yonatan Yohannes, Manager, Utilities, City of Surrey (RGS Applicant)

Preet Heer, Manager, Community Planning, City of Surrey and Yonatan Yohannes, Manager, Utilities, City of Surrey, provided members with a presentation on the *Metro 2040* proposed amendment for South Campbell Heights, highlighting the shortage of industrial land, the extension of the Urban Containment Boundary and the tools Surrey is using to address any environmental impacts.

9:07 a.m. Director De Genova arrived at the meeting.
9:10 a.m. Director Dominato arrived at the meeting.

Presentation material titled "South Campbell Heights – Land Use Designation Amendment Request" is retained with the October 29, 2021 MVRD Board agenda.

2. Joshua Kuepfer, Mennonite Church British Columbia

Joshua Kuepfer, Mennonite Church British Columbia, provided members with a presentation on the *Metro 2040* proposed amendment for South Campbell Heights, noting his opposition for the proposal as he believes it goes against *Metro 2050*.

3. Sofi Hindmarch, Wildlife Biologist

Sofi Hindmarch, Wildlife Biologist, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, outlining her opposition to the proposal, highlighting ecological concerns with the proposed change and the risk to wildlife living in the South Campbell Heights area.

Members were provided a presentation regarding the *Metro 2040* proposed amendment for South Campbell Heights. Presentation material titled "Ecological Concerns: Proposed *Metro 2040* Amendment for South Campbell Heights" is retained with the October 29, 2021 MVRD Board agenda.

4. Raj Hundal

Raj Hundal spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, highlighting his support for the proposed amendment as many landowners in the area support this proposal and he believes the change would benefit the community.

Members were provided a presentation regarding the *Metro 2040* proposed amendment for South Campbell Heights. Presentation material titled "South Campbell Heights LAP: An Owner's Perspective" is retained with the October 29, 2021 MVRD Board agenda.

5. Peter Stepney

Peter Stepney spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, highlighting his opposition to the proposed amendment noting he believes that industrial land is currently being underutilized and that the Urban Containment Boundary should not be modified.

Members were provided a presentation regarding the *Metro 2040* proposed amendment for South Campbell Heights. Presentation material titled "Smoke and Mirrors: Misdirection In the South Campbell Heights Development Proposal" is retained with the October 29, 2021 MVRD Board agenda.

6. Kim Stepney

Kim Stepney spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, outlining her opposition to the proposal and highlighting health and safety concerns, the impact to the aquifer and additional traffic congestion.

Members were provided a presentation regarding the *Metro 2040* proposed amendment for South Campbell Heights. Presentation material titled "Bad Medicine" is retained with the October 29, 2021 MVRD Board agenda.

7. Greg D'Avignon, President and CEO, Business Council of B.C. and Jock Finlayson, Senior Policy Advisor, Business Council of B.C.

Greg D'Avignon, President and CEO, Business Council of B.C. and Jock Finlayson, Senior Policy Advisor, Business Council of B.C., spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, outlining their support for the proposed amendment highlighting their belief that there are record low vacancy rates and so there is a need for more industrial land.

8. Chris Gardner, President, Independent Contractors and Businesses Association

Chris Gardner, President, Independent Contractors and Businesses Association, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, highlighting his idea that there needs to be more jobs closer to peoples' homes in the region.

Members were provided a presentation regarding the *Metro 2040* proposed amendment for South Campbell Heights. Presentation material is not retained the October 29, 2021 MVRD Board agenda.

9. Jonathan Burke, President and CEO, Canadian Heating Products Inc.

Jonathan Burke, President and CEO, Canadian Heating Products Inc., spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights nothing that he would have liked to expand his business here in the region; however, he could not find adequate industrial space to expand locally.

10. Barry Smith

Barry Smith spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, noting his opposition to this proposal due to the impacts on wildlife in the area.

11. Todd Yuen, President, Industrial Development, Beedie

Todd Yuen, President, Industrial Development, Beedie, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, highlighting his support for the proposed amendment and the critical need for additional industrial land in the region.

Members were shown a picture regarding the *Metro 2040* proposed amendment for South Campbell Heights. Presentation material is not retained the October 29, 2021 MVRD Board agenda.

12. Tom Parsons and Wendy Parsons

Tom Parsons and Wendy Parsons spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, noting their opposition to the proposed amendment due to their concerns about the aquifer being impacted and the existing traffic congestion.

13. Scott Wheatley, Executive Director, Cloverdale District Chamber of Commerce

Scott Wheatley, Executive Director, Cloverdale District Chamber of Commerce, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, noting that he is in support of the proposal as the change would improve the traffic network.

14. Terry Holland, Managing Partner, Krystal Growth Partners

Terry Holland, Managing Partner, Krystal Growth Partners, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights,

highlighting his belief of the increasing costs and lack of availability of industrial land.

15. Tegan Smith, Principal, Channel Consulting

Tegan Smith, Principal, Channel Consulting, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, highlighting her support for the proposal, that there is not enough industrial land in the region, and that this change would create new jobs.

16. Ryan Bruce, B.C. Manager of Government Relations, CLAC Member Centre

Ryan Bruce, B.C. Manager of Government Relations, CLAC Member Centre, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, highlighting his support for the proposal due to the lack of industrial land in the region.

17. David Riley

David Riley spoke to members regarding the Metro 2040 proposed amendment for South Campbell Heights, noting his opposition to the proposal due his belief that there has not been adequate consultation performed and therefore, he believes that the proposal should be referred back to the City of Surrey.

18. Andrew Schulz

Andrew Schulz, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, highlighting his opposition to this proposal due to his belief that this will contribute to further sprawl and that the Urban Containment Boundary needs to be maintained.

19. Harrison Rush

Harrison Rush, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, highlighting his opposition of this proposal due to the need to preserve the aquifer and green space, and the need for additional public consultation.

20. Heidi Greco

Heidi Greco, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, commenting on how the fresh water services and sensitive ecosystems need to be protected and the agricultural land needs to be preserved.

21. Myles Lamont, Principal Wildlife Biologist, TerraFauna Wildlife Consulting Inc.

Myles Lamont, Principal Wildlife Biologist, TerraFauna Wildlife Consulting Inc., spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, outlining his opposition to the proposal, and noting that this area is not ideal for Mixed Employment lands and that he believes there have not been any comprehensive water studies conducted to assess the impacts of significant land use change.

Members were provided a presentation regarding the *Metro 2040* proposed amendment for South Campbell Heights. Presentation material titled "Proposed Metro 2040 Amendment for South Campbell Heights: Environmental and Socioeconomic Impacts" is retained with the October 29, 2021 MVRD Board agenda.

22. Mary Lynn Baker

Mary Lynn Baker, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, highlighting her opposition to the proposal, noting the highly sensitive area and her concern for the Little Campbell river and surrounding ecosystem.

Members were shown a video regarding the *Metro 2040* proposed amendment for South Campbell Heights. Presentation material is not retained the October 29, 2021 MVRD Board agenda.

23. Christine Bishop, Director, Little Campbell Watershed Society

Christine Bishop, Director, Little Campbell Watershed Society, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, outlining her opposition to the proposal due to the natural capital in the South Campbell Heights area.

Members were provided a presentation regarding the *Metro 2040* proposed amendment for South Campbell Heights. Presentation material titled "Top Three Benefits" is retained with the October 29, 2021 MVRD Board agenda.

24. Sarah Rush, Chair, Friends of Hazelmere Campbell Valley

Sarah Rush, Chair, Friends of Hazelmere Campbell Valley, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, outlining her opposition due to her belief that the river already needs support and cannot handle additional changes, and that this proposal is only concerned with the economic benefits.

25. John Elliot, Director, Little Campbell Watershed Society

John Elliot, Director, Little Campbell Watershed Society, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, highlighting his opposition to the proposal as he believes that there needs to be more public engagement conducted.

26. Christy Juteau, Conservation Science Director, A Rocha Canada

Christy Juteau, Conservation Science Director, A Rocha Canada, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, outlining her opposition as the aquifer needs to be protected so it can be properly recharged.

Members were provided a presentation regarding the *Metro 2040* amendment for South Campbell Heights. Presentation material titled "Metro Vancouver 2040: Shaping Our Future Land Use Designation Amendment Request from the City of Surrey – South Campbell Heights" is retained with the October 29, 2021 MVRD Board agenda.

27. David Anderson, Brooksdale Environmental Centre Co-Director, A Rocha Canada

David Anderson, Brooksdale Environmental Centre Co-Director, A Rocha Canada, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights outlining he believes there needs to be more conservation work undertaken in the area.

Members were provided a presentation regarding the *Metro 2040* amendment for South Campbell Heights. Presentation material titled "Canada A Rocha: Environmental Stewardship" is retained with the October 29, 2021 MVRD Board agenda.

28. Deb Jack, President, Surrey Environmental Partners

Deb Jack, President, Surrey Environmental Partners, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights outlining her opposition of the proposal as she believes that the natural habitat needs to be preserved.

29. Deborah Carlson, Staff Lawyer, West Coast Environmental Law

Deborah Carlson, Staff Lawyer, West Coast Environmental Law, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights, outlining her belief that more information needs to be provided before a decision is made and she believes that the current proposal is not compatible with the Regional Growth Strategy.

30. Chief Harley Chappell, Semiahmoo First Nation

Chief Harley Chappell, Semiahmoo First Nation, spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights outlining his concern about the lack of consultation with the Semiahmoo First Nation, and the impacts to food security and water quality.

31. Naty King

Naty King spoke to members regarding the *Metro 2040* proposed amendment for South Campbell Heights outlining her opposition to the proposal due to the need to address climate change and protect our environment.

32. Shawn Low, Manager, Area Planning and Development (South), City of Surrey and Luciana Moraes, Planner, City of Surrey (RGS Applicant)

Shawn Low, Manager, Area Planning and Development (South), City of Surrey and Luciana Moraes, Planner, City of Surrey, spoke to members regarding the *Metro 2040* proposed amendment for 228 175A Street, Surrey, highlighting the

proposed residential development, care facility and commercial building, and project timeline.

Members were provided a presentation regarding the *Metro 2040* amendment for 228 175A Street, Surrey. Presentation material titled "RGS Amendment: Mixed Employment to General Urban" is retained with the October 29, 2021 MVRD Board agenda.

33. Chief Harley Chappell, Semiahmoo First Nation

Chief Harley Chappell, Semiahmoo First Nation, spoke to members regarding the Metro 2040 proposed amendment for 228 175A Street, Surrey, highlighting how the Semiahmoo First Nation has not been included in the planning process to date.

34. Christa Brown, Planner, City of Surrey (RGS Applicant)

Christa Brown, Planner, City of Surrey, spoke to members regarding the *Metro 2040* proposed amendment for the Cloverdale Hospital Site, highlighting the plans for a new Surrey Hospital and Cancer Centre, the timeline for the project and the proposed Type III minor amendment.

Members were provided a presentation regarding the *Metro 2040* amendment for the Cloverdale Hospital Site. Presentation material titled "Metro Vancouver 2040: New Surrey Hospital and Cancer Centre (Cloverdale Site, Surrey)" is retained with the October 29, 2021 MVRD Board agenda.

35. Chief Harley Chappell, Semiahmoo First Nation

Chief Harley Chappell, Semiahmoo First Nation, spoke to members regarding the Metro 2040 proposed amendment for the Cloverdale Hospital Site, highlighting how he believes that this application is premature as there is an unsettled land claim on this site.

36. Ken Carrusca, Vice President, Environment and Marketing, Cement Association of Canada

Delegation was not present when called upon.

D. INVITED PRESENTATIONS

No items presented.

E. CONSENT AGENDA

The Chair identified a typographical error in the recommendation of Item 3.2, "2022 Schedule of Regular Board Meetings", which was corrected prior to consideration below.

It was MOVED and SECONDED

That the MVRD Board adopt the recommendations presented in the following items as presented in the October 29, 2021 MVRD Board Consent Agenda:

1.1 Consideration of the City of Langley's Amended Regional Context Statement
1.2 Request for Sanitary Service Connection at 12745 Laity Street, Maple Ridge
1.3 Request for Sanitary Service Connection at 12606 224 Street, Maple Ridge
1.4 Metro 2050 Q2 / Q3 2021 Status Update
2.1 Race to Zero Initiative
3.1 Metro Vancouver External Agency Activities Status Report – October 2021
3.2 2022 Schedule of Regular Board Meetings

CARRIED

The items and recommendations referred to above are as follows:

1.1 Consideration of the City of Langley's Amended Regional Context Statement

Report dated September 21, 2021 from Mark Seinen, Senior Planner, Regional Planning and Housing Services, seeking MVRD Board's acceptance of the City of Langley's amended Regional Context Statement and all associated changes to the regional land use designations.

Recommendation:

That the MVRD Board accept the City of Langley's amended Regional Context Statement as submitted to Metro Vancouver on July 30, 2021.

Adopted on Consent

1.2 Request for Sanitary Service Connection at 12745 Laity Street, Maple Ridge

Report dated September 8, 2021 from James Stiver, Division Manager, Growth Management and Transportation, Regional Planning and Housing Services, seeking the MVRD Board's concurrence that the City of Maple Ridge's request to extend a sanitary service connection to a new micro-brewery in the City of Maple Ridge is consistent with *Metro Vancouver 2040: Shaping our Future* (*Metro 2040*).

Recommendation:

That the MVRD Board resolve that the extension of GVS&DD sewerage services to a new micro-brewery at 12745 Laity Street in the City of Maple Ridge is consistent with the provisions of *Metro Vancouver 2040: Shaping Our Future*.

Adopted on Consent

1.3 Request for Sanitary Service Connection at 12606 224 Street, Maple Ridge

Report dated September 8, 2021 from James Stiver, Division Manager, Growth Management and Transportation, Regional Planning and Housing Services, seeking the MVRD Board's concurrence that the City of Maple Ridge's request to extend a sanitary sewer service connection to an existing single-detached dwelling located at 12606 224 Street in the City of Maple Ridge is consistent with *Metro Vancouver 2040: Shaping our Future* (*Metro 2040*).

Recommendation:
That the MVRD Board resolve that the extension of GVS&DD sewerage services to an existing single-detached dwelling at 12606 224 Street in the City of Maple Ridge is consistent with the provisions of *Metro Vancouver 2040: Shaping Our Future*.

Adopted on Consent

1.4 Metro 2050 Q2 / Q3 2021 Status Update

Report dated September 29, 2021 from Erin Rennie, Senior Planner, Regional Planning and Housing Services, providing the MVRD Board with an update of the technical and engagement work associated with *Metro 2050* undertaken between April 2021 and August 2021.

Recommendation:
That the MVRD Board receive for information the report dated September 29, 2021, titled "*Metro 2050* Q2 / Q3 Status Update".

Adopted on Consent

2.1 Race to Zero Initiative

Report dated October 15, 2021 from the Climate Action Committee, seeking the MVRD Board's approval of applying to join the Race to Zero initiative and forwarding the Race to Zero initiative information to member jurisdictions for their consideration.

Recommendation:
That the MVRD Board:

a) apply to join the *Race to Zero* initiative ahead of the 2021 Conference of the Parties (COP26) on behalf of Metro Vancouver Regional District; and
b) forward the executive summary and presentation material from the October 15, 2021 delegation to the Climate Action Committee from Lia Cairone, C40 Cities Climate Leadership Group, to member jurisdictions for their consideration in joining the *Race to Zero* initiative.

Adopted on Consent

3.1 Metro Vancouver External Agency Activities Status Report – October 2021

Report dated October 18, 2021 from Katie Karn, Deputy Corporate Officer, Board and Information Services, updating the MVRD Board on the recent activities of external agencies to which representatives have been appointed.

Recommendation:
That the MVRD Board receive for information reports from Metro Vancouver representatives to the following external organizations:

a) Delta Heritage Airpark Management Committee;
b) Fraser Valley Regional Library Board (FVRL);
c) Katzie Treaty Negotiation Table;
d) Lower Mainland Flood Management Strategy Leadership Committee;

e) Lower Mainland Local Government Association (LMLGA);
f) Municipal Finance Authority of BC;
g) Ocean Watch Action Committee;
h) Pacific Parklands Foundation;
i) Sasamat Volunteer Fire Department Board of Trustees;
j) Union of British Columbia Municipalities (UBCM);
k) Western Transportation Advisory Council,

as provided in the report dated October 18, 2021, titled "Metro Vancouver External Agency Activities Status Report – October 2021".

Adopted on Consent

3.2 2022 Schedule of Regular Board Meetings

Report dated October 20, 2021 from Chris Plagnol, Corporate Officer, providing the MVRD Board with its 2022 schedule of regular board meetings.

Recommendation:

That the MVRD Board receive for information the schedule of regular board meetings, as follows:

a) Meeting Dates
- Friday, January 28, 2022 ..... Electronic Meeting
- Friday, February 25, 2022 ..... Electronic Meeting
- Saturday, February 26, 2022 ..... Electronic Meeting
- Friday, March 25, 2022 ..... Electronic Meeting
- Wednesday, April 27, 2022 ..... Electronic Meeting
- Friday, April 29, 2022 ..... Electronic Meeting
- Friday, May 27, 2022 ..... Electronic Meeting
- Friday, June 24, 2022 ..... Electronic Meeting
- Friday, July 29, 2022 ..... Electronic Meeting
- Friday, September 23, 2022 ..... Electronic Meeting
- Wednesday, October 19, 2022 ..... Electronic Meeting
- Friday, October 28, 2022 ..... In-Person Meeting
- Friday, November 25, 2022 ..... In-Person Meeting

b) Time
All meetings are scheduled for 9:00 a.m., unless otherwise specified on the meeting notice.

c) Place
All in-person meetings will take place in the Metro Vancouver boardroom on the 28th Floor, 4730 Kingsway, Burnaby BC, and all electronic meetings will take place using a hybrid model of simultaneous use of electronic facilities and the Metro Vancouver boardroom on 28th Floor, 4730 Kingsway, Burnaby BC., unless otherwise specified on the meeting notice.

Adopted on Consent

F. ITEMS REMOVED FROM THE CONSENT AGENDA

No items presented.

Recess
The Board recessed at 12:27 p.m. and reconvened at 12:32 p.m. with the same members being in attendance.

G. REPORTS NOT INCLUDED IN CONSENT AGENDA

1.1 Metro Vancouver 2040: Shaping Our Future Land Use Designation Amendment Request from the City of Surrey – South Campbell Heights

Report dated October 8, 2021 from Regional Planning Committee, together with the report dated September 20, 2021 from James Stiver, Division Manager, Growth Management and Transportation, and Mark Seinen, Senior Planner, Regional Planning and Housing Services, providing the MVRD Board with the opportunity to review and comment on the City of Surrey's request to amend the Regional Growth Strategy, *Metro Vancouver 2040: Shaping our Future*, for the South Campbell Heights area.

Discussion ensued regarding the proposed amendment, noting the following:

- the need to support the autonomy of the member jurisdictions;
- the requirement to protect sensitive ecosystems including aquifers;
- the previously dedicated special study area in the South Campbell Heights community;
- the consultation with Indigenous groups in the area;
- the intent of the Urban Containment Boundary; and
- the potential impacts on public transit and sewer systems if the amendment is adopted.

1:05 p.m.
Board Meeting Extension
Members were advised that the Board meeting had been in session for four hours from the time the meeting was convened, and is deemed adjourned unless the Board resolves to extend the meeting.

It was MOVED and SECONDED
That the MVRD Board extend its meeting of October 29, 2021 beyond four hours pursuant to the *Procedure Bylaw*.

CARRIED

The motion was before the Board and a Director requested a recorded vote be taken.

It was MOVED and SECONDED
That the MVRD Board:

a) initiate the regional growth strategy amendment process for the City of Surrey's requested regional land use designation amendments for the South

Campbell Heights area, including extension of the Urban Containment Boundary and removal of the Special Study Area overlay;

b) give first, second, and third readings to "Metro Vancouver Regional District Regional Growth Strategy Amendment Bylaw No. 1328, 2021";

c) direct staff to notify and seek comment from affected local governments as per section 6.4.2 of *Metro Vancouver 2040: Shaping our Future*; and

d) direct staff to notify and seek comment from local First Nations on the proposed *Metro 2040* amendment.

Points of Order

In response to several Points of Order raised by Directors, the Chair advised that a referral motion would send the proposed amendment application to a Metro Vancouver standing committee in lieu of sending the proposal back to the City of Surrey, and the motion that has been put forward should be considered prior to considering a referral motion.

The question was then called on the motion and it was

	Number of Votes	
Director	**Against**	**For**
Linda Annis		4
Ken Baird	1	
Mary-Ann Booth	3	
Christine Boyle	5	
Malcolm Brodie	5	
Linda Buchanan	3	
Pietro Calendino		4
Adriane Carr	5	
Jonathan Coté	4	
Melissa De Genova		5
Sav Dhaliwal		4
Bill Dingwall	1	
Lisa Dominato		4
Doug Elford		5
Jack Froese		3
Pete Fry		5
Laurie Guerra		4
Colleen Hardwick	4	
George Harvie		3
David Hocking	1	
Craig Hodge		3
Mike Hurley		4
Dylan Kruger		3
Gayle Martin	2	
Doug McCallum		5
Jen McCutcheon	1	

Director	Against	For
John McEwen		1
Ron McLaughlin		1
Mike Morden		5
Lisa Muri	5	
Mandeep Nagra		4
Allison Patton		4
Kim Richter	3	
Jamie Ross	1	
Harold Steves	5	
Richard Stewart		4
Rob Vagramov	2	
Darryl Walker	1	
Brad West		3
Michael Wiebe		4
Total Votes	**52**	**82**

CARRIED

1.2 Metro Vancouver 2040: Shaping our Future Land Use Designation Amendment Request from the City of Surrey – 228 175A Street

Report dated September 27, 2021 from Mark Seinen, Senior Planner, Regional Planning and Housing Services, providing the MVRD Board with the opportunity to consider the City of Surrey's request to amend *Metro Vancouver 2040: Shaping our Future,* accommodating the development of a mixed-use project consisting of 39 townhouse units, 77 apartment units, and a care facility.

It was MOVED and SECONDED

That the MVRD Board:

a) initiate the regional growth strategy amendment process for the City of Surrey's requested regional land use designation amendment from Mixed Employment to General Urban for the lands located at 228 175A Street;
b) give first, second, and third readings to "Metro Vancouver Regional District Regional Growth Strategy Amendment Bylaw No. 1326, 2021"; and
c) direct staff to notify affected local governments as per section 6.4.2 of *Metro Vancouver 2040: Shaping our Future*.

CARRIED

1.3 Metro Vancouver 2040: Shaping our Future Land Use Designation Amendment Request from the City of Surrey – Cloverdale Hospital Site

Report dated September 17, 2021 from Eric Aderneck, Senior Planner, Regional Planning and Housing Services, providing the MVRD Board with the opportunity to consider the City of Surrey's request to amend *Metro Vancouver 2040: Shaping our Future,* accommodating the development of the new Cloverdale Hospital and Cancer Centre.

It was MOVED and SECONDED

That the MVRD Board:

a) initiate the regional growth strategy amendment process for the City of Surrey's requested regional land use designation amendment for the Cloverdale Hospital Site located at 5510 180 Street, amending approximately 9 hectares of land designated 'Industrial' to 'Mixed Employment';
b) give first, second, and third readings to "Metro Vancouver Regional District Regional Growth Strategy Amendment Bylaw No. 1327, 2021"; and
c) direct staff to notify affected local governments as per section 6.4.2 of *Metro Vancouver 2040: Shaping our Future*.

CARRIED

2.1 MVRD Air Quality Management Fees Regulation Bylaw No. 1330, 2021

Report dated October 21, 2021 from Roger Quan, Director, Air Quality and Climate Change, Parks and Environment, seeking the MVRD Board's adoption of *Metro Vancouver Regional District Air Quality Management Fees Regulation Bylaw No. 1330, 2021*, updating the air quality permit and regulatory fees.

Discussion ensued regarding the proposed updates to the Bylaw No. 1330, 2021, highlighting the breakdown of the proposed fee increases, the consultation with industry stakeholders, and the definition of odorous air contaminants.

It was MOVED and SECONDED

That the MVRD Board give first, second and third reading to *Metro Vancouver Regional District Air Quality Management Fees Regulation Bylaw No. 1330, 2021*.

CARRIED

It was MOVED and SECONDED

That the MVRD Board pass and finally adopt *Metro Vancouver Regional District Air Quality Management Fees Regulation Bylaw No. 1330, 2021*.

CARRIED

2.2 MVRD Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021

Report dated October 5, 2021 from Ray Robb, Director, Environment Regulation and Enforcement, Cindy Onyejekwe, Senior Policy Analyst, Parks and Environment, seeking the MVRD Board's adoption of MVRD *Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021*, regulating all non-road diesel engine tiers and promoting further emission reductions.

It was MOVED and SECONDED

That the MVRD Board give first, second and third reading to *Metro Vancouver Regional District Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021*.

CARRIED

It was MOVED and SECONDED

That the MVRD Board pass and finally adopt *Metro Vancouver Regional District Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021*.

CARRIED

2:32 p.m. Director Coté departed the meeting.

3.1 Election of the MVRD Representative on the 2021-2022 Union of British Columbia Municipalities Executive

Report dated October 13, 2021 from Chris Plagnol, Corporate Officer, regarding an election of a member of the Metro Vancouver Regional District (MVRD) Board of Directors to serve as the MVRD representative on the Union of British Columbia Municipalities (UBCM) Executive Board for 2021-2022.

Chair Dhaliwal called upon members present for nominations for the office of MVRD Representative to the UBCM for the 2021-2022 term.

Director Hodge was nominated as a candidate for the office and consented to the nomination.

Chair Dhaliwal called for further nominations and after the third call, with there being no further nominations, declared nominations closed.

The Chair declared Director Hodge acclaimed to the office of MVRD Representative to the UBCM for the 2021-2022 term.

4.1 MVRD 2022 Budget and 2022 – 2026 Financial Plan and Five Year Bylaw 1331

Report dated October 20, 2021 from Dean Rear, General Manager, Financial Services/Chief Financial Officer, seeking the MVRD Board's approval of the 2022 MVRD Annual Budget for Regional District Services, endorsement of the MVRD 2022 – 2026 Financial Plan, and adoption of the *Metro Vancouver Regional District 2022 to 2026 Financial Plan Bylaw No. 1331, 2021*.

A member noted the need for on-going financial review in order to support a sustainable financial model for the region.

It was MOVED and SECONDED

That the MVRD Board approve the 2022 Annual Budget and endorse the 2022 2026 Financial Plan as shown in Attachment 1 of the report dated October 20, 2021, titled "MVRD 2022 Budget and 2022 – 2026 Financial Plan and Five Year Bylaw 1331", in the following schedules:

- Revenue and Expenditure Summary
- Air Quality
- E911 Emergency Telephone Service
- Electoral Area Service

- General Government Administration
- General Government Zero Waste Collaboration Initiatives
- Housing Planning and Policy
- Regional Economic Prosperity
- Regional Emergency Management
- Regional Employer Services
- Regional Global Positioning System
- Regional Parks
- Capital Portfolio - Regional Parks
- Regional Planning

CARRIED

It was MOVED and SECONDED
That the MVRD Board approve the 2022 Annual Budget and endorse the 2022 2026 Financial Plan as shown in Attachment 1 as presented for the Sasamat Fire Protection Service, and shown in the following schedules:

- Revenue and Expenditure Summary
- Sasamat Fire Protection Service

CARRIED

It was MOVED and SECONDED
That the MVRD Board approve the 2022 Reserve Applications as shown in Attachment 2 of the report dated October 20, 2021, titled "MVRD 2022 Budget and 2022 – 2026 Financial Plan and Five Year Bylaw 1331".

CARRIED

It was MOVED and SECONDED
That the MVRD Board give first, second and third reading to *Metro Vancouver Regional District 2022 to 2026 Financial Plan Bylaw No. 1331, 2021*.

CARRIED

It was MOVED and SECONDED
That the MVRD Board pass and finally adopt *Metro Vancouver Regional District 2022 to 2026 Financial Plan Bylaw No. 1331, 2021*.

CARRIED

H. MOTIONS FOR WHICH NOTICE HAS BEEN GIVEN

No items presented.

I. OTHER BUSINESS

1. MVRD Board Committee Information Items and Delegation Summaries

It was MOVED and SECONDED
That the MVRD Board receive for information the MVRD Board Committee Information Items and Delegations Summaries, dated October 29, 2021.

CARRIED

J. BUSINESS ARISING FROM DELEGATIONS

No items presented.

K. RESOLUTION TO CLOSE MEETING

It was MOVED and SECONDED
That the MVRD Board close its regular meeting scheduled for October 29, 2021 pursuant to the *Community Charter* provisions, Section 90 (1) (a), (g), and (m) as follows:

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

(a) personal information about an identifiable individual who holds or is being considered for a position as an officer, employee or agent of the regional district or another position appointed by the regional district;

(g) litigation or potential litigation affecting the regional district; and

(m) a matter that, under another enactment, is such that the public may be excluded from the meeting."

CARRIED

L. RISE AND REPORT (Items Released from Closed Meeting)

No items presented.

M. ADJOURNMENT/CONCLUSION

It was MOVED and SECONDED
That the MVRD Board adjourn its regular meeting of October 29, 2021.

CARRIED
(Time: 3:00 p.m.)

CERTIFIED CORRECT

Chris Plagnol, Corporate Officer

Sav Dhaliwal, Chair

48763898 FINAL

To: Regional Planning Committee

From: James Stiver, Division Manager, Growth Management and Transportation and Jessica Hayes, Senior Planner, Regional Planning and Housing Services

Date: October 12, 2021 Meeting Date: November 5, 2021

Subject: **Final Report of the Canada-British Columbia Expert Panel on the Future of Housing Supply and Affordability**

RECOMMENDATION

That the MVRD Board send a letter to the Minister of Municipal Affairs, the Attorney General and Minister Responsible for Housing, and the Minister of Finance expressing support for the overall goals of the Final Report of the Canada-British Columbia Expert Panel on the Future of Housing Supply and Affordability, and requesting that the Province engage with Metro Vancouver member jurisdictions, and other BC municipalities and regional districts, before advancing any of the policy issues and recommendations that have implications for local governments.

EXECUTIVE SUMMARY

The Canada-British Columbia Expert Panel on the Future of Housing Supply and Affordability was established as a joint federal-provincial Panel in 2019 to examine rental and ownership housing supply and to develop actionable recommendations for the Governments of Canada and BC that would increase housing supply and affordability.

This report highlights the policy issues and potential implications of the recommendations made by the Panel, and provides an opportunity to communicate feedback to the Province and request continued engagement with local governments, given the critical role they play in facilitating the supply of affordable housing.

PURPOSE

To inform the Regional Planning Committee and MVRD Board about the recommendations outlined in the Final Report of the Canada-British Columbia Expert Panel on the Future of Housing Supply and Affordability, to identify potential implications for member jurisdictions, and to provide an opportunity to communicate feedback to the Province.

BACKGROUND

In September 2019, the governments of Canada and British Columbia established the Expert Panel on the Future of Housing Supply and Affordability. The Panel's mandate was to examine all supply-side aspects of housing and develop actionable recommendations to create more housing and deepen affordability in British Columbia. Throughout 2020 and early 2021, the Panel consulted with a wide range of groups, including the public, academia, private and non-profit housing providers, property developers, public servants, and elected officials.

In April 2020, Metro Vancouver provided a written submission as part of its initial engagement period (Attachment 1). The Panel published an interim "What We Heard" report in August 2020, followed by the Final Report released on June 17, 2021.

This report summarizes the findings of the Final Report, which include five calls to action and 23 policy recommendations for all levels of government, identifies potential implications for local governments and linkages to Metro Vancouver's ongoing projects, initiatives, and advocacy actions through its Regional Planning and Housing Services function, and provides an opportunity for the MVRD Board to provide comment on the Final Report to the Province.

POLICY ISSUES AND RECOMMENDATIONS

In September 2019, the governments of Canada and British Columbia established the Expert Panel on the Future of Housing Supply and Affordability. The members of the Expert Panel included Joy McPhail (Chair of ICBC and Owner of OUTtv), Jill Atkey (CEO of BCNPHA), Jock Finlayson (Executive VP and Chief Policy Officer of Business Council of BC), Brian McCauley (President and CEO of Concert Properties), Sue Paish (CEO of Canada's Digital Technology Supercluster), and Helmut Pastrick (CEO of Central 1 Credit Union).

The Panel's final report, "Opening Doors: Unlocking Housing Supply for Affordability", categorizes its recommendations into five thematic "calls to action", further elaborated into 23 recommendations, as summarized in Attachment 2. The Panel was specifically tasked with making recommendations to the Federal Government and the Province, and therefore, most of the recommendations are targeted to senior levels of government.

However, many of the recommended actions have direct implications for local government policies, planning, and finances. The recommendations under each "call to action" that are most relevant to local governments and Metro Vancouver are discussed below. Where applicable, policy issues and recommendations that align with projects and initiatives of Metro Vancouver's Regional Planning and Housing Services function have also been identified.

1. Creating a planning framework that proactively encourages housing

This call to action includes seven recommendations targeted primarily at the Province, with direct implications for local government policies and planning:

- *Provincial:* Set statutory time limits for development approvals
- *Provincial:* Require that local governments use anticipated growth numbers outlined in Housing Needs Reports as binding minimum targets
- *Provincial:* Require that local governments update Official Community Plans (OCPs) every 5 years in tandem with Housing Needs Reports and update Zoning Bylaws accordingly (i.e. through pre-zoning)
- *Provincial and local governments:* Implement recommendations of the Development Approvals Process Review (DAPR) report (e.g. provincial review of public hearings process and alternatives, policy review of OCPs with respect to development approvals, consideration of tying development approvals to housing targets)

- *Provincial:* Require that provincial priorities (i.e. those outlined in BC's *30-Point Plan for Housing in BC*) be reflected in OCPs (e.g. minimum density requirements for market and non-market housing development near transit infrastructure)
- *Federal and provincial:* Make new infrastructure investments conditional on local OCPs, Zoning Bylaws, and policies allowing increased density and a mix of housing types. Federal funding for land-use modelling in major urban areas ($60M over 10 years)
- *Provincial:* Development of a province-wide digital development permitting system

Changes to provincial legislation that set the framework for local planning processes would significantly affect Metro Vancouver member jurisdictions; therefore, engagement with local governments on any contemplated changes is essential to their success. Through *Metro 2050*, the draft update to the regional growth strategy, Metro Vancouver has proposed to advocate to the Federal Government and the Province for greater measures to support the coordination of growth, land use, and transportation planning at the regional scale through updates to legislation, regulations, partnerships, plans, agreements, and funding programs.

Housing Needs Reports

In April 2019, legislative requirements came into effect in BC requiring that local governments collect and analyze relevant data and present this analysis in Housing Needs Reports (HNRs) describing the current and anticipated housing needs of their respective jurisdiction every five years. The Panel recommended a stronger role for these provincially-required HNRs, and a stronger connection between municipal OCPs and the estimated need outlined in HNRs, including exploring the use of anticipated growth numbers from HNRs as binding minimum targets for local governments (Recommendations #2 and #3).

Proposed policy changes outlined in *Metro 2050* also emphasize the importance of HNRs and tie several of the regional growth strategy's housing policy outcomes to HNRs. The previously used Housing Demand Estimates have been removed from the draft regional growth strategy on the understanding that the onus should be placed on member jurisdictions' HNRs for the purpose of indicating how member jurisdictions will work towards meeting estimated future housing needs and demand. In addition, *Metro 2050* proposes a new policy action that requires that member jurisdictions review and / or update their housing strategies or actions plans every 5-10 years, in line with HNR updates, to ensure that local housing policy decisions are based on the most recent housing needs, data and market conditions. Given this additional work, should the Province consider advancing this requirement, it should be developed in collaboration with member jurisdictions, including the provision of supportive funding.

A further related recommendation from the Panel was to incorporate an "affordability adjustment" into future HNRs to account for past undersupply and market imbalances due to unaffordability in particular areas. The Panel proposes a methodology to calculate this adjustment and ensure that the measurement of local housing need not only takes into account projected household growth, but also considers the existing undersupply and affordability gap specific to the local housing market in question. Metro Vancouver has committed to assisting its member jurisdictions with the data and information collection required to complete their HNRs, and would be well-positioned to test the use

of this methodology in collaboration with local governments in the region when preparing future HNRs.

Land Use Modelling

The Panel recommended $60 million in federal funding over 10 years to create a robust urban land use modelling system in major urban areas of Canada that would inform decision-making and ensure the timely delivery of benefits from joint infrastructure investments (Recommendation #6). Metro Vancouver is in a strong position to assist with any land use modelling efforts, given its mandate to develop and implement the regional growth strategy, which already requires the preparation and regular update of projections for population, housing, employment and land use to support regional and local planning. Through *Metro 2050*, growth projections are prepared at a regional and sub-regional scale that support local planning and guide land use and infrastructure planning initiatives among Metro Vancouver's utilities, member jurisdictions, TransLink and other regional agencies. Regional Planning also provides those projections at a municipal scale as a core service. In 2021 Regional Planning also received Sustainability Innovation Fund (SIF) funding to undertake a regional land use assessment project which will also provide a centralized regional resource for much of this land use data. However, a challenge associated with such a centralized approach would include how best to consider local context issues or restrictions (e.g. slopes, heritage covenants, environmental development permit areas, view corridors, etc.).

Development Processing Timelines

The Panel concluded that the timelines and complexities of the local government property development approvals processes are a challenge and barrier to providing affordable housing and recommends that improvements be made to proactively encourage new housing. While provincially-imposed processing time limits in Ontario and Alberta are cited as examples, it is noted that, in some cases, those systems have created significant implementation challenges for local governments. Any imposed timelines must be realistic and account for: the necessary steps in the approvals processes to engage the public and consider the technical aspects (i.e. required supporting studies / materials) and impacts of any proposed development; the limitations of council meeting timelines and schedules; workloads and staff resources available / costs; OCP and council priorities; defining what constitutes a "complete application" or sufficient information needed to consider a development proposal; the processing delays caused by applicants; and mechanisms and implications of enforcement of the timelines. Overly restrictive timelines would also have impacts on those parcels that may require additional scrutiny in an approvals process such as those that may have unique environmental concerns, within heritage districts, require design panel review, or other existing development permit area requirements.

Updating Zoning to Reflect Infrastructure Planning

The Panel recommended that the Province require all local governments to proactively update and orient zoning bylaws and infrastructure planning to reflect OCPs as widely and as rapidly as possible; the reliance on privately-initiated site-specific (spot) rezoning should be discouraged. Spot-rezonings are often used by local governments to tailor a parcel's zoning to specific needs of a development; if pre-zoning becomes a requirement, local governments will be limited in their ability to take advantage of good development proposals if it doesn't fit with the current zoning that may have been

introduced years prior, and have to rely on the variance or development permit processes. It is also noted that rezoning applications trigger public engagement requirements once specific development details are known (e.g. parking, landscaping, access, etc.); involvement of those members of the public who are directly impacted by land development projects would be limited or excluded if pre-zoning is widely introduced. Furthermore, infrastructure needs and other development related requirements such as road dedications, public amenities, site engineering issues, etc. that are associated with a particular development are not often known in advance of development applications being submitted.

2. Reforming fees on property development

This call to action includes four recommendations targeted primarily at the Province, with direct implications for local government policies and planning:

- *Local governments*: Advance designation and prioritization of infrastructure needs and amenity preferences, and the associated share of costs to be generated through development charges (instead of negotiated through rezoning)
- *Provincial*: Phase out Community Amenity Contributions (CACs) and expand definition of Development Cost Charges (DCCs)
- *Provincial*: Conduct review of local government revenue sources and responsibilities and consider additional or enhanced funding sources that are more predictable and do not rely on rezoning / development process
- *Federal and provincial*: Create a municipal housing incentive program rewarding net new housing supply where it is needed

The recommendation to move away from negotiated zoning-based development fees such as CACs in favour of funding a wider list of infrastructure and amenities through DCCs would be a major shift in the way that local governments finance growth in their communities. Furthermore, there are many indirect "soft" costs of new development that impact local governments that are not infrastructure-related and not currently DCC-eligible (e.g. library, parks, recreation, fire, police, etc.).

If there is a focus on moving to the greater use of DCCs, then any future legislation will need to contemplate both local government hard and soft costs. In addition, research undertaken as part of Metro Vancouver's *Transit-Oriented Affordable Housing Study* explains some of the benefits and challenges of the use of CACs to achieve affordable housing supply through rezoning, noting some of the ways that the tool could be improved, such as: greater transparency, advanced planning, and clearly defined priorities when communicating desired public benefits and affordable housing priorities. Along with local government impacts, expanding the scope of DCCs may constrain the ability of other agencies such as the *Greater Vancouver Sewerage & Drainage District, Greater Vancouver Water District* or TransLink to collect revenues that support regional services such as transit infrastructure, sewerage system expansion, and water infrastructure. Given the impact on local government finances, and the range of amenities funded by property development fees, reforming these fees or any local government revenue sources and spending responsibilities would require careful collaboration and consultation with regional districts and local governments.

3. Expanding the supply of community and affordable housing

This call to action includes five recommendations, targeted primarily at the Federal Government and the Province, that call for a return to Canada's historically high levels of community housing construction and federal funding commitments.

- *Federal and provincial*: Create an acquisition fund to enable non-profit housing organizations to acquire currently affordable housing properties. Exempt non-profit organizations from the provincial property transfer tax for affordable housing building acquisitions
- *Federal*: Make long-term funding commitments for community and affordable housing rather than short-term capital grants
- *Federal and provincial*: Provide more dedicated money to the community housing sector, increase contributions relative to loans under current National Housing Strategy (NHS) programs, and tie federal funding allocations to provinces to levels of core housing need.
- *Federal, provincial, local governments*: Undertake land assembly and provide long-term leases to private and non-profit developers of affordable housing
- *Federal*: Amend the *Income Tax Act* to enable charitable housing providers to undertake mixed-income housing developments

Specific recommendations such as the creation of an acquisition fund to enable non-profit housing organizations to acquire currently affordable housing properties (Recommendation #12) are consistent with previous advocacy and written input provided to the Panel by Metro Vancouver. Making long-term portfolio-based funding commitments for community and affordable housing rather than short-term capital grants (Recommendation #13) is an action that would facilitate the implementation of the *Metro Vancouver Housing 10-Year Plan,* and that aligns with proposed policies put forward in *Metro 2050*.

As the Panel's report states, several local governments in BC and in Metro Vancouver are already providing land at nominal cost and through long-term leases to private and non-profit developers of affordable housing as recommended by the Panel (Recommendation #15). To further expand this practice in this region, Metro Vancouver Housing (MVH) has initiated two Expressions of Interest for member lands on which to construct new affordable rental housing in partnership with member jurisdictions.

4. Improving coordination among and within all orders of government

This call to action includes four recommendations targeted at all levels of government, that are focused on expanding and improving federal housing programs and funding.

- *Federal*: Move forward with co-developing an urban, rural and northern housing strategy
- *Federal and provincial*: Expand funding and streamline application processes (e.g. expand debt ceilings for programs providing financing support to affordable housing developments, set funding limits based on proponent demand)
- *Federal and provincial*: Provide greater flexibility to align affordable housing program requirements with those of other program providers (i.e. CMHC and BC Housing)

- *Local governments*: Offer density bonuses to affordable housing developers that receive federal and provincial construction and redevelopment funding (e.g. to incent longer-term or deeper affordability criteria)

The Panel did not specifically identify Regional Districts or regional growth strategies as a tool to support greater housing supply and affordability through local government coordination and collaboration. The recommendation to provide greater flexibility in affordable housing funding programs (Recommendation #19) aligns with *Metro 2050*'s proposed advocacy actions, and would facilitate the implementation of the *Metro Vancouver Housing 10-Year Plan*. The Panel suggests that local governments could offer density bonusing to affordable housing projects that are funded through federal and provincial programs to deepen affordability (Recommendation #20), which local governments may already be doing for below-market projects that meet specific criteria.

The Panel also recommended that to better address housing needs in Indigenous communities and support Indigenous-led housing initiatives, the Federal Government should move forward with co-developing an urban, rural and northern housing strategy, and sufficiently fund the three distinctions-based Indigenous housing strategies. There are other issues associated with development on First Nations lands that don't appear to have been considered by the Panel in particular, consideration of the supports for needed infrastructure and interconnectivity with surrounding communities, as well as engagement in shared planning interests for mutual benefit.

5. Ensuring more equitable treatment of renters and homeowners

This call to action includes three recommendations targeted at the Federal Government and the Province that propose changes to provincial and federal tax policies and programs available to homeowners.

- *Federal and provincial*: Make changes to tax programs to ensure more equitable treatment of renters and homeowners (e.g. reviewing the impact of the capital gains tax exemption on principal residences, extending comparable fiscal support to other forms of wealth building)
- *Federal*: Provide tax savings measures to renters to help offset the favourable tax treatment of ownership (e.g. tax deductibility or tax credits for annual rent paid, renter's tax-free savings account (TFSA) contribution amount)
- *Provincial*: Phase out Home Owner Grant and redirect these savings to fund more social housing

Metro Vancouver studies have documented the challenges faced by renter households in accessing affordable housing, particularly in transit-oriented locations. For example, the *Transit-Oriented Affordable Housing Study* and *Housing and Transportation Cost Burden Study* found that renter households, on average, use transit at higher rates than owner households, and that renter and lower income families carry disproportionately high housing and transportation cost burdens. From a regional planning perspective, there is a compelling case for social and financial supports, targeted toward renter households, that enable renters to build wealth and minimize housing and transportation costs.

Metro Vancouver has also undertaken research to explore ways to make homeownership more attainable, including examining existing models and best practices for attainable and affordable homeownership programs that target entry-level home buyers, rather than relying on market-driven demand. Goal 4 of the draft *Metro 2050* encourages increased diversity of housing tenure options, such as attainable homeownership, rental, co-op housing, rent-to-own models, and cohousing.

NEXT STEPS

Though primarily aimed at the Federal Government and the Province, many of the Panel's recommendations have implications for local governments. Metro Vancouver staff will have discussions with the Regional Planning Advisory Committee (RPAC) and the RPAC Housing Subcommittee to determine the viability and impacts of the Panel's policy recommendations, and identify any that might be suitable for further study or advocacy by Metro Vancouver on behalf of its member jurisdictions.

Given the key role that local governments play in supporting affordable housing, it is recommended that the MVRD Board send a letter to the Province expressing general support for the goals outlined in the Final Report, and the overall objective of increasing housing supply and affordability, and request that the Province consult with Metro Vancouver and its member jurisdictions prior to any of the policy recommendations pertaining to local government responsibilities being explored further.

ALTERNATIVES

1. That the MVRD Board send a letter to the Minister of Municipal Affairs, the Attorney General and Minister Responsible for Housing, and the Minister of Finance expressing support for the overall goals of the report, and requesting that the Province engage with Metro Vancouver member jurisdictions, and other BC municipalities and regional districts, before advancing any of the policy issues and recommendations that have implications for local governments.

2. That the MVRD Board receive the report dated October 12, 2021, titled "Final Report of the Canada-British Columbia Expert Panel on the Future of Housing Supply and Affordability" and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

There are no direct financial implications resulting from this report.

CONCLUSION

This report summarizes the policy issues and recommendations outlined in the final report of the Canada-British Columbia Expert Panel on the Future of Housing Supply and Affordability, a joint federal-provincial panel whose mandate was to examine all aspects of housing supply, and make actionable recommendations to the Federal Government and the Province to increase housing supply and affordability. This report provides staff commentary on the policy issues and recommendations outlined by the Panel, summarizes the Panel's recommendations, identifies potential implications for local governments, and highlights the policy issues that most closely align with Metro Vancouver's projects and initiatives, along with potential opportunities for further examination of these policy ideas in collaboration with member jurisdictions. Staff will convene discussions with RPAC and the

RPAC Housing Subcommittee to further evaluate the Panel's proposed policy ideas in terms of impacts on local planning practices and applicability in the Metro Vancouver region.

Attachments *(48587805)*

1. "Submission to the Expert Panel on the Future of Housing Supply and Affordability", dated April 2, 2020
2. Summary of Expert Panel Calls to Action and Recommendations

References

1. Opening Doors: Unlocking housing supply for affordability – Final report of the Canada-British Columbia Expert Panel on the Future of Housing Supply and Affordability
2. What We Heard – Interim report of the Canada/British Columbia Expert Panel on the Future of Housing Supply and Affordability

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

Office of the Commissioner/Chief Administrative Officer
Tel. 604 432-6210 Fax 604 451-6614

April 2, 2020

Expert Panel on the Future of Housing Supply and Affordability
VIA EMAIL: experthousingpanel@gov.bc.ca

Dear Sir or Madam:

Submission to the Expert Panel on the Future of Housing Supply and Affordability

Metro Vancouver is pleased to submit this written submission to the Expert Panel on the Future of Housing Supply and Affordability consultation process. The attached staff comments detail the impacts of limited housing diversity and affordability in the Metro Vancouver region, particularly rental housing, and suggest actions for the provincial and federal government to ensure that all residents have access to a suitable and secure place to call home.

Metro Vancouver is a partnership of 21 municipalities, one Electoral Area and one Treaty First Nation that collaboratively plans for and delivers regional-scale services. Metro Vancouver also regulates air quality, plans for urban growth, manages a regional parks system and provides affordable housing through its non-profit housing corporation. As one of the region's largest affordable housing providers, Metro Vancouver Housing provides over 3,400 safe and affordable rental homes for more than 9,400 people on 49 sites. Our sites are diverse, mixed-income communities, primarily for families, seniors, and people with disabilities. Metro Vancouver Housing offers a range of homes, from SRO units to four-bedroom townhomes, at below-market rates and rates based on tenants' incomes.

As outlined in the *Board Strategic Plan (2019-2022)*, Metro Vancouver seeks to ensure complete and livable communities by encouraging and protecting affordable housing, particularly rental housing in transit-oriented locations. Through its Regional Planning and Housing Services functions, Metro Vancouver is implementing several plans and strategies to address regional housing objectives, including *Metro Vancouver 2040: Shaping Our Future* (*Metro 2040*), the regional growth strategy, the *Regional Affordable Housing Strategy*, and the *Metro Vancouver Housing 10-Year Plan*.

To this end, Metro Vancouver, through its Regional Planning and Housing Services Department, is:

- Investing $190 million in affordable housing over the next 10 years. This includes $90 million in renewing and enhancing existing housing and another $100 million to develop new affordable housing.
- Undertaking a comprehensive update to *Metro 2040* to prioritize climate change, social equity and housing action.
- Undertaking policy and best practices research to support affordable housing, for example, *What Works: Securing Affordable and Special Needs Housing through Housing Agreements*

(2020), the *Transit-Oriented Affordable Housing Study* (2019), *Regional Parking Study* (2018), and *Housing and Transportation Cost Burden Study* (2015).

In the past several years, both provincial and federal governments have made significant historic investments and commitments to affordable housing. The release of housing strategies, funding programs, and new legislation have provided a major catalyst for new housing development, as well as innovative policies and tools to support affordable housing and lower-income households. To build on this success, Metro Vancouver recommends a number of actions at the provincial and federal levels to support the following goals:

1. Preserve and renew existing rental housing;
2. Redevelop existing rental housing, while protecting tenants;
3. Develop new rental housing; and,
4. Reduce demand on rental housing.

This letter and the attached comments present the views of Metro Vancouver staff and have not been reviewed or endorsed by the Metro Vancouver Board of Directors. Metro Vancouver appreciates the opportunity to provide comments to the Expert Panel on the Future of Housing Supply and Affordability and looks forward to responding to proposed provincial and federal housing supply and affordability actions in the future.

If you have any questions regarding these comments, please contact Laurel Cowan, Program Manager, Housing Planning and Policy, Regional Planning and Housing Services, by email at Laurel.Cowan@metrovancouver.org or by phone at 604-451-6510.

Yours Sincerely,

Jerry W. Dobrovolny, P. Eng., MBA
Commissioner/Chief Administrative Officer

JWD/HC/lc

Encl:

1. Comments dated April 1, 2020 titled "Metro Vancouver Submission to the Expert Panel on the Future of Housing Supply and Affordability" *(Doc# 38203993)*
2. Metro Vancouver Housing – Backgrounder *(Doc# 38209344)*
3. *Metro 2050* – Backgrounder *(Doc# 38215732)*

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Metro Vancouver Submission to the Expert Panel on the Future of Housing Supply and Affordability

Metro Vancouver staff highlight the following goals and recommendations to encourage housing supply and affordability within the region and beyond. Recommendations are focused primarily on various forms of rental housing, where increasing and preserving the supply can have the greatest impact on affordability, particularly for lower income households.

1. Preserve and renew existing rental housing		
Goal	**Recommendations**	**Impact**
Preserve and renew existing rental housing stock while maintaining affordability	• Continue and enhance provincial and federal funding programs to support property owners/operators to renew and repair existing rental housing • Provide provincial policy guidance or establish a provincial program for acquisition of rental housing in need of major rehabilitation (e.g., where the existing property owner can no longer support regular maintenance or major repair) • Explore ways to support the transition of existing private rental into non-profit or co-op ownership	New construction alone cannot keep up with the demand for rental units, and new housing units typically rent at a higher cost. Therefore, the renewal of existing rental housing is a significant opportunity for preventing the loss of affordable units. Currently, the ability of housing providers to fund major capital projects and maintenance without resultant rent increases is challenging. Furthermore, protection and preservation of existing housing prevents tenant displacement and maintains existing land use patterns.
Preserve and renew existing rental housing stock while maintaining tenancies	• Require proof of permits as part of the Notice to End Tenancy for major renovations through the *Residential Tenancy Act* (*RTA*) • Continue to educate landlords and tenants on the types of renovations and upgrades that can be performed while maintaining tenancies, and tenants' rights under the *RTA* with respect to ending a tenancy for renovation or repair	Renovations or repairs must be very extensive and require the unit to be empty in order in order to end tenancies under the *RTA*, even so, if the tenant is willing to move out for the duration of the renovation, the tenancy should still be maintained. Ensuring that landlords and tenants understand that in most cases tenancies can continue during renovations or repairs is key to preventing tenant displacement, while renewing existing rental housing stock.
Support non-profit housing providers with expiring Operating Agreements	• Work with non-profit and cooperative housing providers to secure long-term funding / ongoing operating subsidies to ensure preservation of non-profit and cooperative housing	The existing stock of non-profit and cooperative housing that were originally developed under provincial Operating Agreements are aging. Operators, especially those serving very low income households and/or vulnerable populations, need to be supported to ensure that they can continue to maintain and preserve the same level of safe and secure housing.

Increase accessibility, sustainability, and safety of existing rental housing	• Align provincial and federal funding programs and requirements to support layered funding for major repair and renewal projects • Enhance flexibility and balance accessibility and sustainability requirements to ensure financial viability, especially for non-market and cooperative housing that have limited income from rental revenues	Existing rental housing (including private, non-market, and cooperative housing) is aging and in need of retrofits and upgrades to meet modern seismic standards, and energy codes, and to enhance accessibility, sustainability, and safety of housing. Funding programs exist to support property owners with renewal projects; however, some older buildings may not be able to meet program requirements (e.g., accessibility). Greater flexibility in meeting program objectives will lead to greater project viability for developers and operators.
2. Redevelop existing rental housing while protecting tenants		
Goal	**Recommendations**	**Impact**
Ensure tenant protection and support	• Continue to provide support to tenants and landlords through the Residential Tenancy Branch and relevant updates to the *Residential Tenancy Act* (*RTA*) • Track renovictions/demovictions across BC, and share data with local governments • Work with housing stakeholders to explore potential for shared swing spaces for temporary tenant relocation during redevelopment, particularly for lower income households and vulnerable populations	In Metro Vancouver and other parts of BC, there is increasing pressure on tenants as a result of redevelopment, including renoviction and demoviction. Support for tenants, landlords, and local governments through the Residential Tenancy Branch and supportive policy/legislation is key to ensuring that tenant protection is maintained.
Increase the supply of rental housing through redevelopment	• Continue and enhance funding and financing to support market and non-market rental redevelopment (e.g. low-interest loans, capital contributions, operating subsidies), paired with requirements for maintaining tenancies and affordability • Explore the limited use of fixed-term leases by non-profit housing providers, to prevent units from remaining vacant during redevelopment, and support temporary tenant relocation	While new rental housing is often less affordable than existing housing, increasing the overall supply helps to reduce pressure which supports overall affordability. Where existing rental buildings are in need of significant investment, and there is potential for additional density, there is an opportunity for redevelopment. Tenant protection (relocation and compensation) can help to ensure that existing tenants are supported throughout the process to find suitable and affordable homes.
3. Develop new rental housing		
Goal	**Recommendations**	**Impact**
Stimulate market rental housing supply	• Continue and enhance funding programs and incentives to encourage market rental development (e.g. GST exemption for affordable rental units, low interest loans to support new rental construction, etc.)	Until recently, there has been very limited supply of new rental created since the early 1980s. This lack of new rental supply has created a backlog of demand which is further increased in areas where moderate income households are priced out of homeownership. This overall demand for rental housing results in low vacancy rates, particularly for affordable

	• Provide guidance and best practice research on municipal incentives to support and encourage market rental development • Remove barriers of land and construction costs (e.g. ongoing incentives and grants for energy efficient building, support for expedited development approvals processes, increased labour availability)	rental options. New purpose-built market rental supply can relieve pressure on the overall rental supply, and provide suitable and secure housing for those who cannot attain homeownership, but do not require affordable rental housing.
Stimulate non-market rental housing supply	• Continue and enhance funding and financing programs for non-market housing (e.g. low-interest loans, capital contributions, operating subsidies, etc.) • Continue and enhance incentives to encourage non-market rental development (e.g. taxation policies, GST exemptions, etc.) • Encourage local governments to adopt Inclusionary Housing policies to secure affordable rental housing through new development • Remove barriers of land and construction costs (e.g. provision of surplus provincial / federal land for affordable housing, ongoing incentives and grants for energy efficient building, support for expedited development approvals processes, increased labour availability)	Substantial funding commitments from provincial and federal levels of government is needed to expand the supply of non-market rental housing supply, and ensure that this type of housing can be built. Additional funding and incentives will ensure that units are available for low-income residents.
Target new rental housing starts to households with low to moderate incomes	• Prioritize affordability criteria in funding programs to reduce the number of households in core housing need	To meet the region's forecasted population growth, an estimated 5,400 new rental units are needed every year, with over 80% of these for very low to moderate income households. Nearly 60% of all rental households in Metro Vancouver have very low (<$35,000/year) or low incomes (<$60,000/year), making it difficult to find housing that is affordable for them.
Secure new affordable rental units for low income families, seniors and households with special housing needs	• Increase support and incentives to build transitional / supportive / social housing • Encourage the use of housing agreements to secure affordable and special needs housing (Section 483 *Local Government Act*) • Continue to address key drivers of homelessness through programs that address poverty, mental health and addiction	Waitlists for social housing in BC have almost doubled in the past 10 years and the Metro Vancouver region represents two-thirds of the provincial need with over 12,000 applicants. Increasing support for affordable and special needs housing is essential to support our most vulnerable residents.

Encourage gentle density / missing middle housing	• Evaluate the impacts of the use of Residential Rental Tenure Zoning in BC, and develop best practice guidance for local governments • Continue to provide best practice research and policy guidance to support local governments to encourage gentle density	Residential development has favoured single-detached homes and multi-family housing in high density forms, with very little ground oriented multi-family housing like duplexes, triplexes, and townhouses, termed the "missing middle", gentle density adds critical supply to the housing stock, taking pressure off of other parts of the housing continuum.
Support transit-oriented affordable housing	• Provide incentives to retain and expand the supply of rental housing in transit-oriented locations as new transportation corridors are developed • Explore Land Value Capture mechanisms as a means to generate funds to invest in new affordable rental housing • Support efforts to establish a revolving, low-interest loan fund to support Transit-Oriented Affordable Housing in the Metro Vancouver region • Encourage the use of housing agreements and Residential Rental Tenure Zoning in transit-oriented locations	Conversations about affordability in the Metro Vancouver region must include both housing and transportation costs. The Metro Vancouver *Transit-Oriented Affordable Housing Study* and *Housing and Transportation Cost Burden Study* outline the high household burden many renters face when housing and transportation costs are considered together, and the positive impacts of co-locating affordable rental housing in good transit locations. There have been unintended consequences resulting from major new transit investments in urban areas (e.g. raising property values at station areas), therefore, it is important that there are the necessary financial supports to ensure there are opportunities to build affordable rental housing near frequent transit.
Promote partnerships and coordinate funding	• Align provincial and federal funding programs and requirements to support layered funding • Work with municipalities to ensure alignment of municipal lease/housing agreements and provincial operating agreements	Funding programs provide much needed support for the development of new rental housing, particularly for non-profits. Aligning provincial and federal program requirements, as well as municipal and provincial agreements, will help to streamline partnerships and support new housing projects to get on the ground faster.
Support expedited development approvals processes	• Support local governments to improve the development approvals process through provincial opportunities identified by the 2019 Development Approvals Process Review, including training and best practices to optimize processes, provincial funding for local government digital permit systems, and establishment of standardized/provincial application timeframes	Accelerating the construction of affordable housing through effective development approvals processes at the local level will have a significant impact on the private and non-profit development sector's ability to introduce new supply.
Build community support / education	• Provide tools and support to local governments to encourage community acceptance of non-market housing • Review public hearing requirements and consider alternative options for more meaningful, earlier public input and in different formats (e.g. online tools)	As local governments and stakeholders strive to deliver more non-market housing in their communities, some are facing resistance from community members. Public education and tools to better engage with and respond to community resistance will promote the development of safe, secure and affordable housing for those most in need.

4. Reduce demand on rental housing		
Goal	**Recommendations**	**Impact**
Address the financialization of housing and reduce speculation	• Continue to explore measures to address foreign and domestic speculation • Continue to address the impacts of short-term rentals on affordable housing supply	Available data suggest that BC housing prices have been driven up by investor demand and speculation. While this has created wealth for existing homeowners, it has also placed the possibility of purchasing a home out of reach for many British Columbians. This in turn creates pressure on the rental stock and other forms of housing, increasing competition for an ever-smaller number of units for moderate to low-income individuals and families.
Consider the housing needs of a growing and changing population	• Monitor the impact of non-permanent resident and student demand on existing rental housing supply • Encourage and support the creation of new student housing, particularly by universities and colleges who want to build affordable student housing • Continue to monitor and explore the housing needs of an aging population and changing family structures (e.g. aging-in-place, intergenerational living, lock-off suites, laneway/coach houses)	The Metro Vancouver region is expected to continue to grow by over 35,000 residents per year. Growth is being driven by various factors, and leading to various typed on housing needs (i.e. family housing for immigrant families, and smaller and more accessible homes to support an aging population). Data indicates a substantial number of non-permanent residents are located in Metro Vancouver at various points in time during the calendar year and are not captured in the Census count. These can be non-permanent usual residents missed by the Census (undercount) or persons that do not have a usual residence in Metro Vancouver on Census day (i.e. students in dormitories during the academic term). This additional population may have significant implications for Metro Vancouver housing, transportation and other factors. Monitoring and responding to changing housing needs is key to ensuring that communities do not have a mismatch between their housing demand and available supply.
Explore options to move renters into ownership housing	• Encourage and incentivize affordable homeownership and rent-to-own projects • Advocate for an increase in the total annual qualifying income ($120,000) and total borrowing amount ($480,000) to qualify for a shared-equity mortgage through the CMHC First-Time Home Buyer Incentive in Metro Vancouver and other urban regions with high home prices	With high prices preventing many people from homeownership, the pressure on the rental market has grown. New households in the Metro Vancouver region are increasingly renting rather than owning, further driving the demand for rental housing. Moving those who are interested in homeownership along the housing spectrum can reduce some of the pressure on rental housing stock.

Metro Vancouver Housing

METRO VANCOUVER HOUSING SITE

Metro Vancouver Housing provides safe and affordable mixed-income rental homes, primarily for families, seniors, and people with special housing needs.

A trusted non-profit housing provider since 1974, Metro Vancouver Housing partners with governments, community organizations, other non-profits, and tenants to support inclusive and engaged communities.

Metro Vancouver Housing 10-Year Plan

The *Metro Vancouver Housing 10-Year Plan* provides a vision and framework to guide how Metro Vancouver Housing will *provide*, *preserve*, and *expand* affordable housing in the region.

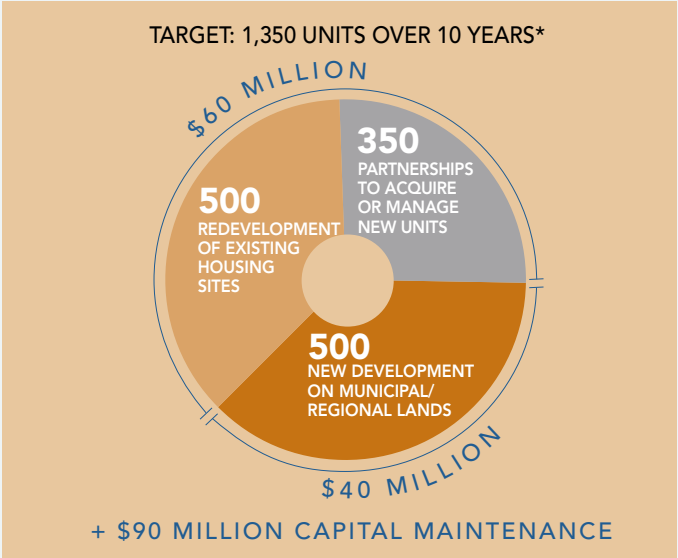
Supporting Provincial and Federal Housing Programs

Metro Vancouver Housing targets strongly align with Provincial and Federal program requirements, including:

- Mixed-income affordability
- Financial sustainability
- Accessibility
- Energy reduction
- Greenhouse gas emission reduction
- Step Code

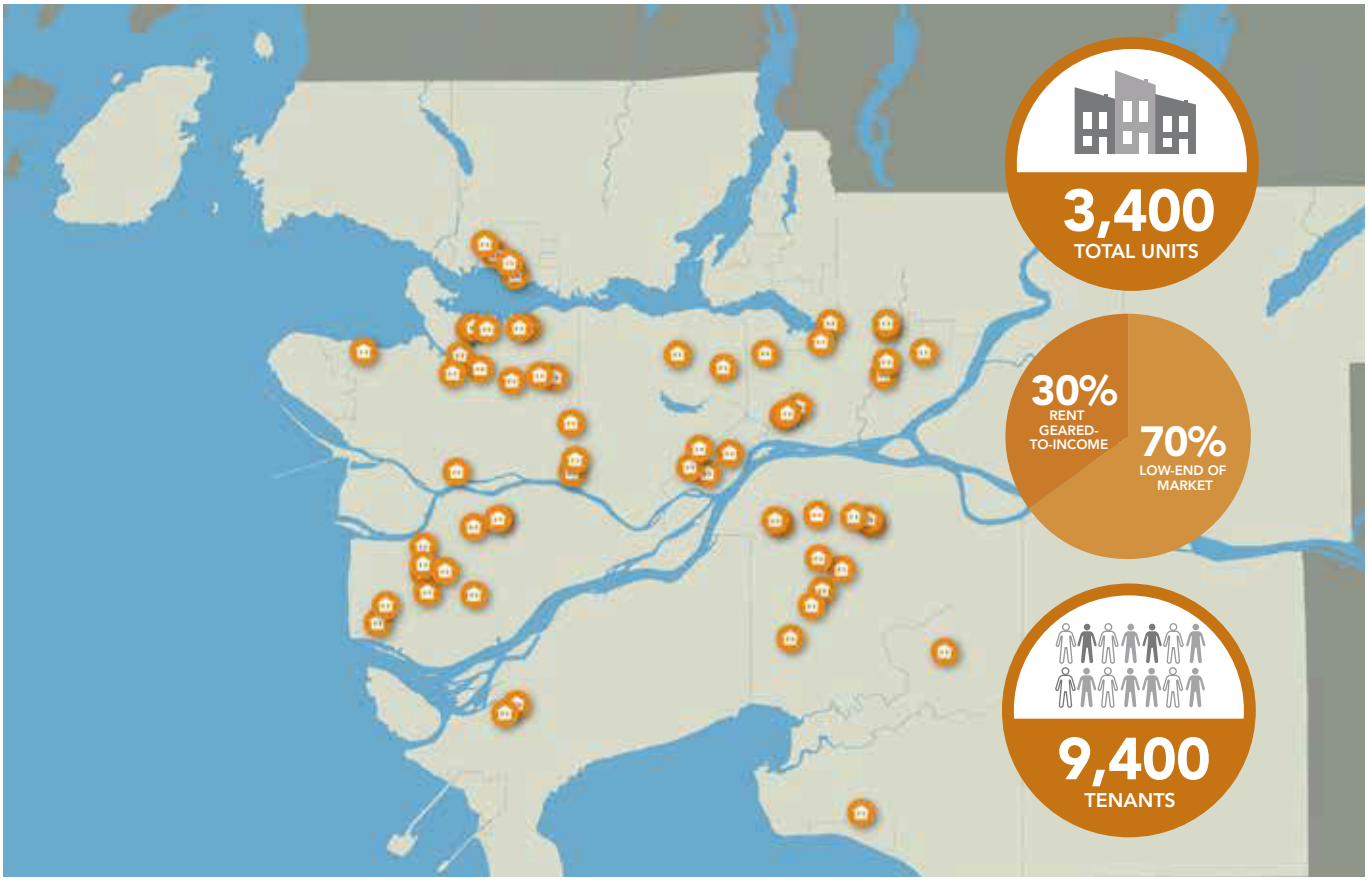
Funding New Affordable Housing

To support the *10-Year Plan*, Metro Vancouver Housing intends to invest $190 million over the next decade to renew and expand its stock of affordable rental housing across the region.



Leveraging Investment

These targets outline what Metro Vancouver Housing aims to achieve through its funding sources and partnerships with local governments. Additional funding through BC Housing and CMHC could further leverage this investment and create even more affordable rental units across the region.



METRO VANCOUVER HOUSING

- $100 million cash equity for development
- $923 million portfolio asset value

+

LOCAL GOVERNMENT

- Leased land
- Pre-zoning
- Expedited approvals and other incentives

+

PROVINCIAL & FEDERAL

Funding programs to support more housing units and improve affordability.

Implementing the Plan

The *Metro Vancouver Housing 10-Year Plan* includes key goals and actions to support operations, maintenance, development and partnerships.

Current projects include:

- **Expanding annual tax requisition funding** to $5 million per year to provide ongoing funding to support redevelopment of existing sites and new development on municipal lands.
- **Issuing an Expression of Interest for municipal leased lands** to support new Metro Vancouver Housing development across the region.
- **Creating a Redevelopment Plan** to assess and prioritize all existing Metro Vancouver Housing sites for renewal or redevelopment over time.
- **Investing $90 million in capital maintenance** over the next 10 years including major rehabilitation projects and ongoing capital maintenance to extend the lifespan of existing buildings.
- **Undertaking redevelopment projects** and exploring new housing sites to increase the number of units in the portfolio (four projects underway).

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Metro 2050

Metro Vancouver welcomes about 35,000 people to the region each year, putting pressure on the region's already constrained land base, which is bordered on three sides by mountains, the ocean and the USA. Addressing this challenge requires innovative land use and transportation choices from Metro Vancouver and its member jurisdictions.

How We Plan for Growth

A comprehensive growth management strategy is vital for protecting the region's environment and quality of life, especially in the face of challenges like population growth, aging infrastructure, rapid technological advancements and climate change.

Since the 1960s, the regional district has worked with its members to develop a series of long-range plans that set a shared vision and empower us to build toward it. These long-range plans are critical to ensuring that growth happens in a structured way that supports our common goals and values.

The current regional growth strategy, *Metro Vancouver 2040: Shaping our Future*, was adopted in 2011 by all member jurisdictions, adjacent regional districts, TransLink, and the Metro Vancouver Board. It has provided an effective collective vision for how to manage growth anticipated to our region in a way that:

- **puts growth in the right places** (Urban Centres and along transit corridors),
- **protects important lands** (agricultural, industrial and conservation & recreation), and
- **supports the efficient provision of urban infrastructure** (utilities and transit).

Metro 2040 also supports the provision of diverse and affordable housing, better mobility, complete communities, and a vibrant regional economy and has provided a set of effective tools such as an Urban Containment Boundary, an Urban Centre and Transit Corridor network, long range projections for population, housing and employment, parcel based land use designations, and Sewerage Extension Policies, to sustainably manage growth.

Metro 2050

After close to ten years of implementation, Metro Vancouver is updating the regional growth strategy to extend its timeline to 2050, integrate with TransLink's update to the Regional Transportation Strategy, and to incorporate updated policies to better address issues such as climate change, social equity, the importance of linking affordable housing to transit, and protection of sensitive ecosystems. The update will be called *Metro 2050*, and is anticipated to be complete in mid 2022. Metro Vancouver anticipates having a draft circulated for comment by the end of Q1, 2021.

Metro Vancouver's engagement strategy for *Metro 2050* has four streams of engagement for: strategy signatories, regional stakeholders, First Nations and the public. In 2019, Metro Vancouver partnered with TransLink on a survey of residents on their vision and values for the future of the region with over 31,000 responses, provided Council workshops to member jurisdictions, struck an Intergovernmental Advisory Committee, and has developed a project webpage with comment forms. In 2020, Metro Vancouver hosted a public dialogue series with speakers from member municipalities, TransLink and Metro Vancouver. More than 400 people attended, from students to seniors, industry representatives and NGOs. Much of the engagement is being undertaken through a series of 11 technical policy reviews focusing on policy areas such as housing, centres and corridors, industrial and employment lands, agriculture, and complete communities.

SUMMARY OF EXPERT PANEL CALLS TO ACTION AND RECOMMENDATIONS

Calls to Action	Recommendations
1. Creating a planning framework that proactively encourages housing	1. *Provincial:* Set statutory time limits for development approvals 2. *Provincial:* Require that local governments use anticipated growth numbers outlined in Housing Needs Reports as binding minimum targets 3. *Provincial:* Require that local governments update Official Community Plans (OCPs) every 5 years in tandem with Housing Needs Reports and update Zoning Bylaws accordingly (i.e. through pre-zoning) 4. *Provincial and local governments:* Implement recommendations of the Development Approvals Process Review (DAPR) report (e.g. provincial review of public hearings process and alternatives, policy review of OCPs with respect to development approvals, consideration of tying development approvals to housing targets) 5. *Provincial:* Require that provincial priorities (i.e. those outlined in BC's *30-Point Plan for Housing in BC*) be reflected in OCPs (e.g. minimum density requirements for market and non-market housing development near transit infrastructure) 6. *Federal and provincial:* Make new infrastructure investments conditional on local OCPs, Zoning Bylaws, and policies allowing increased density and a mix of housing types. Federal funding for land-use modelling in major urban areas ($60M over 10 years) 7. *Provincial:* Development of a province-wide digital development permitting system
2. Reforming fees on property development	8. *Local governments*: Advance designation and prioritization of infrastructure needs and amenity preferences, and the associated share of costs to be generated through development charges (instead of negotiated through rezoning) 9. *Provincial*: Phase out Community Amenity Contributions (CACs) and expand definition of Development Cost Charges (DCCs) 10. *Provincial*: Conduct review of local government revenue sources and responsibilities and consider additional or enhanced funding sources that are more predictable and do not rely on rezoning / development process 11. *Federal and provincial*: Create a municipal housing incentive program rewarding net new housing supply where it is needed

3. Expanding the supply of community and affordable housing	12. *Federal and provincial*: Create an acquisition fund to enable non-profit housing organizations to acquire currently affordable housing properties. Exempt non-profit organizations from the provincial property transfer tax for affordable housing building acquisitions 13. *Federal*: Make long-term funding commitments for community and affordable housing rather than short-term capital grants 14. *Federal and provincial*: Provide more dedicated money to the community housing sector, increase contributions relative to loans under current National Housing Strategy (NHS) programs, and tie federal funding allocations to provinces to levels of core housing need. 15. *Federal, provincial, local governments*: Undertake land assembly and provide long-term leases to private and non-profit developers of affordable housing 16. *Federal*: Amend the *Income Tax Act* to enable charitable housing providers to undertake mixed-income housing developments
4. Improving coordination among and within all orders of government	17. *Federal*: Move forward with co-developing an urban, rural and northern housing strategy 18. *Federal and provincial*: Expand funding and streamline application processes (e.g. expand debt ceilings for programs providing financing support to affordable housing developments, set funding limits based on proponent demand) 19. *Federal and provincial*: Provide greater flexibility to align affordable housing program requirements with those of other program providers (i.e. CMHC and BC Housing) 20. *Local governments*: Offer density bonuses to affordable housing developers that receive federal and provincial construction and redevelopment funding (e.g. to incent longer-term or deeper affordability criteria)
5. Ensuring more equitable treatment of renters and homeowners	21. *Federal and provincial*: Make changes to tax programs to ensure more equitable treatment of renters and homeowners (e.g. reviewing the impact of the capital gains tax exemption on principal residences, extending comparable fiscal support to other forms of wealth building) 22. *Federal*: Provide tax savings measures to renters to help offset the favourable tax treatment of ownership (e.g. tax deductibility or tax credits for annual rent paid, renter's tax-free savings account (TFSA) contribution amount) 23. *Provincial*: Phase out Home Owner Grant and redirect these savings to fund more social housing

To: Regional Planning Committee

From: Heidi Lam, Senior Policy and Planning Analyst, Regional Planning and Housing Services

Date: October 5, 2021 Meeting Date: November 5, 2021

Subject: ***Metro Vancouver 2040: Shaping our Future* - 2020 Annual Performance Monitoring Report**

RECOMMENDATION

That the MVRD Board receive for information the report dated October 5, 2021, titled "*Metro Vancouver 2040: Shaping our Future* - 2020 Annual Performance Monitoring Report", and direct staff to forward a copy to the Province of BC's Ministry of Municipal Affairs, Local Government Division.

EXECUTIVE SUMMARY

The *Local Government Act* and *Metro Vancouver 2040: Shaping our Future (Metro 2040)* require the preparation of an annual report on the regional growth strategy's progress. The 2020 Annual Performance Monitoring Report provides a summary update on the performance measures with relevant annual change and available data. A complete profile of *Metro 2040*'s performance measures with a detailed data breakdown is available in the *Metro 2040* Performance Monitoring Dashboard on the Metro Vancouver website (Reference 1).

PURPOSE

To provide the Regional Planning Committee and MVRD Board the 2020 annual performance monitoring report of the region's performance toward the goals of *Metro 2040*. This is based on the key summary and context measures in Section G of the regional growth strategy, from plan adoption in 2011 to 2020, as well as the policy and regional land use designation amendments to date.

BACKGROUND

Metro 2040 is the regional federation's shared vision to guide urban growth among the 23 member jurisdictions comprising the Metro Vancouver Regional District. Annual reporting on the regional growth strategy's progress is required by Subsection 452(1)(b) of the *Local Government Act* and Section 6.13.3 of *Metro 2040*. The preparation of an annual report is also important to ensure that the regional growth strategy, its indicators and policies are actively monitored and assessed as the region continues to grow and change. This report provides the 2020 Annual Performance Monitoring Report.

***METRO 2040* PERFORMANCE MONITORING**

Metro Vancouver recognizes the important role that performance monitoring plays in the implementation of *Metro 2040* and collective decision-making. The *Progress Toward Shaping Our Future* monitoring program provides a framework for discussing *Metro 2040* implementation among Metro Vancouver Board members, member jurisdictions, TransLink, other regional agencies, and the

general public. With this process, the MVRD Board is able to review and evaluate the state of growth management in the region, progress being made, and any issues that may need further attention.

Performance Monitoring Dashboard

To better convey the status of *Metro 2040's* performance measures and associated information in a clear and easy to understand way, the *Metro 2040* Performance Monitoring Dashboard on the Metro Vancouver website was created and launched in May 2017 (Reference 1). The webpage replaces the previous large, static *Metro 2040 Progress Toward Shaping Our Future* hard copy annual report, and provides a complete profile of *Metro 2040* performance measures that are updated regularly as data becomes available.

To date, 31,883 unique users have accessed the Dashboard locally and internationally. Over the past year, 9,874 users have accessed the Dashboard, which is up by 12% compared to the same period in the previous year (see Table 1). The overall utilization of the Dashboard continues to remain strong and consistent.

Table 1. Web Analytics of the *Metro 2040* Dashboard

	Launch date to Sep 30, 2021	Oct 1, 2020 to Sep 30, 2021
Dashboard Users	31,883	9,874
National Users Percentage	72%	70%
International Users Percentage	28%	30%
Returning User Percentage	14%	16%
User Session Totals	48,694	14,979

Metro 2040 Performance Monitoring Program

The *Metro 2040* performance monitoring program consists of 38 performance measures in total. There are 15 Key Summary Measures, 11 Strategy Performance Measures and a range of context and participation measures where the role of monitoring is simply to observe, not meet targets. Detailed information on data source and methodology for each performance measure can be found in the *Metro Vancouver 2040: Shaping our Future Performance Monitoring Guideline* (Reference 2).

Tables 2 to 7 below provide a status highlight of some of the *Metro 2040* performance measures. More detailed information on each performance measure's vision, intent, performance, and data files are available for viewing and download through the Performance Monitoring Dashboard.

In terms of the status column:

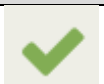
- for context measures, the status is observing
- for directional measures with a target, the status will either be on track or may not be on track / area of concern

It is important to note that most of these performance measures are in response to long range objectives, and one year's information is only a snapshot in time. Many of the performance measures can only be assessed every 5 years because of the release of new Census data or because inventories are undertaken every 5 years.

Table 2. Performance Measures for Regional Land Use Designations

Measure	Performance	Status
Total and cumulative change in land by regional land use designation	1,181 ha of land, 0.4% of the regional area changed regional land use designation since 2011. • Agricultural: 55,150 ha (net loss of 198 ha) • Conservation & Recreation: 136,974 ha (net gain of 836 ha) • Industrial: 10,203 ha (net gain of 77 ha) • Mixed Employment: 3,371 ha (net loss of 21 ha) • Rural: 8,438 ha (net loss of 128 ha) • General Urban: 70,166 ha (net loss of 561 ha)	
Total and cumulative change in land within Urban Containment Boundary (UCB)	The land area within the UCB has remained relatively consistent. 2011: 90,400 ha, 32.27% of regional area 2020: 90,568 ha, 32.33% of regional area There were no amendment to the UCB in 2020.	
Total and cumulative change in number and hectares of Urban Centre (UC)	There were no changes to Urban Centres in 2020. • 1 Metro Core, Downtown Vancouver & Central Broadway (1,907 ha) • 1 Surrey Metro Centre (473 ha) • 5 Regional City Centres (2,981 ha in total) • 19 Municipal Town Centres (2,199 ha in total) The 26 Urban Centres in the region have a total area of 7,560 ha, or 2.7% of the region's land area.	
Total and cumulative change in number and hectares of Frequent Transit Development Areas (FTDA)	There were no changes to Frequent Transit Development Areas in 2020. • 16 FTDAs (967 ha in total)	

Table 3. Performance Measures for *Metro 2040* Goal 1: Create a Compact Urban Area

Measure	Performance	Status
Percentage of regional dwelling units growth within UCB	98% of growth occurred within the UCB between 2011 and 2020.	
Percentage of regional dwelling units growth in UCs	From 2006 to 2016, 40% of the regional dwelling unit growth was within the region's 26 Urban Centres. New custom data from 2021 Census will be available in 2022 to update this performance measure.	

Annual regional population growth	Metro Vancouver's population in 2021 is estimated at 2,807,469 people, an average growth of 42,856 people per year since 2016. The release of 2021 Census data in 2022 will verify the current estimate. Detailed data on population growth by municipality is available on the *Metro 2040* Dashboard.	
Annual regional dwelling unit growth	Metro Vancouver's total dwelling unit count in 2021 is estimated at 1,096,150, an average growth of 19,123 unit per year since 2016. The release of 2021 Census data in 2022 will verify the current estimate. Detailed data on dwelling unit growth by municipality is available on the *Metro 2040* Dashboard.	
Annual regional employment growth	Metro Vancouver's employment in 2021 is estimated at 1,438,416, an average growth of 19,247 jobs per year since 2016. The release of 2021 Census data in 2022 will verify the current estimate. Detailed data on employment growth by municipality is available on the *Metro 2040* Dashboard.	
Average number of dwelling units per ha within UCs	In 2016, there were an average of 36.7 dwelling units per hectares within Urban Centres. New custom data from 2021 Census will be available next year to update this performance measure.	
Average number of dwelling units per ha within FTDAs	In 2016, there was an average of 15.8 dwelling units per hectares within FTDAs. New custom data from 2021 Census will be available next year to update this performance measure.	
Number and status of regional sewerage service connection application	In 2020, MVRD Board did not receive any requests to extend sanitary connection beyond the UCB.	

Table 4. Performance Measures for *Metro 2040* Goal 2: Support a Sustainable Economy

Measure	Performance	Status
Percentage of regional employment growth in Urban Centres	33% of the regional employment growth was within the region's Urban Centres from 2006 to 2016. This growth trend is not on track with the regional target of 50%. New custom data from 2021 Census will be available in 2022 to update this performance measure.	
Employed labour force in retail trade sector in UCs & FTDAs	In 2016, 48% of employment in the retail trade sector is located in UCs and FTDAs. New custom data from 2021 Census will be available in 2022 to update this performance measure.	

Average number of kilometre travelled to commute region-wide	The region-wide average trip length to work / post secondary school is 13.1km according to the 2017 TransLink Trip Diary. TransLink conducts a regional trip diary every 5 years; the next survey will likely be in 2022.	
Average number of mins. travelled for commute region-wide	In 2016, 50% of the regional employed labour force travelled less than 30 mins for work. 38% travel for 30 to 59 mins and 11% travel for an hour or longer. New data from 2021 Census will be available in 2022 to update this performance measure.	
Percentage of residents living and working in the same subregion	In 2016, 44% of the regional employed labour force with a usual place of work live and work within the same municipality while 54% work at a different municipality within Metro Vancouver. New data from 2021 Census will be available in 2022 to update this performance measure.	

Table 5. Performance Measures for *Metro 2040* Goal 3: Protect the Environment and Respond to Climate Change Impacts

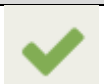
Measure	Performance	Status
Hectares of land inventoried as sensitive ecosystem (SE) or modified ecosystem (ME)	The 2018 Sensitive Ecosystem Inventory (SEI) study reported a loss of 1,640 hectares of sensitive and modified ecosystems for region from 2009 to 2014. 1,190 ha of the loss was within the regional core area (mostly aligned with UCB). The SEI study is conducted every 6 years; the next study will be in 2022.	
Percentage of inventoried SE & ME rated high quality	The 2018 SEI study found that 84.7% of the identified sensitive / modified ecosystems in the region are rated higher quality, but the percentage drops significantly when looking at just the regional core (39.1%). The SEI study is conducted every 6 years; the next study will be in 2022.	
Track the number of pollutant exceedances of regional and national objectives and standards	Using data from the Lower Fraser Valley Air Quality Monitoring Network, Metro Vancouver continues to track air quality trends annually and report out on the number of exceedances of regional air quality objectives.	
Tonnes and percentage of regional greenhouse gas (GHG) emissions produced by building and on-road transportation sources	Based on the 2015 GHG emission inventory, the 2019 GHG emission level was forecasted at 14.7 million tonnes, a 1% reduction from the 2010 baseline. 35% of regional GHG emissions were from on-road transportation and 26% were from buildings. A new study is currently underway to establish annual updates to the GHG inventory. An updated 2019 GHG inventory for Metro Vancouver will be available in early 2022.	 additional policies being developed as part of *Climate 2050*

Regional baseline and change projections for relevant climate variables	The 2016 Climate Change Projections for Metro Vancouver study anticipates that Metro Vancouver will have warmer temperatures in all seasons, wetter winters, drier summers, and a significant decrease in snowpack year-round.	

Table 6. Performance Measures for *Metro 2040* Goal 4: Develop Complete Communities

Measure	Performance	Status
Status of municipal Housing Action Plans	As of September 2021, 15 municipalities have adopted housing action plans. City of White Rock's Housing Action Plan is underway. City of Delta's Housing Action Plan is in its final project phase and is awaiting stakeholders' review and endorsement.	
Composition of housing stock by type, tenure and cost	New dwelling unit completion by type in 2020 • Single detached: 3,682 • Semi-detached (duplex): 588 • Row house: 2,702 • Apartment: 17,067 New dwelling unit completion by tenure in 2020 • Freehold ownership: 3,324 • Condominium ownership: 14,566 • Rental: 5,961 Total of 24,039 new dwelling units in 2020.	
Percentage of hours with Air Quality Health Index (AQHI) in high and low health risk categories	In 2020, air quality was in the low health risk category over 97% of the time. While the region did experience impacts from wildfire smoke from outside the region, there were more hours in the low health risk category than in other years affected by wildfires (e.g. 2017, 2018).	
Walkability	The Walkability Index was updated in 2020 to allow for cross comparison between the three-research periods, 2006, 2011, and 2016. The five indicators that contribute to the Walkability Index are residential density, intersection density, land use mix, commercial floor area ratio, and sidewalk completeness.	

Table 7. Performance Measures for *Metro 2040* Goal 5: Support Sustainable Transportation Options

Measure	Performance	Status
Percentage of total trips that are private vehicle based	In comparison to the 2011 Trip Diary, the 2017 Trip Diary shows a clear shift from motorized trips to walking. Trips by automobile driver decreased from 59% to 55%, while walking trips increased from 10% to 14%. TransLink conducts a regional trip diary every 5 years; the next survey will likely be in 2022.	

Percentage of population living within walking distance of the Frequent Transit Network (FTN)	50.2% of the Metro Vancouver population live within a 5-minute walk to the FTN or a 10-minute walk to a rapid transit station, according to 2016 Census data. New custom data from 2021 Census will be available in 2022 to update this performance measure.	
Number of actively insured vehicles	Metro Vancouver had approximately 1,283,283 actively insured passenger vehicles in 2020, 87% for personal use and 10% for business use. The number of actively insured passenger vehicles reduced by 46,109 in compared to 2019 data. The decrease in vehicle count is likely impacted by the COVID-19 pandemic.	
Collision statistics including fatalities and injuries	In 2020, Metro Vancouver had approximately 120,480 reported crashes of which 22% resulted in casualty. In comparison, 174,139 crashes were reported in 2019 of which 23% resulted in casualty. The decrease of 53,659 reported crashes is likely impacted by the COVID-19 pandemic.	

METRO 2040 AMENDMENTS JANUARY 2020 TO SEPTEMBER 2021

From January 2020 to September 2021, there were two approved amendments to *Metro 2040*:

- *Bylaw No. 1295, 2019* – Text amendment to the GHG emission reduction targets to pursue a carbon neutral region by 2050, with an interim target of 45% reduction by 2030.
- *Bylaw No. 1310, 2020* – Land use designation amendment for 60 parcels of Regional Parkland to amend 26.1 hectares of land designated General Urban and 102.2 hectares of land designated Rural, to the Conservation and Recreation land use designation

ALTERNATIVES

1. That the MVRD Board receive for information the report dated October 5, 2021, titled "*Metro Vancouver 2040: Shaping our Future* - 2020 Annual Performance Monitoring Report", and direct staff to forward a copy to the Province of BC's Ministry of Municipal Affairs, Local Government Division.
2. That the MVRD Board receive for information the report dated October 5, 2021, titled "*Metro Vancouver 2040: Shaping our Future* - 2020 Annual Performance Monitoring Report", and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

Data acquisition and development for performance monitoring is a regular component of the annual Regional Planning budget. As required under Metro Vancouver's *Regional Growth Strategy Procedures Bylaw No. 1148, 2011*, addressing staffing and other costs related to *Metro 2040* implementation, is also being provided to the Regional Planning Committee in a separate report, titled "*Metro Vancouver 2040*: *Shaping our Future* – 2020 Procedural Report", as part of the Committee's November 2021 agenda package.

SUMMARY / CONCLUSION

The *Local Government Act* and *Metro 2040* require the preparation of an annual report on the regional growth strategy's progress. The 2020 Annual Performance Monitoring Report provides a

summary update on the performance measures with relevant annual change and available data. A complete profile of *Metro 2040* performance measures with a detailed data breakdown is available in the *Metro 2040* Performance Monitoring Dashboard. Recognizing the important role that performance monitoring plays in the implementation of the regional growth strategy and collective decision-making, Metro Vancouver continues to provide regular updates on the Dashboard as data becomes available.

References

1. *Metro 2040* Performance Monitoring Dashboard
2. *Metro Vancouver 2040*: Shaping our Future Performance Monitoring Guideline

48236662

To: Regional Planning Committee

From: Heidi Lam, Senior Policy and Planning Analyst, Regional Planning and Housing Services

Date: October 5, 2021 Meeting Date: November 5, 2021

Subject: ***Metro Vancouver 2040: Shaping our Future* - 2020 Procedural Report**

RECOMMENDATION

That the MVRD Board receive for information the report dated October 5, 2021, titled "*Metro Vancouver 2040: Shaping our Future* - 2020 Procedural Report".

EXECUTIVE SUMMARY

This report documents the staffing and resources required to implement, administer and amend the regional growth strategy, and provides an annual procedural reporting on the operational performance of the Regional Planning Division.

PURPOSE

This report conveys to the Regional Planning Committee and MVRD Board the 2020 *Metro Vancouver 2040: Shaping our Future* Procedural Report for information as required by *Greater Vancouver Regional Growth Strategy Procedures Bylaw No. 1148, 2011*.

BACKGROUND

Metro Vancouver 2040: Shaping our Future (*Metro 2040*), the regional growth strategy, as well as the *Greater Vancouver Regional District Regional Growth Strategy Procedures Bylaw No. 1148, 2011* (RGS Procedures Bylaw) were both adopted by the MVRD Board in July 2011. The *RGS Procedures Bylaw* includes requirements for reporting on operational performance measures associated with *Metro 2040*, including such items as the number of amendments processed and resources required to implement the regional growth strategy.

PROCEDURAL PERFORMANCE REPORTING

Procedural reporting requirements are in addition to, and separate from, reporting on the performance measures listed in Section G of *Metro 2040,* which Metro Vancouver is required to report on annually as per Subsection 452(1)(b) of the *Local Government Act*.

The *RGS Procedures Bylaw* states:

> 7. *The Regional Growth Strategy Annual Report shall include a report on those measures set out in Section G of the Regional Growth Strategy.*
> 8. *Additionally, the Regional Growth Strategy Annual Report shall include a report on the following measures:*
> a) *Metro Vancouver staff time, expressed in the number of full-time equivalent staff budgeted to administer the Regional Growth Strategy;*

b) The total cost of implementing, managing, monitoring and amending the Strategy for the calendar year, including the cost Metro Vancouver and municipal staff, costs related to referral of requested amendments to the Technical Advisory Committee [now called: Regional Planning Advisory Committee]*, external consultants, external legal advisors and all other resources;*

c) The number of requested amendments and approved amendments to the Regional Growth Strategy by type;

d) A comparison of items a), b) and c) year over year and pre- and post-adoption of the Regional Growth Strategy: and

e) A record of the timelines to process amendments to the Regional Growth Strategy, including staff, Technical Advisory Committee [now called: Regional Planning Advisory Committee] *and Board review.*

9. If requested by an Affected Local Government, Metro Vancouver will make a presentation on the Regional Growth Strategy Annual Report to that Affected Local Government's Council or board, answer any questions that may arise and report back to the Board on information received during the presentation.

There are a number of different tasks associated with implementing *Metro 2040*, including reviewing Regional Context Statements, preparing supporting implementation documents, conducting policy research and analysis, and processing proposed amendments. Since the adoption of *Metro 2040* in mid-2011, the number of staff directly associated with the Regional Planning Division has remained relatively consistent. Total costs / budget have also remained relatively consistent.

Consistent with the *RGS Procedures Bylaw*, this Procedural Report provides an update on procedural performance measures for the year 2020 (Attachment 1). This report is being provided for information to the Regional Planning Committee and MVRD Board.

ALTERNATIVES

This is an information report. No alternatives are provided.

FINANCIAL IMPLICATIONS

Staffing and resources to support the implementation and monitoring of *Metro 2040* are incorporated into the annual budget for Regional Planning approved by the MVRD Board on an annual basis.

CONCLUSION

This report conveys the 2020 Metro Vancouver 2040: Shaping our Future Procedural Report as required by *Regional Growth Strategy Procedures Bylaw No. 1148, 2011*. The report documents the resources that have been required to implement, administer and amend the regional growth strategy since its adoption to year-end 2020. Staffing and resources required to implement *Metro 2040* include a variety of tasks, such as supporting and reviewing Regional Context Statements, preparing supporting implementation documents, conducting policy research and analysis, and processing proposed amendments.

In keeping with the requirements of the *RGS Procedures Bylaw*, Metro Vancouver staff are available to make a presentation on annual regional growth strategy performance monitoring to any affected

local government's Council or Board on request, answer any questions that may arise, and report back to the MVRD Board on information received during the presentation(s) if required.

Attachment
Metro Vancouver 2040: Shaping our Future 2020 Procedural Report, dated October 5, 2021.

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ATTACHMENT

Metro Vancouver 2040: Shaping our Future
2020 Procedural Report

As required by *Greater Vancouver Regional District Regional Growth Strategy Procedures Bylaw No. 1148, 2011*

October 5, 2021

Introduction

Metro Vancouver 2040: Shaping our Future (Metro 2040), the regional growth strategy, and the *Greater Vancouver Regional District Regional Growth Strategy Procedures Bylaw No. 1148, 2011* (RGS Procedures Bylaw) were both adopted by the Greater Vancouver Regional District (now MVRD) Board in July 2011. The *RGS Procedures Bylaw* includes requirements for reporting on procedural performance measures associated with *Metro 2040*, such as the number of amendments processed and resources required to implement the regional growth strategy.

Supporting Work to Implement *Metro 2040*

To advance *Metro 2040* implementation, Metro Vancouver conducts research and undertakes supporting analysis and studies. These publications include *Metro 2040* implementation guidelines to support interpretation and procedures, and specific studies / reports providing technical information, analysis and recommendations on particular *Metro 2040* strategies and actions.

By year-end 2020, eight Implementation Guidelines had been prepared and adopted by the MVRD Board to advance the implementation of *Metro 2040*.

- *Implementation Guideline #1: Regional Context Statements* (2012). Guidance for municipalities on developing Regional Context Statements
- *Implementation Guideline #2 - Amendments to the Regional Growth Strategy* (2012; updated in 2014). Detailed explanation of *Metro 2040* amendment procedures (should be read with the *Regional Growth Strategy Procedures Bylaw*)
- *Implementation Guideline #3: What Works: Affordable Housing Initiatives in Metro Vancouver Municipalities* (2012). Information for municipalities on how to develop Housing Action Plans
- *Implementation Guideline #4: Identifying Frequent Transit Development Areas* (2013). Information for municipalities on how to Identify Frequent Transit Development Areas, a key tool for transit-oriented development
- *Implementation Guideline #5: Metro Vancouver Industrial Land Protection and Intensification Policies* (2014). Guidance for municipalities on how to protect and efficiently develop industrial lands
- *Implementation Guideline #6: What Works: Municipal Measures for Sustaining and Expanding the Supply of Purpose-Built Rental Housing (2016)*. Information on municipal measures for sustaining and expanding the supply of purpose-built rental housing along with project profiles.
- *Implementation Guideline #7: Extension of Regional Sewerage Services (2017).* Information on *Metro 2040* policies and procedures for connection to regional sewerage services in Agricultural and Rural areas of Metro Vancouver.
- *Implementation Guideline #8: Metro Vancouver 2040 Performance Monitoring Guideline (2017).* Information about *Metro 2040* performance measures and the monitoring and reporting process.

Progress on the Completion of Regional Context Statements

Per the *Local Government Act,* within the first two years following adoption of a regional growth strategy member municipalities are required to submit an updated Regional Context Statement (RCS)

that clearly lays out how local plans and aspirations as expressed in Official Community Plans align with the regional objectives laid out in *Metro 2040*. All required RCSs have been accepted by the MVRD Board.

The *Local Government Act* also requires that municipalities review the Regional Context Statement at least once every 5 years after acceptance by the MVRD Board, and if no amendment is proposed, submit the statement to the Board for its continued acceptance.

Table 1: Status of Regional Context Statements to year end 2020

Municipality	Status	Year
Anmore	Accepted	2019
Belcarra	Accepted	2011
Burnaby	Accepted	2019
Coquitlam	Accepted	2013
Delta	Accepted	2013
Langley City	Accepted	2013
Langley Township	Accepted	2016
Lions Bay	Accepted	2016
Maple Ridge	Accepted	2018
New Westminster	Accepted	2017
North Vancouver City	Accepted	2015
North Vancouver District	Accepted	2014
Pitt Meadows	Accepted	2019
Port Coquitlam	Accepted	2013
Port Moody	Accepted	2015
Richmond	Accepted	2017
Surrey	Accepted	2014
Tsawwassen First Nation	Not Required	
Vancouver	Accepted	2013
West Vancouver	Accepted	2018
White Rock	Accepted	2017
University of British Columbia*	Approved by Province	2015
University Endowment Lands*	Not Required	

*within Electoral Area A

***Metro 2040* Amendments**

In 2020, the MVRD Board processed two Type 3 and one Type 2 Minor Amendment requests to amend the regional growth strategy.

On February 28, 2020, the MVRD Board approved a Type 3 Minor Amendment request initiated from Metro Vancouver to update the *Metro 2040*'s Greenhouse Gas (GHG) emission reduction target. The target was amended from a GHG reduction of 33% by 2020 and 80% by 2050, to an ambitious target to pursue a carbon neutral region by 2050 with an interim target of 45% GHG reduction by 2030.

On March 4, 2020, City of Delta submitted a Type 2 Minor Amendment request to change the regional land use designation of a 0.63 hectare parcel on Burns Drive from 'Agricultural' to 'Rural'. As the parcel is small and unsuitable for agricultural uses, bounded by major roadways, and comparable to other precedent anomaly sites in the area that is inconsistent with *Metro* 2040, the MVRD Board ultimately determined that a regional land use designation amendment or a Regional Context Statement amendment is not required for the City of Delta's rezoning application.

On September 28, 2020, Metro Vancouver initiated a Type 3 Minor Amendment to incorporate 60 individual regional land use designation changes to 'Conservation and Recreation' to reflect the acquisition of these property interests by Metro Vancouver Regional Parks. The MVRD Board later approved the amendment request in early 2021.

Table 2 shows the number and type of requested *Metro 2040* amendments, and those approved for the years 2011-2020 by calendar year.

Table 2: *Metro 2040* Bylaw Amendments Requested, Approved and Declined, 2011-2020

	2011		2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Requested Amendments												
Type 1	2		-	-	-	-	-	-	-	-	-	2
Type 2	1		1	2	1	-	2	1	-		1	9
Type 3	4		-	3	4	2	2	2	2	3	1	23
Total	**7**		**1**	**5**	**5**	**2**	**4**	**3**	**2**	**3**	**2**	**34**
Approved Amendments												
Type 1	-		1	-	-	-	-	-	-	-	-	1
Type 2	-		-	1	1	-	-	1	-	-	-	3
Type 3	4		-	2	1	3	-	3	2	2	1	18
Total	**4**		**1**	**3**	**2**	**3**	**0**	**4**	**2**	**2**	**1**	**22**
Declined Amendments												
Type 1	1		-	-	-	-	-	-	-	-	-	1
Type 2	1		-	2	-	-	-	-	1	-	-	4
Type 3	-		-	1	2	-	-	-	-	-	-	3
Total	**2**		**0**	**3**	**2**	**0**	**0**	**0**	**1**	**-**	**-**	**8**

The average processing time for approved amendment requests between 2011 and 2020 was **30** weeks. In 2012, a Type 1 amendment requested by the City of Coquitlam which required approval from each member municipality was initiated just after the adoption of the regional growth strategy, and took 78 weeks to process. If this outlier is removed from the inventory of amendments, the average processing time drops to **27** weeks, and includes review by the Regional Planning Advisory Committee, review by the Regional Planning Committee, initiation of early readings of an associated amendment bylaw by the MVRD Board, a notification period to allow for affected local government comment, and final consideration of the amendment bylaw by the Board. The key milestones and associated timeline for *Metro 2040* amendments to year-end 2020 are provided in Appendix 1.

***Metro 2040* Implementation Costs and Staffing**

Between 2011 and year-end 2020, *Metro 2040* was primarily supported by Regional Planning staff and resources, which includes financial resources for planning staff as well as other resources such as consulting and data acquisition. Regional Planning staff also work on and support initiatives throughout the organization.

The Regional Planning Budget is adopted annually by the MVRD Board. Information regarding the 2020 budget for staffing, consulting and data acquisition associated with the development, administration, implementation and monitoring of *Metro 2040* can be found in Report G4.1 titled "MVRD 2020 Budget and 2020 – 2024 Financial Plan and Five Year Bylaw 1291" at:
http://www.metrovancouver.org/boards/GVRD/RD_2019-Nov-1_AGE.pdf#page=231

Previous year budgets can also be found on the Metro Vancouver website.

Appendix 1: Summary of Processed Amendments to *Metro Vancouver 2040: Shaping our Future*, 2011-2020

Amendment Type and Bylaw Number	Municipality	Amendment Request Description	Date of Amendment Request Letter from Municipality	Date Considered by Regional Planning Advisory Committee	Date Considered by Regional Planning Committee	Date Bylaw Initiated/ Referred by MVRD Board	Date Bylaw Considered by MVRD Board for Initial Readings	Date Bylaw Considered by MVRD Board for Adoption	Total Processing Time (Weeks)
Type 3 Bylaw No. 1150, 2011	City of Richmond	Land Use Designation Amendment: General Urban to Conservation and Recreation (3 sites totaling 149 ha)	Mar 2, 2011	Sept 6, 2011	Sept 16, 2011	Sept 23, 2011	Oct 28, 2011	Oct 28, 2011	34
	Tsawwassen First Nation	Text Amendment (Table A.1): Revise growth projections for the TFN	Mar 7, 2011	Sept 6, 2011	Sept 16, 2011	Sept 23, 2011	Oct 28, 2011	Oct 28, 2011	33
	District of West Vancouver	Overlay Amendment: Extend Special Study Area (1 site designated General Urban, 679 ha)	Mar 8, 2011	Sept 6, 2011	Sept 16, 2011	Sept 23, 2011	Oct 28, 2011	Oct 28, 2011	33
		Text Amendment (Section 6.12.5 Special Study Areas): acknowledge inclusion of revised Special Study Area for West Vancouver	Mar 8, 2011	Sept 6, 2011	Sept 16, 2011	Sept 23, 2011	Oct 28, 2011	Oct 28, 2011	
	City of Coquitlam	Land Use Designation Amendment: General Urban to Conservation & Recreation (numerous sites totaling 459 ha)	Mar 22, 2011	Sept 6, 2011	Sept 16, 2011	Sept 23, 2011	Oct 28, 2011	Oct 28, 2011	31
Type 1 Bylaw No. 1160, 2012	City of Coquitlam	Text Amendment (Section 6.3.4 b): Remove phrase, "Conservation and Recreation lands utilized for commercial extensive recreation facilities"	Mar 22, 2011	Sept 6, 2011	Sept 16, 2011	Sept 23, 2011	Mar 30, 2012	Sept 21, 2012	78
Type 1 Did Not Proceed	District of North Vancouver	Process Amendment: Amend the RGS to require a 2/3 majority vote for Conservation & Recreation lands to be converted to Agricultural land and then Industrial lands in two steps conversion	Mar 22, 2011	Sept 6, 2011	Sept 16, 2011	Sept 23, 2011	Sept 23, 2011: Board declined amendment request; did not proceed to bylaw readings. Issue addressed in RGS Procedures Amendment Bylaw No. 1206, 2014 and *Implementation Guideline # 2 – Amendments to the RGS*		26

Appendix 1: Summary of Processed Amendments to *Metro Vancouver 2040: Shaping our Future*, 2011-2020

Amendment Type and Bylaw Number	Municipality	Amendment Request Description	Date of Amendment Request Letter from Municipality	Date Considered by Regional Planning Advisory Committee	Date Considered by Regional Planning Committee	Date Bylaw Initiated/ Referred by MVRD Board	Date Bylaw Considered by MVRD Board for Initial Readings	Date Bylaw Considered by MVRD Board for Adoption	Total Processing Time (Weeks)
Type 2 Did Not Proceed	District of North Vancouver	Overlay Amendment: Designate Lower Lynn as a Municipal Town Centre	Mar 22, 2011	Sept 6, 2011	Sept 16, 2011	Sept 23, 2011	Sept 23, 2011: Board declined amendment request; did not proceed to bylaw readings. Subsequently identified as a Frequent Transit Development Area in the 2014 RCS.		26
Type 2 Bylaw No. 1168, 2012	Village of Anmore	Land Use Designation Amendment: Rural to General Urban and extend the Urban Containment Boundary (1 site, 2 ha)	Feb 29, 2012	Feb 24, 2012	May 4, 2012	Mar 30, 2012	May 25, 2012	Jul 27, 2012	21
Type 3 Bylaw No. 1185, 2013	City of Port Moody	Overlay Amendment: Create 3 Special Study Areas (2 sites designated Industrial totaling 397 ha; 1 site designated General Urban, 70 ha)	Jan 30, 2013	Mar 22, 2013	Apr 5, 2013 & Jul 5, 2013	Apr 26, 2013	Jul 26, 2013	Jul 26, 2013	25
		Text Amendment (Section 6.12.5 Special Study Areas): to acknowledge inclusion of revised Special Study Area for the City of Port Moody	Jan 30, 2013	Mar 22, 2013	Apr 5, 2013 & Jul 5, 2013	Apr 26, 2013	Jul 26, 2013	Jul 26, 2013	25
Type 2 Did Not Proceed	Corporation of Delta	Land Use Designation Amendment (MK Delta Lands): Conservation and Recreation to General Urban and expand the Urban Containment Boundary	Jun 12, 2013	Jun 19, 2013	Jul 5, 2013	Jul 26, 2013	On hold at the request of the Corporation of Delta (Submitted new amendment request on Jan 29, 2019)		n/a
Type 2 Did Not Proceed	Township of Langley	Land Use Designation Amendment (North Murrayville and Hendricks): Agricultural to General Urban	Jun 24, 2013	Jun 19, 2013	Jul 5, 2013	Jul 26, 2013	Oct 11, 2013: Board declined the RGS amendment request; did not proceed with bylaw readings.		16
Type 3 Did Not Proceed	Township of Langley	Land Use Designation Amendment (Highway #1 at 200th Street): Mixed Employment to General Urban	Jun 24, 2013	Jun 19, 2013	Jul 5, 2013	Jul 26, 2013	Oct 11, 2013: Board declined the RGS amendment request; did not proceed with bylaw readings.		16

Appendix 1: Summary of Processed Amendments to *Metro Vancouver 2040: Shaping our Future*, 2011-2020

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Type 3 Did Not Proceed	Township of Langley	Land Use Designation Amendment (Highway #1 at 200th Street): Mixed Employment to General Urban	Jun 24, 2013	Jun 19, 2013	Jul 5, 2013	Jul 26, 2013	Oct 11, 2013: Board declined the RGS amendment request; did not proceed with bylaw readings.		16
Type 3 Bylaw No. 1207, 2014	City of Surrey	Land Use Designation Amendment (Central Newton Cultural Commercial District): Industrial to Mixed Employment (1 site, 6.5 ha)	May 2, 2014	May 22, 2014	June 6, 2014	Jun 27, 2014	Jun 27, 2014	Sept 19, 2014	20
Type 2 Bylaw No. 1203, 2014	Corporation of Delta	Land Use Designation Amendment (Southlands): Agricultural to General Urban and extend the Urban Containment Boundary (1 site, 59.7 ha); Agricultural to Conservation and Recreation (1 site, 42.4 ha)	Jan 14, 2014	Feb 21, 2014	Mar 7, 2014	Mar 28, 2014	Mar 28, 2014	Jun 27, 2014	23
Type 3 Bylaw No. 1209, 2014	City of Port Moody	Land Use Designation Amendment (Moody Centre Transit Oriented Development Area and Murray Street Boulevard Area): Mixed Employment and Industrial to General Urban (1 site, 8.3 ha)	Jun 2, 2014	June 20, 2014	July 4, 2014	Jul 11, 2014	Jul 11, 2014	May 15, 2015	49
Type 3 Did Not Proceed	City of Port Moody	Land Use Designation Amendment (Andres Wine Site): Industrial to General Urban	Jun 2, 2014	June 20, 2014	July 4, 2014	Jul 11, 2014	July 11, 2014: Board declined the RGS amendment request; did not proceed with bylaw readings.		6
Type 3 Did Not Proceed	City of Port Moody	Land Use Designation Amendment (Mill and Timber Site): Industrial to General Urban (1 site)	Jun 2, 2014	June 20, 2014	July 4, 2014	Jul 11, 2014	July 11, 2014: Board declined the RGS amendment request; did not proceed with bylaw readings.		6
Type 3 Bylaw No. 1222, 2015	Township of Langley	Land Use Designation Amendment (2 adjacent sites in the Latimer area): Mixed Employment to General Urban (1 site, 1 ha), and General Urban to Mixed Emp. (1 site, 7.5 ha)	April 2, 2015	May 1, 2015	May 22, 2015	June 12, 2015	June 12, 2015	Sept 4, 2015	22

Appendix 1: Summary of Processed Amendments to *Metro Vancouver 2040: Shaping our Future*, 2011-2020

Amendment Type and Bylaw Number	Municipality	Amendment Request Description	Date of Amendment Request Letter from Municipality	Date Considered by Regional Planning Advisory Committee	Date Considered by Regional Planning Committee	Date Bylaw Initiated/ Referred by MVRD Board	Date Bylaw Considered by MVRD Board for Initial Readings	Date Bylaw Considered by MVRD Board for Adoption	Total Processing Time (Weeks)
Type 3 Bylaw No. 1223, 2015	Metro Vancouver (North Vancouver District, Anmore, Surrey, New Westminster, North Vancouver City, West Vancouver, and Port Moody)	Incorporate changes stemming from 7 GVRD board accepted RCS. Amendment includes revisions to regional land use designation boundaries, the addition of Frequent Transit Development Areas (FTDAs), and local centres. The proposed amendment also includes updates to the Metro 2040 Appendix A, Table A-1: Population, Dwelling Unit and Employment Projections for Metro Vancouver Sub regions and Municipalities.	n/a	Jun 5, 2015	Jul 10, 2015	Jul 31, 2015	Jul 31, 2015	Oct 30, 2015	21
Type 2 Did not Proceed	Corporation of Delta	Land Use Designation Amendment (Ladner Trunk Road): Agricultural to Rural (1 site, 0.23 ha)	May 27, 2016	n/a	Jul 15, 2016	Jul 29, 2016	Jul 29, 2016: Board determined the proposed RGS amendment request is not required		9
Type 2 Bylaw No. 1236, 2016	Metro Vancouver	Text Amendment: Update the policy provisions regarding the extension of regional sewerage services, and adopt associated implementation guidelines #7, Extension of Regional Sewerage Services.	n/a	n/a	Sept 9, 2016	Sept 23, 2016	Sept 23, 2016	Apr 28, 2017	33
Type 3 Bylaw No. 1237, 2016	Metro Vancouver	Text Amendment (Appendix A Table A.2): update figures on 10 years regional and municipal household growth projections by tenure.	n/a	Sept 8, 2016	Oct 14, 2016	Oct 28, 2016	Oct 28, 2016	Apr 28, 2017	33

Appendix 1: Summary of Processed Amendments to *Metro Vancouver 2040: Shaping our Future*, 2011-2020

Amendment Type and Bylaw Number	Municipality	Amendment Request Description	Date of Amendment Request Letter from Municipality	Date Considered by Regional Planning Advisory Committee	Date Considered by Regional Planning Committee	Date Bylaw Initiated/ Referred by MVRD Board	Date Bylaw Considered by MVRD Board for Initial Readings	Date Bylaw Considered by MVRD Board for Adoption	Total Processing Time (Weeks)
Type 3 Bylaw No. 1243, 2017	Metro Vancouver	Text Amendment (Schedule G): update and reduce 55 performance measures to 15 key summary measures. The reduced number of measures facilitates simpler and more useful annual reporting.	n/a	Nov 18, 2016	Mar 10, 2017	Mar 31, 2017	Mar 31, 2017	Jul 28, 2017	20
Type 3 Bylaw No. 1246, 2017	Metro Vancouver (Langley Township, Surrey, and North Vancouver City)	Incorporate land use designation and overlay map revisions stemming from 3 MVRD Board accepted RCS amendments	n/a	Jun 23, 2017	Jun 9, 2017	Jun 23, 2017	Jun 23, 2017	Oct 27, 2017	18
Type 3 Bylaw No. 1259, 2018	City of Port Moody	Land Use Designation Amendment (Flavelle Mill Site): Industrial to General Urban (12.7 ha), removal of special study area	Sep 15, 2017	Nov 17, 2017	Feb 2, 2018	Feb 23, 2018	Feb 23, 2018	May 25, 2018	36
Type 2 Did Not Proceed	City of Surrey	Land Use Designation Amendment (Hazelmere): Rural to General Urban, 23.7 ha, extension of UCB	Oct 23, 2017	Nov 17, 2017	Feb 2, 2018	Feb 23, 2018	Mar 23, 2018: Board declined the RGS amendment request; did not proceed with bylaw readings.		22
Type 3 Did Not Proceed	City of Surrey	Land Use Designation Amendment (South Campbell Heights): Rural & Special Study Area (235 ha) to General Urban (143 ha), Mixed Emp (37 ha), Con Rec (55 ha) & extension of UCB; Mixed Emp (22.4 ha) to Con Rec (16.4 ha), General Urban (6 ha); Rural & Special Study Area (12 ha) to Agricultural & ALR	Jan 16, 2018	Apr 20, 2018	May 4, 2018	May 25, 2018	May 25, 2018: Board referred the amendment back to City of Surrey to consider an alternative amendment.		18

Appendix 1: Summary of Processed Amendments to *Metro Vancouver 2040: Shaping our Future*, 2011-2020

Amendment Type and Bylaw Number	Municipality	Amendment Request Description	Date of Amendment Request Letter from Municipality	Date Considered by Regional Planning Advisory Committee	Date Considered by Regional Planning Committee	Date Bylaw Initiated/ Referred by MVRD Board	Date Bylaw Considered by MVRD Board for Initial Readings	Date Bylaw Considered by MVRD Board for Adoption	Total Processing Time (Weeks)
Type 3 Bylaw No. 1266, 2018	Township of Langley	Land Use Designation Amendment (Williams Neighbourhood Plan): Mixed Employment to General Urban (4 ha), General Urban to Mixed Emp (2 ha)	May 8, 2018	May 11, 2018	Jun 8, 2018	Jun 22, 2018	Jun 22, 2018	Sep 28, 2018	20
Type 3 Bylaw No. 1285, 2019	City of Delta	Land Use Designation Amendment (MK Delta Lands): Agricultural to Industrial (62.7 ha) and extension of UCB	Jan 29, 2019	Mar 15, 2019	Apr 5, 2019	May 24, 2019	May 24, 2019	Oct 4, 2019	35
Type 3 Bylaw No. 1285, 2019	Metro Vancouver: Vancouver, Anmore, New Westminster	Incorporate land use designation amendment and addition of new FTDAs stemming from 3 MVRD Board accepted RCS amendments	n/a	Apr 12, 2019	May 3, 2019	May 24, 2019	May 24, 2019	Oct 4, 2019	25
Type 3 Bylaw No. 1295, 2019	Metro Vancouver	Text amendment: update the GHG emission reduction targets to pursue a carbon neutral region by 2050, with an interim target of 45% reduction by 2030	n/a	n/a	Oct 11, 2019	Nov 1, 2019	Nov 1, 2019	Feb 28, 2020	20
Type 2 Did Not Proceed	City of Delta	Amendment from Agriculture to Rural; 9568 Burns Drive	Mar 4, 2020	n/a	May 1, 2020	May 29, 2020	May 29, 2020: A regional land use amendment or RCS amendment is not required for rezoning		12
Type 3 Bylaw No. 1310, 2020	Metro Vancouver	Land Use Designation Amendment (60 parcels of Regional Parks Lands): General Urban to Con Rec (26.1ha); Rural to Con Rec (102.2ha)	n/a	Sep 18, 2020	Oct 9, 2020	Oct 30, 2020	Oct 30, 2020	Feb 26, 2021	20

To: Regional Planning Committee

From: Sinisa Vukicevic, Program Manager, Regional Planning Analytics, Regional Planning and Housing Services

Date: October 7, 2021 Meeting Date: November 5, 2021

Subject: **Metro Vancouver Growth Projections Methodology Report**

RECOMMENDATION

That the MVRD Board receive for information the report dated October 7, 2021, titled, "Metro Vancouver Growth Projections Methodology Report".

EXECUTIVE SUMMARY

Metro Vancouver has updated the regional population, dwelling unit and employment projections in collaboration with member jurisdictions. Providing long range projections is a core service for Regional Planning. The Metro Vancouver long range projections support planning throughout the region. They are provided to TransLink and Metro Vancouver utilities to support capital infrastructure planning and to member jurisdictions and other regional stakeholders to support transportation, housing, and community planning throughout the region.

The Metro Vancouver Growth Projections Methodology Report aims to provide details about methods and assumptions utilized in framing the projections. The primary methodological tool in Metro Vancouver's population projections is a Hybrid Cohort Projection Model that combines a standard age-cohort model with adjustments that account for municipal land capacity and policy frameworks. Metro Vancouver's projections technical report is being provided to the Regional Planning Committee and MVRD Board for information.

PURPOSE

To provide the Regional Planning Committee and MVRD Board with information on the methodology and model assumptions that were used to produce Metro Vancouver's population, dwelling unit and employment growth projections.

BACKGROUND

In December 2018, Metro Vancouver published "Metro Vancouver Growth Projections – A Backgrounder," providing technical details of the methods used to define Regional Planning's growth projections at that time (Reference). The update to the regional growth strategy provided an opportunity to both extend the projections to the year 2050 and improve the methodology utilized. The attached Metro Vancouver Growth Projections Methodology Report details the methodology updates compared to the previous model (Attachment).

METRO VANCOUVER GROWTH PROJECTIONS METHODOLOGY REPORT

Metro Vancouver prepares and updates regional long-range projections of population, dwelling unit, and employment for the next 30 years. Future growth is modelled according to historical growth trends and adjustment factors that reflect future municipal development plans, policies and long-range strategies such as Official Community Plans. Growth projections are critical to utility, transportation, housing, and other forms of long-range planning in the region. The projections are not static but rather evolve over time. Metro Vancouver's projections are updated regularly as new data sources become available and as the Census is undertaken every 5 years. The projections will be updated again after 2021 Census data is released beginning in 2022. Metro Vancouver continues to work closely with member jurisdictions, other regional agencies, and key stakeholders to provide and share data to build accurate and consistent population, dwelling units, and employment projections.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

There are no financial implications associated with this report.

CONCLUSION

The Metro Vancouver Projections Methodology Report aims to provide the details about the Projections Model that has been developed by and used by Metro Vancouver to prepare and update the population, dwelling unit and employment growth projections that are fundamental to supporting planning throughout the region. The report provides member jurisdictions, regional agencies, and the public with the specifics about the methods and assumptions applied in the projection model, as well as the data sources used to define the baseline population, housing, and employment.

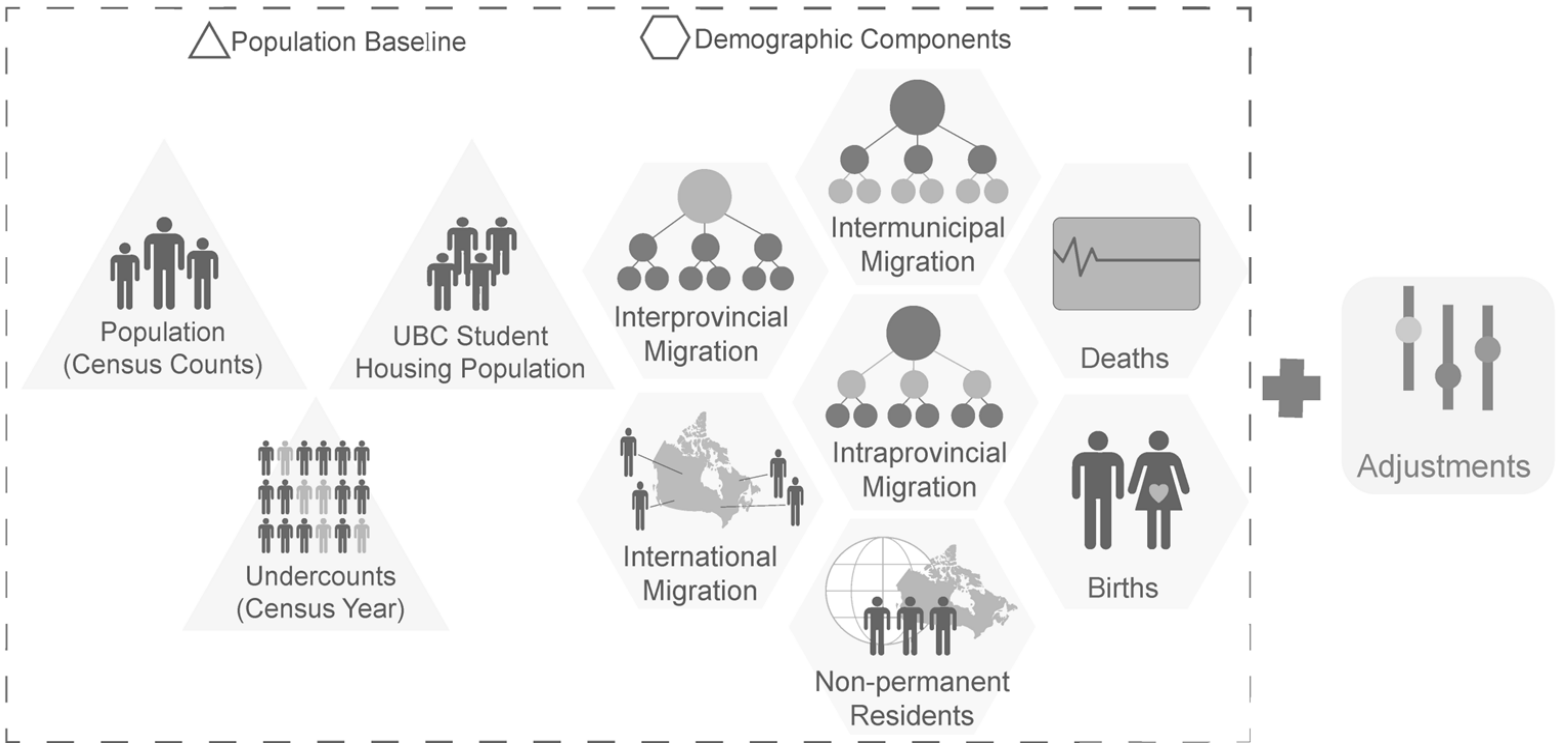
Attachment *(48803098)*

Metro Vancouver Growth Projections Methodology Report (2021)

Reference

Metro Vancouver Growth Projections – Backgrounder (2018)

47989116



Metro Vancouver Growth Projections

Methodology Report

June 2021

48803098

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1.0 INTRODUCTION

1.1. Background

Providing long range population, dwelling unit and employment projections is a core service for Metro Vancouver's Regional Planning Division, and these long range projections support planning throughout the region. They are provided to TransLink and Metro Vancouver utilities to support capital infrastructure planning and to member jurisdictions and other regional stakeholders to support transportation, housing, and community planning. They are also a core part of supporting work towards achieving strategies and policies in the regional growth strategy.

Projection modeling is intended to promote collaboration and consistency among provincial, regional, and municipal planning agencies and establish a common basis of information, assumptions, and growth and policy implementation methods. Metro Vancouver prepares projections applicable to the following work to ensure an appropriate integration among critical regional infrastructure planning and implementation:

- Supporting regional water service and liquid waste utilities demand planning
- Assisting TransLink's transportation demand modelling
- A reference for local Official Community Plans (OCP)
- Fundamental inputs to Metro Vancouver's regional land-use model

Given the potential resource demand, Metro Vancouver attempts to combine available staff knowledge and resources from regional and municipal agencies with commissioned studies to provide reasonable assumptions and estimates of future growth. All projections are established in four steps:

1. Prepare a draft of municipal population, dwelling unit, and employment projections
2. Engage with member jurisdictions on proposed draft projections
3. Calibrate and reconcile municipal projections to develop finalized estimates
4. Aggregate of agreed local projections to sub-regional and regional levels

All projections are explicitly or implicitly scenario-based. This document provides an overview of the methods and assumptions applied in long-range projections of a medium-growth scenario, which is the baseline scenario. This baseline scenario generally assumes that the existing regional growth policy framework remains in place and that a variety of external factors potentially affecting the region (i.e., the global and national economies) will remain consistent and stable on average over the long term, using 2016 as the benchmark. Based on this established medium-growth scenario, a +/-15% growth range[1] is incorporated regarding factors influencing regional growth.

[1] For a given year, +15% and -15% of the total growth accumulated since 2016 is applied to calculate projection ranges (named high-growth and low-growth scenarios, respectively).

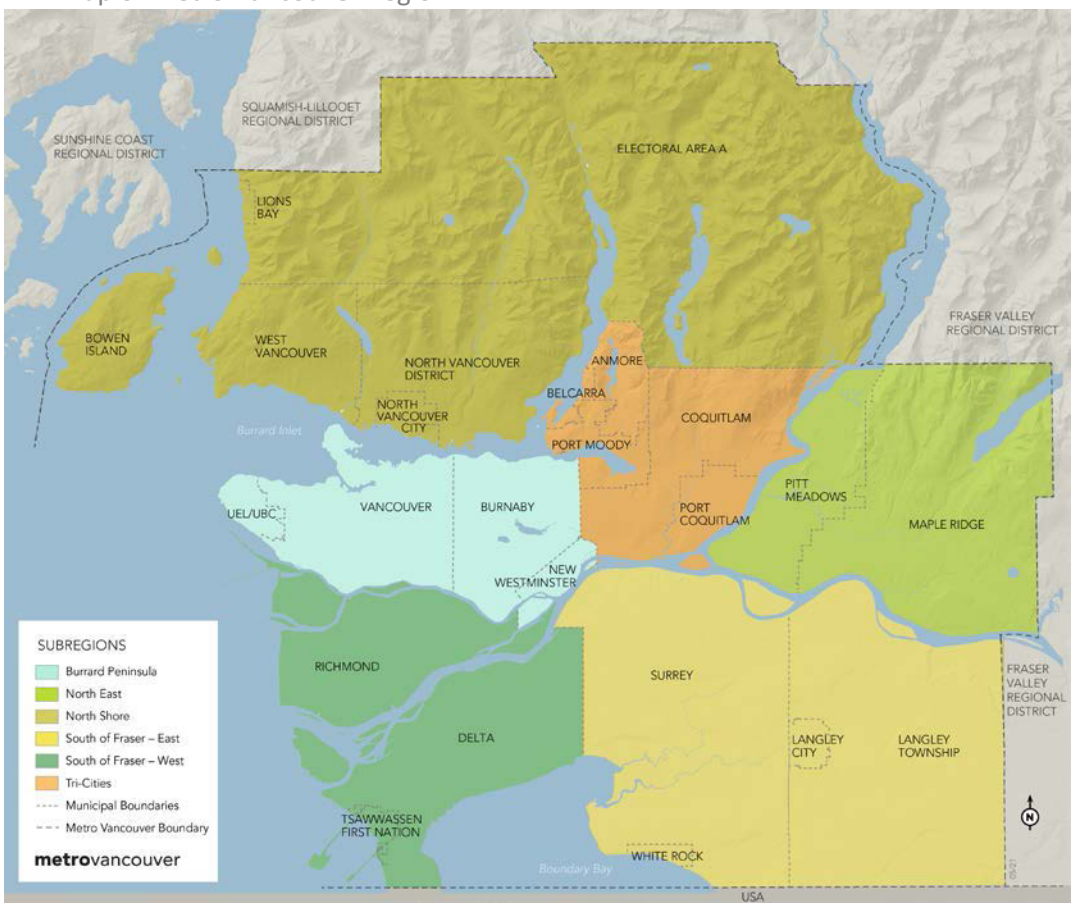
1.2. Geographical Coverage

Metro 2040 reported projections by member jurisdiction[2]. Each municipal projection includes the totals for any First Nation communities located geographically within or directly adjacent to the respective municipal boundary. The 2016 Census indicated approximately 6,500 people were living in Indian Reserves (IRs) in the region of Metro Vancouver.

Metro 2050 separates IRs from municipalities so that they can be treated independently. Because IRs' population size is relatively small and there are no demographic components of sufficient quality at that level, the approach to forecasting IRs' future growth differs from those of municipalities'. Projection models assume a linear growth by extrapolating historical growth trends over past Census periods for IRs.

FIGURE 1 represents six sub-regions within Metro Vancouver, corresponding to **TABLE 4** in Appendix B. Regional or sub-regional projections in *Metro 2050* are an aggregate of municipal and IRs' projections based on Census subdivisions (CSDs)[3]. Projection methodologies described hereafter do not apply to IRs.

FIGURE 1 A Map of Metro Vancouver Region



[22] Metro Vancouver is a partnership of 21 municipalities, one Electoral Area and one Treaty First Nation, see **TABLE 4**. Metro Vancouver projections include Bowen Island (**TABLE 4** and **FIGURE 4**)

[3] A reference map for Vancouver Census Metropolitan Area (CMA) developed by Statistics Canada (Year of 2016).

2.0 METHODS AND ASSUMPTIONS

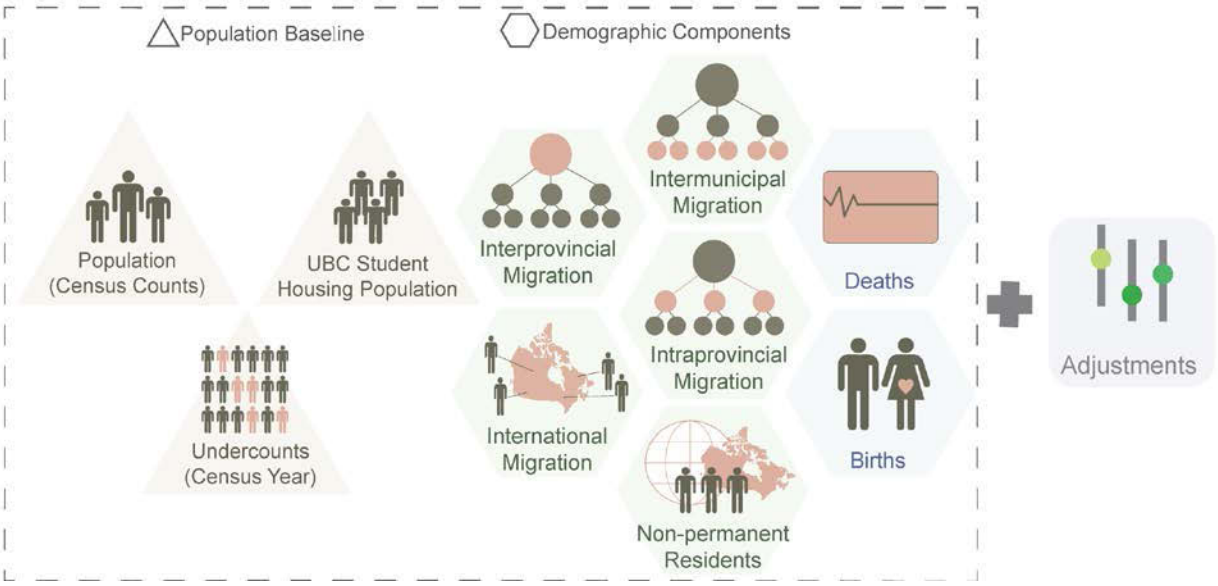
2.1. Population Projections

Population projections provide a foundation for projecting dwelling unit and employment projections. Metro Vancouver's population projections are based on:

- Census data and annual population change estimates developed by Statistics Canada (StatCan)
- Estimates of national (StatCan), provincial (BC Stats) and municipal (if applicable) future growth
- Land capacity analysis and local development plans and policies
- Assumptions of indicators that may evolve in the future

A primary methodological tool in Metro Vancouver's population projections is a Hybrid Cohort Projection Model that combines a standard age-cohort model with adjustments that account for municipal land capacity and policy framework, see **FIGURE 2**.

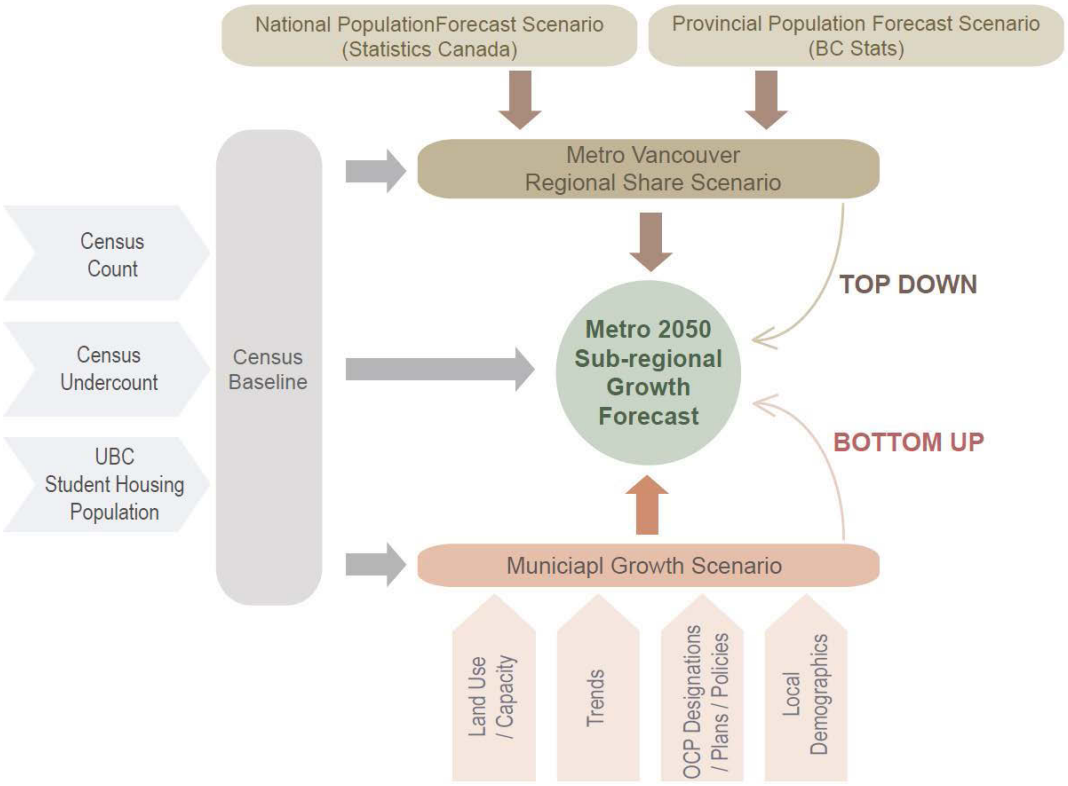
FIGURE 2 An Age-Cohort Model and Population Growth Adjustments



Metro Vancouver staff apply a hybrid model combining both top-down and bottom-up approaches (**FIGURE 3**). The model itself is regional and uses trend projections for births, deaths, immigration, and migration between provinces and within the province. The top-down approach is based on the age-cohort model and produces draft projections as a base for consultation with member jurisdictions. Those draft projections have been vetted by municipal staff who provide municipal land capacity and local policy frameworks expertise that is incorporated into the model through refinements and adjustments.

The following subsections explain the approach in detail. The age-cohort model establishes population by gender and single year of age for a given base year. Then for every subsequent year, the population for that single year of age is predicted by estimating the change in natural increase and migration trends. Demographic components of population growth are expected to generally follow historical trends over the projection period. This approach is applied to individual municipal area except for IRs (see **TABLE 4** in Appendix B).

FIGURE 3 An Illustration of Top-Down and Bottom-Up Approaches



2.1.1. Age-cohort Modeling Methods

2.1.1.1. Estimates of Population Baseline

The initial population or base population is the population at the beginning of a period used as a starting point for the estimation process. It is estimated from the Census counts in 2016, adjusted for undercount estimates[4] and on-campus student housing population, which is not generally captured in Census program. Census counts in 2016 are adjusted to include a 4.6% undercount rate estimated by StatCan for the region of Metro Vancouver and roughly 11,000 UBC (the University of British Columbia) on-campus students, resulting in a total of 2.59 million people in 2016.

[4] Undercounts refer to Census net undercoverage (CNU), a difference between undercoverage and overcoverage.

2.1.1.2. Natural Increase

Projecting natural increase involves estimating the difference between the number of births and deaths by age and gender within the population. Births are estimated by age-specific fertility rates in each member jurisdiction. Metro Vancouver acquired a custom tabulation of historical age-specific fertility rates from BC Stats. The fertility rates data are disaggregated by Local Health Areas (LHAs) and age from 15 to 49 years old. Deaths are estimated by an annual estimate of death probability between two ages (in single years) The death probability is characterized by age and gender at a provincial level and derived from life tables published by StatCan. Future patterns in births and deaths specified by age and gender are derived by following vital statistics and assumptions.

- A custom tabulation of fertility rates developed by BC Stats
- Survivorship rates released by StatCan
- Variations in fertility and mortality rates according to a moderation of their historic annual changes

The fertility rate in the past 5 years declined in Metro Vancouver, especially for females under the age of 35. The survivorship rate of the elderly is assumed to gradually increase, whereas that of the rest of the population cohorts will remain relatively stable. With the overall aging of the population and a growing share of the population in the older age cohorts, the number of deaths in Metro Vancouver is expected to increase more rapidly than the number of births. Thus, the natural increase will continue to decrease and reach 0 in the early 2030s; deaths will continue to exceed births thereafter.

2.1.1.3. Migration

As shown in **FIGURE 2**, migration consists of 5 components: international migration (immigration), interprovincial migration, intra-provincial migration, inter-municipal migration, and flows of non-permanent residents (NPRs). Future migration trends are predicted by a net value reflecting in and outflows of migration. Trend data on migration flows for Metro Vancouver and its member jurisdictions are derived from a custom acquisition of Census mobility data (current Census residence and place of residence 5 years ago). This data is cross-referenced by gender, age, and municipality to produce a trend profile of migrants and municipal distribution patterns.

International migration

International migration represents population movement (a change in the usual place of residence) between Canada and a foreign country. It comprises immigrants, returning emigrants, and emigrants leaving the region to settle in other countries[5]. Net international migration or net immigration is the primary factor in projecting Metro Vancouver's population growth. Over the past 10 years (from 2009 to 2018), about 81% of BC's immigrants lived in the Metro Vancouver region (while Metro Vancouver comprises approximately 53% of the provinces population), which is 11% of Canada's total immigrant population. The following datasets and assumptions are applied to project future net international migration.

[5] Net temporary emigration is not considered in Metro Vancouver's population projection model. Net non-permanent residents (NPRs) is discussed in another section.

- A custom tabulation of mobility status on the place of resident developed by StatCan
- Annual estimates of net international migration published by StatCan
- Assumptions of an annual growth rate of annual net international migration
- A gradual shift toward a more balanced distribution of immigrant settlement in relation to overall population growth capacity in each member jurisdiction
- Historical distribution of net international migration by gender and age group
- 2021-2023 Immigration Levels Plan released by Canada's Ministry of Immigration, Refugees and Citizenship (IRCC)

The number of regional net immigrants is estimated annually by StatCan. In the short term, it is adjusted due to an update of the Federal's Immigration Levels Plan, which considers the impacts of COVID-19 on permanent resident admissions. The number of immigrants coming to the Metro Vancouver region will increase by 6,000 every year from 2021 to 2023. Over the longer term, it is assumed to steadily increase at an annual growth rate. As a result, Metro Vancouver expects to gain 30,000 to 40,000 net immigrants per year through the projection period (ending 2050), accounting for almost 70% of regional population growth. Municipal allocation trends generally follow historical distribution of immigrant settlements observed within a 10-year term, resulting in 26% and 23% of regional immigrants settling in the City of Vancouver and the City of Surrey, respectively. It is assumed that immigrants' and emigrants' gender and age structure will stay relatively constant over time.

Interprovincial migration

Interprovincial migration represents movement between Canadian provinces or territories. Interprovincial migration in Metro Vancouver refers to the movement by people from the region to another province or territory in Canada. Trends in the inter-provincial migration rates primarily relate to the comparative strength of the regional economy, employment opportunities, and lifestyle in Metro Vancouver versus other areas in Canada. Net interprovincial migration is measured by the following estimates and assumptions:

- National population projection developed by StatCan
- A custom tabulation of mobility status on the place of resident developed by StatCan
- Annual estimates of interprovincial in- and out-migration published by StatCan
- A relative consistent share of the national population moving from other provinces to the Metro Vancouver region
- A constant proportion of population leaving the Metro Vancouver region to other provinces or territories in Canada

In the next 30 years, the overall regional annual net interprovincial migration is expected to remain relatively minor in overall regional growth projections, generally averaging a net gain ranging from 2,000 to 4,000. It is expected to increase to a level of 4,000, which comprises of an inflow of 29,000 and an outflow of 25,000 by 2050. Historic interprovincial flow distributions by the municipality, age, and gender will remain relatively consistent. The City of Vancouver is projected to accommodate the region's largest

share of regional interprovincial migrants (29%), followed by the City of Burnaby with a share of 13%, and the City of Surrey with a share of 12%.

Intraprovincial migration

Intraprovincial migration or sub-provincial migration of Metro Vancouver involves movements between the region and the rest of British Columbia. It represents movements occurring within the same province. Historical patterns in intraprovincial migration are carried forward to estimate future trends. The annual intraprovincial migration outflow is expected to exceed that of inflow. Net intraprovincial migration is estimated by the following estimates and assumptions:

- Provincial population projection estimated by BC Stats
- A custom tabulation of mobility status on the place of resident developed by StatCan
- Annual estimates of intra-provincial in and out-migration published by StatCan
- A relative consistent share of BC provincial population moving from other regions in BC to the region of Metro Vancouver
- A constant proportion of regional population leaving from the region to another area in BC

Metro Vancouver will anticipate a net loss of an average of 9,900 people per year only because of intra-provincial movement activities. The intra-provincial flow dynamics vary among municipalities. The City of Surrey will have the highest share of the regional net flow (26%) over the projection period, followed by Langley Township (12%) and the City of Vancouver (11%).

Inter-municipal migration

Inter-municipal migration represents regional residents moving among municipalities within the region of Metro Vancouver. In theory, the sum of net inter--municipal migration over all municipalities should be zero. Historic inter-municipal migration trends showed that Metro Vancouver's region involved 394,000 movements (between different municipalities) between 2006 and 2016. Trends in the inter-municipal migration rates typically relate to the particular lifestyle preference and choices for residents and the relative housing, employment, and amenity options and opportunities in each municipality. The projections of net inter-municipal migration are based on the following assumptions:

- A custom tabulation of mobility status on the place of resident published by StatCan
- A relative consistent share of Metro Vancouver residents will be moving among municipalities in the region in any given year
- A constant mover rate of inter-municipal inflow or outflow by municipality, gender, and age

A constant share of Metro Vancouver's residents is assumed to move within the region in any given year. This share is estimated by a ratio of inter-municipal movements to the total regional population in 2016. Future inter-municipal migration generally aligns with historical patterns. The City of Vancouver will experience 29% of the total outflow of regional inter-municipal migration among all municipalities, followed by the City of Burnaby at 13%, and the City of Richmond at 7%. On the contrary, the following three municipalities can anticipate a higher municipal share of regional inter-municipal inflow than the

rest of the region's municipalities: 12% of regional inter-municipal inflow migrants will move to the City of Surrey, 11% to Langley Township, and 9% to Maple Ridge.

Non-permanent residents (NPRs)

A non-permanent resident or temporary resident is a foreign national legally authorized to enter Canada for temporary purposes, such as international students and temporary workers. NPRs in the region are projected to decrease from 6,500 in 2020 to 1,400 by 2050. Annual NPRs are modeled according to the following assumptions:

- Census NPRs estimates and annual estimates of net NPRs released by StatCan
- A scaling factor to develop a declining trend of regional net NPRs per year based on the assumption that temporary residents are very likely to transition into formal applications for permanent residency and become an immigrant in the future
- A constant share of regional NPRs by the municipality, gender, and age

2.1.2. Adjustments of Population Growth

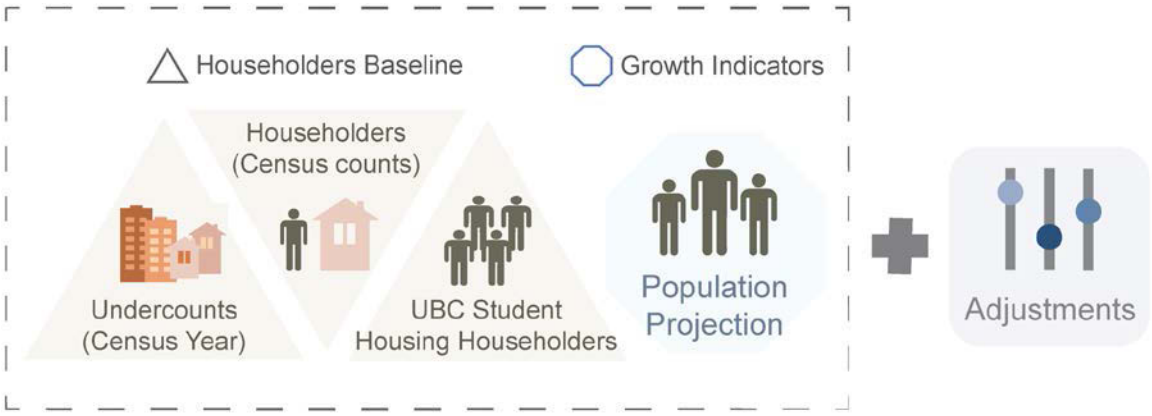
An adjustment of annual population growth is introduced to modify population projections due to the following two reasons. First, demographic projection methods do not consider the factors such as land capacity or high-level goals. Secondly, the adjustments should address the data gaps between Census counts and ground-proof data on population, employment, and housing in municipalities. During the consultation process with Tsawwassen First Nation (TFN) and UBC, it was determined that their population is higher than the enumerated number in the 2016 Census. Therefore, official Census data needed to be revisited with the data provided by member jurisdictions.

2.1. Dwelling Unit Projections

Dwelling unit projections represent an estimate of dwelling units occupied by private households (PHHs). Vacant homes, collective dwellings, etc. are excluded from projections. Householders, or primary household maintainers, are the individuals identified in the Census as the primary person in a household. Each householder equals one household. The model assumes one householder equals to one dwelling unit, noting that a building (including a single detached house) can include multiple dwelling units. Metro Vancouver has explored the relationship between population and householders for each modeling area. Similar to population projection, dwelling units are estimated based on a bottom-up approach. Municipal projections are developed based on a householder rate model and an adjustment of units growth considering factors such as land capacity (see **FIGURE 4**).

The average household size, the typical number of persons occupying a dwelling unit, is one of the projection models' outputs. Average household size at regional, sub-regional, or municipal levels is estimated by dividing the projected population living in PHHs by the projected dwelling units in that defined area. The 2016 Census provides an estimate of the regional average household size of 2.53 without considering undercounts, or 2.55 including Census undercounts.

FIGURE 4 A Householder Rate Model and Dwelling Unit Growth Adjustments



2.1.1. Householder Rate Modeling Methods

2.1.1.1. Estimates of Dwelling Unit Baseline

Dwelling unit projections utilize projected population and a householder rate characterized by the municipality, age group, gender, and dwelling structure type (see Appendix B). For each population cohort specified by age group, municipality, and gender, the model assumes a constant population share of the total population to estimate the population in collective dwellings for that population cohort. Once the collective population is determined, the population in private dwelling units is estimated by subtracting the collective population from the total population. The 2016 Census indicates about 1.5% of the total regional population living in collective dwellings. Additionally, householders' counts in 2016 are adjusted, including a 3.23% undercount rate estimated by StatCan and about 7,700 on-campus UBC student housing that is not generally captured in the Census program. The adjusted number of regional householders is estimated at nearly 1 million, indicating 39% of regional residents are identified as householders.

2.1.1.2. Householder Rates

Total future occupancy demand, which reflects dynamic changes of household formation and demography, is determined by a householder rate model. The demographic characteristics of the householders (i.e., age, gender) associated with the dwelling structure type (i.e., single-detached house, townhouse, apartment, etc.), household type (i.e., single person, couple, family, etc.), and tenure characteristics. Metro Vancouver develops dwelling unit projection distinguished by age, gender, and dwelling structure type.

Future dwelling unit growth is a multiplication of projected population by householder rates. The householder rate, applied in dwelling unit projection, is specified by age cohort and gender to account for shifting demographics, and by the municipality to account for locational differences and preferences. Instead of applying a constant householder rate estimated in the 2016 Census through the projection period, Metro Vancouver modifies the rates to reflect factors such as housing affordability and personal preference for future living. This modification is based on extrapolation from historical trends in householders' change by municipality and dwelling structure type from 2001 to 2016.

Results show that housing development throughout the region is distinctly trending toward increasingly dense multi-unit forms, with apartments comprising about 50% of new unit growth from 2016 to 2050. Correspondingly, regional average household size is estimated to decline slightly.

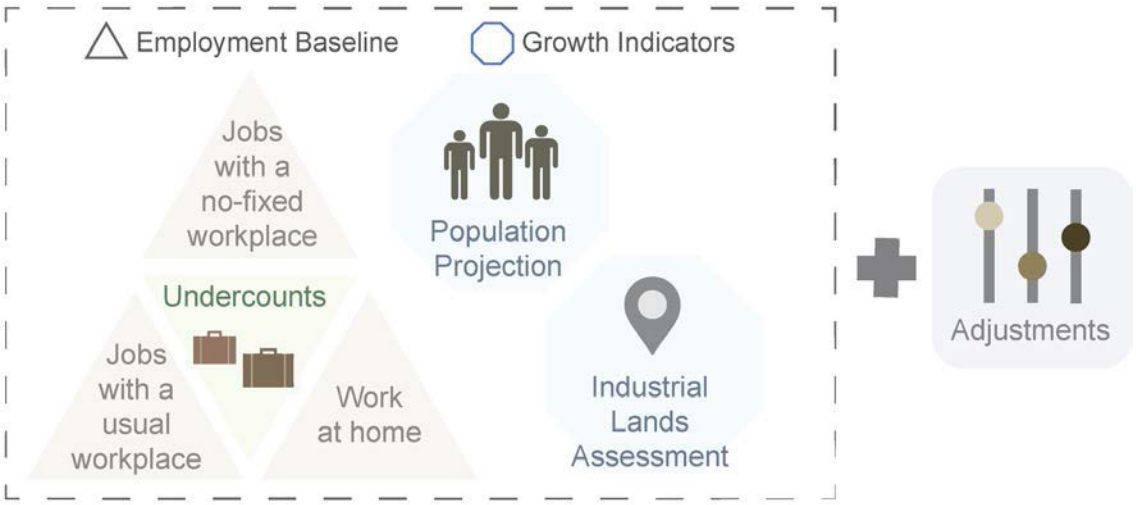
2.1.2. Adjustments of Dwelling Unit Growth

The dwelling unit projection model includes an annual adjustment of units' growth. The municipal growth was adjusted to reflect potential growth by dwelling structure types and local land use plans.

2.2. Employment Projections

Metro Vancouver prepares employment growth by industry sector at municipal, sub-regional, and regional levels. Metro Vancouver assumes a steady growth in employment at a regional level and develops an allocation method to estimate municipal employment growth. The draft results of municipal projections are adjusted after discussing with member jurisdiction staff and iterated with consideration for existing local plans, policies and studies. After endorsment of municipal projection by municipal counerparts, municipal projections are aggregated to the sub-regional level. **FIGURE 5** illustrates components or indicators of future employment growth. Metro Vancouver establishes a base model by estimating a baseline of employment in the region and future growth by using projected population and land use information. The following sections present a detailed description of the employment estimation methodology.

FIGURE 5 A Labour Force Model and Employment Growth Adjustments



2.2.1. Labour Force Modeling Methods

2.2.1.1. Estimates of Employment Baseline

Metro Vancouver establishes a Census baseline for the labour force. The employed labour force was allocated by industry sector. Three components are considered to establish the baseline for the number of jobs by the municipality and industry sectors in 2016:

- Number of jobs with a usual workplace and home-based jobs reported in Census Place of Work Status (POW) tables
- Estimates of jobs with no-fixed workplace (NF) reported in Census Place of Residence (POR) tables
- An undercount rate of 4.6% to be consistent and comparable with population undercounts

The Census allocates jobs with no-fixed workplace address to the city where the worker resides rather than the city of the work activity. For example, a no-fixed job of a truck driver living in the City of Burnaby and working in the City of Vancouver would be allocated to the City of Burnaby's no-fixed jobs. Municipal NF jobs by industry sector are estimated by a regional allocation method. The municipal share of regional NF jobs depends on POW jobs in that municipality and its population size.

2.2.1.2. Regional and Municipal Employment Projections

Projecting future employment growth is inter-related between the type and level of economic activity in the region, trends in employment demand, and the regional population labour force. To estimate future employment growth, Metro Vancouver has assessed land use and analyzed relationships between population and labour force. The employment projections are strongly associated with regional population growth projections and the following assumptions of sectoral employment trends:

- A marginal decrease in the overall regional employment-to-population ratio, with the component employment sectors generally shifting toward increases in service industries and modest changes in the share of employment within the individual sectors
- Economic growth and sectoral composition will be consistent with the current status and relatively stable in future years, with some trending projected among the component industry sector shares of employment activity

The estimated regional employment growth is distributed to municipal levels by industry sector. The municipal share of the regional total is based on the following factors:

- Projected municipal population growth
- Municipal employment characteristics by industry sector
- The likelihood that future employment will be location-dependent (e.g. ports, agriculture, education institutions) or population-serving (e.g. retail, food services)
- An assessment of available industrial and employment land for all municipalities to estimate location-based job growth such as employment in manufacturing and wholesale sectors

2.2.2. Adjustments of Employment Growth

The municipal annual estimates determined by the above methods are adjusted according to the feedback received from the municipal staff, resulting in a change in the estimates of regional total employment.

3.0 CONCLUSIONS

Metro Vancouver prepares regional long-range projections of population, dwelling unit, and employment for the next 30 years. Future growth is modeled according to historical growth trends and adjustment factors to reflect future municipal development plans and/or ongoing policies and long-range strategies. Metro Vancouver expects to have 3.8 million people, 1.6 million dwelling units, and 1.9 million jobs (the baseline scenario of projections) in the year 2050.

COVID-19 pandemic has had impacts in the short-term on regional population growth, households' spending and preferences, as well as the labour force. National and provincial immigrantion levels have been significantly impacted by COVID-19. Moreover, evidence has shown that the economy is rebounding since the initial shock. Metro Vancouver assumes this pandemic situation is a one-time disruptor that will not have a strong or significant impact on projections in the long term.

Metro Vancouver's projections are updated regularly as new data sources become available and as the Census is undertaken. The projections are not static but rather evolve over time. The projections are critical to utility, transportation, housing, and other forms of long-range planning in the region. Metro Vancouver continues to work closely with member jurisdictions, other regional agencies, and key stakeholders to provide and share data to build accurate and consistent population, dwelling units, and employment projections.

APPENDICES

Appendix A – Results of Projections

This section presents disaggregated information of projection results or outputs[6].

a) Population is projected annually by age, and gender at regional, sub-regional, municipal, and CSDs levels (see details in **TABLE 4**). Therefore, one can estimate population in a customized age group.

TABLE 1 Disaggregated Groups of Projected Population

Population			
Disaggregation Group	Area	Single Year of Age	Gender
Classifications	Region, sub-region, municipality, or CSDs areas	Under 1 year, 1 year old, 2 years old, ... 108 years old, 109 years old, 110 years old and over	Male and Female

* Source: Metro Vancouver

b) Dwelling unit estimates are disaggregated by gender, age group, and dwelling structure type (see details in **TABLE 5**) at regional, sub-regional, municipal, and CSDs levels (see details in **TABLE 4**).

TABLE 2 Disaggregated Groups of Projected Dwelling Units

Dwelling Units				
Disaggregation Group	Area	Age Group	Gender	Dwelling Structure Type
Classifications	Region, sub-region, municipality, or CSDs areas	15 to 19, 20 to 24, ... 55 to 59, 60 to 64, 65 years old and over	Male and Female	2 types of groups represented in **TABLE 5**, the first 2 columns

* Source: Metro Vancouver

c) Employment projections are available by industry sector (see details in **TABLE 6**) at regional, sub-regional, municipal, and CSDs levels (see details in **TABLE 4**).

TABLE 3 Disaggregated Groups of Projected Employment

Employment		
Disaggregation Group	Area	Industry Sector
Classifications	Region, sub-region, municipality, or CSDs areas	2 types of groups represented in **TABLE 6**, the first 2 columns

* Source: Metro Vancouver

[6] Projections broken down into disaggregated groups are not available for Electoral Area A, Tsawwassen First Nation and Indian Reserves.

Appendix B – Categorization

TABLE 4 Geographical Areas of Metro Vancouver Region, Sub-regions, Municipalities, and CSDs

Geographical Areas in Models					
Region	Sub-regions	Municipalities	Areas	CSD Name	CSD Type
Metro Vancouver	Burrard Peninsula	Electoral Area A (EAA)	UBC	Greater Vancouver A	Regional district Electoral Area (RDA)
			University Endowment Lands	Greater Vancouver A	RDA
				Musqueam 2	Indian Reserve (IR)
		City of New Westminster	New Westminster	New Westminster	City
		City of Burnaby	Burnaby	Burnaby	City
		City of Vancouver	Vancouver City	Vancouver	City
				Kitsilano 6	IR
	North East	City of Pitt Meadows	Pitt Meadows	Pitt Meadows	City
				Katzie 1	IR
		City of Maple Ridge	Maple Ridge	Maple Ridge	City
				Langley 5	IR
	North Shore	Village of Lions Bay	Lions Bay	Lions Bay	Village
		Bowen Island Municipality	Bowen Island	Bowen Island	Island Municipality
		District of West Vancouver	West Vancouver	West Vancouver	District Municipality (DM)
				Capilano 5	IR
		District of North Vancouver	North Vancouver District	North Vancouver	DM
				Seymour Creek 2	IR
				Burrard Inlet 3	IR
		City of North Vancouver	North Vancouver City	North Vancouver	City
				Mission 1	IR
		EAA	EAA Rural (North)	Greater Vancouver A	RDA
	South of Fraser – East	City of White Rock	White Rock	White Rock	City
		City of Langley	Langley City	Langley	City
		Township of Langley	Langley Township	Langley	DM
				Katzie 2	IR
				Matsqui 4	IR
				McMillan Island 6	IR
		City of Surrey	Surrey	Surrey	City
				Semiahmoo	IR
		EAA	Barnston Island	Greater Vancouver A	RDA
	South of Fraser – West	Tsawwassen First Nation	TFN	Tsawwassen	IR
		City of Delta	Delta	Delta DM	DM
				Musqueam 4	IR
		City of Richmond	Richmond	Richmond	City
	Tri-Cities	Village of Belcarra	Belcarra	Belcarra	Village
		Village of Anmore	Anmore	Anmore	Village
		City of Port Moody	Port Moody	Port Moody	City
		City of Port Coquitlam	Port Coquitlam	Port Coquitlam	City
				Coquitlam 1	IR
				Coquitlam 2	IR
		City of Coquitlam	Coquitlam	Coquitlam	City

* Source: Metro Vancouver, Statistics Canada

TABLE 5 Classification of Dwelling Structure Type

Dwelling Structure Type			
Categories in Models (1)	Categories in Models (2)	Population in private households, Census[7]	Primary household maintainers, Census
Ground-oriented housing	Single-detached house	Single-detached house	Single-detached house
		Movable dwelling	Mobile home
			Other movable dwelling
	Multi-attached house	Semi-detached house	Semi-detached house
		Apartment or flat in a duplex	Apartment or flat in a duplex
		Other single-attached house	Other single-attached house
	Row house	Row house	Row house
Apartment	Apartment	Apartment in a building that has five or more storeys	Apartment in a building that has five or more storeys
		Apartment in a building that has fewer than five storeys	Apartment in a building that has fewer than five storeys

* Source: Metro Vancouver, Statistics Canada

TABLE 6 Classification of Industry Sector

Industry Sector		
Categories in Models (1)	Categories in Models (2)	North American Industry Classification System (NAICS) 2012, Census[8]
Primary	Primary	11 Agriculture, forestry, fishing and hunting
		21 Mining, quarrying, and oil and gas extraction
Industry	Transportation and warehousing	48-49 Transportation and warehousing
	Construction	23 Construction
	Manufacturing	31-33 Manufacturing
	Wholesale	41 Wholesale trade
Commercial Service	Retail	44-45 Retail trade
	FIRE	52 Finance and insurance
		53 Real estate and rental and leasing
	Mgmt Admin Other Services OR Business Commercial Services	55 Management of companies and enterprises
		56 Administrative and support, waste management and remediation services
		81 Other services (except public administration)
	Information and Cultural Industries	51 Information and cultural industries
		71 Arts, entertainment and recreation
	Professional Technical	54 Professional, scientific and technical services
	Accommodation Food	72 Accommodation and food services
Public Administration Service	Education	61 Educational services
	Health and Welfare	62 Health care and social assistance
	Public Admin	22 Utilities
		91 Public administration

* Source: Metro Vancouver, Statistics Canada

[7] Definitions of Census dwelling structure type developed by Statistics Canada
[8] 2-digit code of NAICS developed by Statistics Canada

TABLE 7 Classification of Occupation

Occupation	
Categories in Models	National Occupational Classification (NOC) 2016, Census[9]
Management	0 Management occupations
Business, finance and administration	1 Business, finance and administration occupations
Natural and applied sciences and related	2 Natural and applied sciences and related occupations
Health	3 Health occupations
Social science, education, government services and religion	4 Occupations in education, law and social, community and government services
Art, culture, recreation and sport	5 Occupations in art, culture, recreation and sport
Sales and service	6 Sales and service occupations
Trades, transport and equipment operators and related	7 Trades, transport and equipment operators and related occupations
Natural resources, agriculture and related production	8 Natural resources, agriculture and related production occupations
Manufacturing and utilities	9 Occupations in manufacturing and utilities

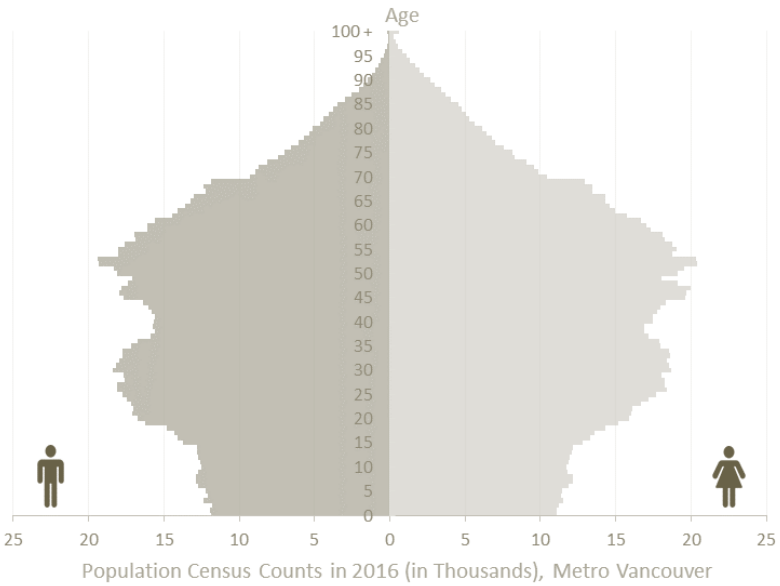
* Source: Statistics Canada, Rennie & Associates Realty Ltd.

[9] 1-digit code of NOC developed by Statistics Canada

Appendix C – Facts from 2016 Census

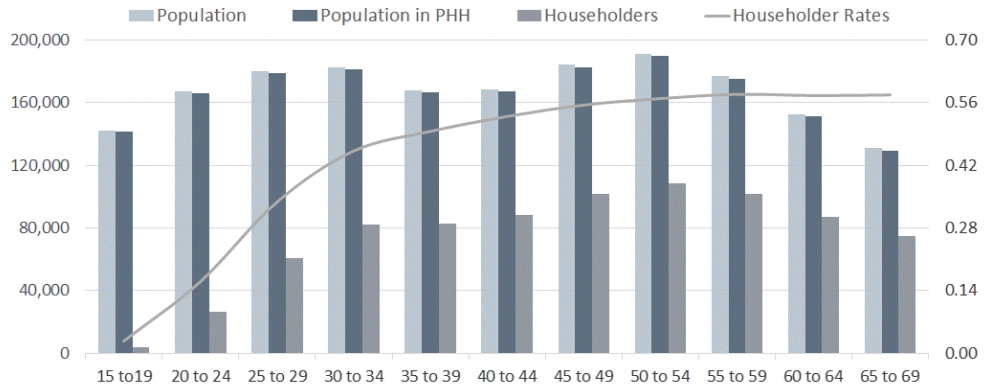
Metro Vancouver's population was nearly 2.5 million (excluding undercount estimates or on-campus student housing population) in 2016. **FIGURE 6** represents the regional population disaggregated by age and gender extracted from 2016 Census counts (excluding undercount estimates or UBC on-campus student housing population). The share of children under 15 years and seniors aged 65 years and over were 14.7% and 15.7%, respectively. The regional sex ratio was 95 males to 100 females.

FIGURE 6 Metro Vancouver's Population Counts by Age and Gender, 2016 Census



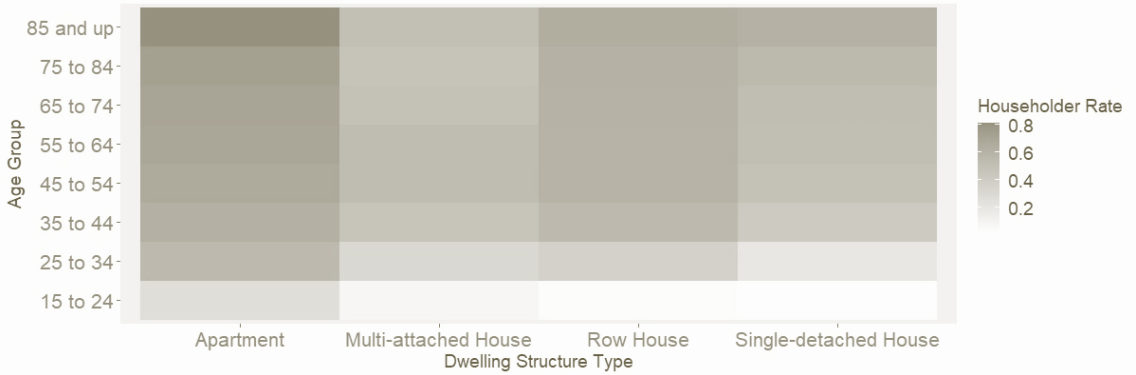
2016 Census reported 961,000 primary household maintainers living in occupied private dwellings for Metro Vancouver (without undercounts or UBC student housings estimates). Metro Vancouver collected Census housing data and explored household composition by age group and structure type. As of 2016, approximately 98% of regional residents lived in occupied private dwellings, representing an overall householder rate of 0.4 or an average household size of 2.53. Homeownership is strongly related to age and dwelling structure type.

FIGURE 7 Metro Vancouver's Population, Population Living in Private Dwellings, and Primary Household Maintainers by Age Groups, 2016 Census



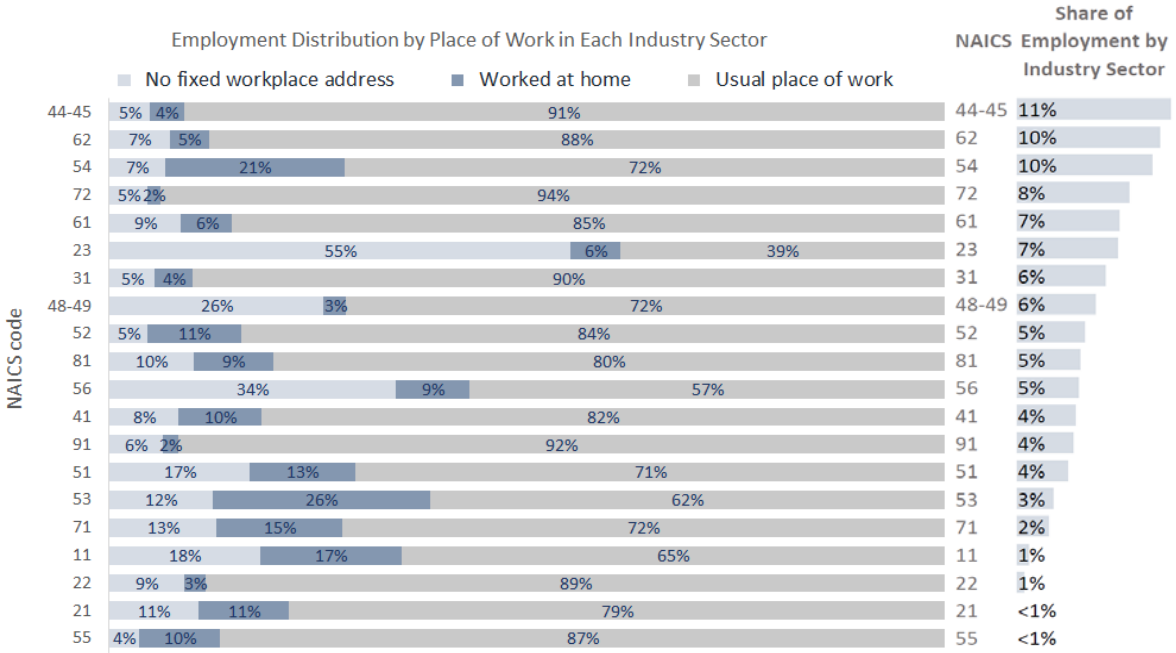
According to **FIGURE 7**, householder rates increased from the age group of 15 to 19 until stabilizing around the early-40s. The age cohort of 50 to 54 accounted for the largest share in terms of population size or number of population in private households (PHH). Although this cohort consumed the most housing units across the region, the 55 to 59 age cohort had the highest householder rate among age groups. **FIGURE 8** illustrates householder rates differentiated by age group and dwelling structure type at a regional level. Persons aged 45 to 54 had the highest householder rates for a multi-attachment house, whereas the householder rates of people aged 85 and up were highest for the other dwelling 3 structure types. Householder rates of apartments were higher than those of other dwelling structure types.

FIGURE 8 Metro Vancouver's Estimated Householder Rates by Age Group and Dwelling Structure Type, 2016 Census



There was a regional total of 1.28 million jobs estimated in 2016 (without undercount estimates). Of those jobs, 1,007,000 were in a fixed location, 105,000 worked at home, and 169,000 had no fixed location (estimates rounded). The employment-to-population ratio was 0.52. **FIGURE 9** summarizes regional jobs by industry sector (see **TABLE 6**).

FIGURE 9 Metro Vancouver's Employment by Industry Sector, 2016 Census



Appendix D – Glossary[10]

Population

- Age

Age as of July 1.

- Average Age

The average age of a population is the average age of all its members.

- Baby Boomers

People born between 1946 and 1965. A period following World War II, marked by an important increase in fertility rates and in the absolute number of births.

- Base Population

The beginning population upon which population projections are based on. Base populations are generally taken from the last full Census year population.

- Census Net Undercoverage (CNU)

Difference between undercoverage and overcoverage.

- Census Overcoverage

Number of persons or families who were counted more than once in the Census.

- Census Undercoverage

Number of persons or families who were intended to have been enumerated in a Census but were not enumerate.

- Census Year

The Census Program provides a statistical portrait of the country every five years such as the year 2016, 2011, etc.

- Immigrant

An immigrant, also known as landed immigrant or permanent resident, refers to a person who is or has ever been a landed immigrant and who has been granted the right to live in Canada permanently by immigration authorities. Emigrants references to a Canadian citizen or immigrant who has left Canada to establish a residence in another country, involving a change in usual place of residence. Emigration may be either temporary or permanent.

- Intermunicipal Migration

[10] An alphabetical list grouped by topics of population, dwelling units, and employment.

Net intermunicipal migration refers to the difference between in-migrants and out-migrants in a given municipality which can be defined as a Census subdivision. It equals 0 at the regional level.

- Labour Force

The population between the ages of 15 to 64.

- Natural Increase

Natural increase is the variation in the population size over a given period as a result of the difference between the numbers of births and deaths.

- Net International Migration

Net international migration basically refers to the total number of moves between Canada and abroad that result in a change in the usual place of residence. It is calculated by adding immigrants and returning emigrants, then subtracting emigrants and net temporary emigration.

- Net Interprovincial Migration

Net interprovincial migration represents the difference between in-migrant and out-migrants for a given province or territory involving a change in the usual place of residence. It equals 0 at the national level.

- Net Intraprovincial Migration

Net intraprovincial migration represents the difference between in-migrants and out-migrants in a given region. A region can be defined as a Census agglomeration or a Census metropolitan area. It equals 0 at the provincial level.

- Net Migration

Net migration is the difference between in-migration and out-migration, comprising variations in international, interprovincial, intraprovincial, intermunicipal migration.

- Net Non-permanent Residents

Net non-permanent residents represents the variation in the number of non-permanent residents between two dates. A non-permanent resident is a person who is lawfully in Canada on a temporary basis under the authority of a valid document (work permit, study permit, Minister's permit or refugee) issued for that person along with members of his family living with them. This group also includes individuals who seek refugee status upon or after their arrival in Canada and remain in the country pending the outcome of processes relative to their claim. Note that Citizenship and Immigration Canada uses the term temporary resident rather than non-permanent resident.

- Population

Estimated population and population according to the Census are both defined as being the number of Canadians whose usual place of residence is within that area, regardless of where they happened to be on Census Day. Also included are any Canadians staying in a dwelling in that area on Census Day and having no usual place of residence elsewhere in Canada, as well as those considered non-permanent residents.

- Population Growth

Population growth is the variation of population size between two dates. It can be positive or negative.

- School Age Population

The population between the ages of 5 to 18.

- Seniors

The population ages 65 and above.

- Sex Ratio

The ratio of the number of men to the number of females. This ratio is usually expressed as an index, with the number of females taken to be a base of 100.

- Year

Unless otherwise specified, the term “year” refers to the period beginning July 1 of a given year and ending June 30 of the following year.

Dwelling Units

- Apartment

An apartment in a high-rise building that has five or more storeys or a low-rise building that has fewer than five storeys.

- Collective Dwelling

Refers to a dwelling of a commercial, institutional or communal nature. For example, hotels, tourist establishments, nursing homes, hospitals, staff residences, military bases, work camps, jails, group homes, and so on.

- Dwelling

A dwelling is defined as a set of living quarters. Two types of dwellings are identified in the Census, collective dwellings and private dwellings.

- Ground-oriented Housing

Refers to the structural characteristics and/or dwelling configuration published by Census program, including the categories of a single-detached house, a semi-detached house, a row house, a mobile home, and other non-apartment dwellings.

- Household

Refers to a person or a group of persons who occupy the same dwelling and do not have a usual place of residence elsewhere in Canada. It may consist of a family group with or without other persons, of two or more families sharing a dwelling, of a group of unrelated persons, or of one person living alone.

- Household Growth

The difference of householder counts between two dates. It can be positive or negative.

- Household Size

The number of persons in a private household. Average household size for each dwelling type is estimated total number of persons living in private occupied dwellings by dwelling unit type dividing by the total number of private occupied dwelling units for the corresponding dwelling types.

- Occupied Private Dwellings

Occupied dwellings (occupied by usual residents) is the one of 3 classifications under private dwellings. Marginal dwellings are classified as occupied solely by foreign residents and/or by temporarily present persons and unoccupied dwellings.

- Primary Household Maintainer Rate

Primary household maintainer rate or householder rate refers to a ratio of 1 to the number of persons per household. The product of household size and primary household maintainer rate is 1.

- Primary Household Maintainers

Primary household maintainer or householder is the first person in the household identified as someone who pays the rent, or the mortgage, or the taxes, or the electricity or other services or utilities for the dwelling. When more than one member of the household contributes to the payments, the first person listed is chosen as the primary household maintainer. If no person in the household is identified as making any such payments, the first person listed is selected by default. A primary household maintainer must be 15 years of age or older.

Where a number of people may contribute to the payments, more than one person in the household may be identified as a household maintainer. Up to five household maintainers can be identified. If no person in the household is identified as making such payments, the reference person is identified by default.

- Private Dwelling

Refers to a separate set of living quarters with a private entrance either from outside the building or from a common hall, lobby, vestibule or stairway inside the building. The entrance to the dwelling must be one that can be used without passing through the living quarters of some other person or group of persons.

Employment

- Employment Growth

The difference of number of jobs between two dates. It can be positive or negative.

- Employment to Population Ratio

Employment to population ratio, also known as employment-population ratio, equals to the number of persons employed (typically population aged 15 to 64) divided by total population.

- Industry Sector

Categorization based on North American Industry Classification System (NAICS) 2012 developed by Statistics Canada. Primary sector includes agriculture, forestry, fishing and hunting, as well as mining, quarrying, etc. Industry includes sectors of transportation, warehousing, construction, manufacturing, and wholesale trade. Public Administration Service includes educational services, health care, utilities and public administration sectors. Other sectors are regarded as a group of Commercial Service, such as retail trade, professional services, etc.

- Employment-to-population Ratio

The number of persons employed divided by total population, represented as a number with two decimal digits.

- No fixed workplace address

Persons who do not go from home to the same workplace location at the beginning of each shift. Such persons include building and landscape contractors, travelling salespersons, independent truck drivers, etc.

metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Climate Action Committee

From: Erik Blair, Regional Planner II
Parks and Environment Department

Date: October 8, 2021 Meeting Date: November 5, 2021

Subject: **Metro Vancouver's *Climate 2050 Buildings Roadmap***

RECOMMENDATION

That the MVRD Board:

a) endorse the *Climate 2050 Buildings Roadmap* as attached to the report dated October 8, 2021, titled "Metro Vancouver's *Climate 2050 Buildings Roadmap*" as the initial Roadmap towards achievement of the *Climate 2050* vision, goals, and targets for greenhouse gas reduction and resilience in the buildings sector;
b) direct staff to continue working with member jurisdictions and other partners to implement the actions in the *Climate 2050 Buildings Roadmap*; and
c) direct staff to update the Roadmap, as needed, in response to changes in science, technology and policy.

EXECUTIVE SUMMARY

The *Buildings Roadmap* is one in a series of ten *Climate 2050* Roadmaps that presents a robust pathway to have a resilient and sustainably powered regional building stock by 2050. Buildings in Metro Vancouver currently contribute about 25% of the region's overall greenhouse gas emissions. The *Buildings Roadmap* complements the recently adopted Clean Air Plan and the buildings-related actions contained therein to meet the region's 2030 greenhouse gas and air quality targets. The *Roadmap* identifies 12 big moves, and includes 7 strategies and 38 actions to reduce emissions, and ensure the region's building stock will be resilient to a changing climate. A draft of the *Buildings Roadmap* was presented to the Climate Action Committee and Board in March 2021. Staff have since completed engagement through a number of avenues, and have included a summary of key feedback that has been considered in finalizing the *Buildings Roadmap*. This report seeks endorsement of the *Climate 2050 Buildings Roadmap* by the MVRD Board.

PURPOSE

This report presents the *Climate 2050 Buildings Roadmap*, seeking endorsement by the MVRD Board.

BACKGROUND

Following the MVRD Board adoption of the *Climate 2050 Strategic Framework* in September 2018, staff were authorized in October 2019 to begin an integrated engagement process for *Climate 2050* and the *Clean Air Plan*, using a series of issue area discussion papers related to the roadmaps. A discussion paper on the *Climate 2050 Buildings Roadmap* was received by the Climate Action Committee at its September 20, 2019 meeting, followed by a draft Buildings Roadmap at the March 3, 2021 meeting. With the completion of engagement on the draft, staff have now finalized the *Climate 2050 Buildings Roadmap*, and are seeking endorsement by the Board.

CLIMATE 2050 STRATEGIC FRAMEWORK

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 gases (GHGs) 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*, as well as forthcoming updates to the regional growth strategy, and management plans such as liquid waste, solid waste, drinking water and regional parks. For actions that are within the jurisdiction or responsibility of others, Metro Vancouver can play a supporting and convening role, working closely with other orders of government, First Nations, and member jurisdictions, along with other key stakeholders, to advance implementation.

METRO VANCOUVER'S *CLIMATE 2050 BUILDINGS ROADMAP*

The *Climate 2050 Buildings Roadmap* (Attachment 1) is Metro Vancouver's pathway to ambitious and necessary change in our built environment. The Roadmap sets the goals that "all buildings are zero emissions from heating and cooling by 2050" and that "residents are protected by buildings that are resilient to high temperatures, harmful air quality, severe storms and flooding by 2050."

Potential Greenhouse Gas Reductions

The *Climate 2050 Buildings Roadmap* establishes a target of reducing GHG emissions from buildings 35% below 2010 levels by 2030, and achieving carbon neutral by 2050. Modelling, as previously presented to the Committee, estimates that actions in the Roadmap could reduce building-related GHGs by approximately 1.4 million tonnes by 2030 and over 3.5 million tonnes by 2050 (2010 buildings emissions were approximately 4.5 million tonnes). This represents a significant reduction of GHG emissions in the region, but still falls short of meeting the 2030 and 2050 science-based buildings targets adopted by the Metro Vancouver Board, which reflect the level of GHG reduction needed to limit global warming to 1.5 degrees Celsius. Achieving these targets presents a significant challenge as well as opportunities for the region's residents and buildings industry.

Metro Vancouver and its partners will continue to explore opportunities to further accelerate emission reductions during the detailed planning and implementation of the actions. It is expected that actions in the *Buildings Roadmap* and other Roadmaps may need to be updated in the future, in response to major changes in science, technology, policy and progress towards the targets. In order to ensure that there is alignment with Roadmaps that are under development, staff will also revisit any previously developed Roadmaps once all ten have been completed to reflect any necessary changes. The Committee will be provided with regular updates on the Roadmaps. For any significant changes that may need to be incorporated (such as enhanced or additional action items), staff will come back to Committee with the update to the respective Roadmap.

Implementation of the *Buildings Roadmap*

The actions in the *Climate 2050 Buildings Roadmap* will be implemented through Metro Vancouver's regulatory and planning authority, delivery of regional services, and its role as convener of and advocate for issues of regional significance. The Roadmap considers equity in all actions, and

identifies opportunities to reduce disproportionate impacts. The Roadmap also identifies actions for implementation by other governments and organizations. Metro Vancouver's resources available for implementation will be focused on the priority "Big Moves". Progress on achieving the goals and targets will be measured against recommended key performance indicators, and reported publically.

Big Moves in the *Buildings Roadmap*

The *Climate 2050 Buildings Roadmap* identifies the following 12 Big Moves, which are foundational actions needed to achieve the goals and targets of the *Climate 2050 Buildings Roadmap*:

1. Greenhouse gas performance requirements for existing large buildings
2. Greenhouse gas performance requirements for existing homes and townhomes
3. New buildings are highly efficient and electric
4. Require greenhouse gas reductions during renovations
5. Building electrification mandate for BC Hydro
6. Expand incentives for low carbon upgrades
7. Online decision support tools for low carbon upgrades in buildings
8. Emission requirements for district energy systems
9. Incorporate embodied emissions into the BC Building Code
10. Apply leading water efficiency standards to buildings
11. Require cooling measures in new buildings and major retrofits
12. Apply leading standards for ventilation and filtration in new buildings

Relationship between the *Buildings Roadmap* and *Clean Air Plan*

The *Clean Air Plan*, approved by the MVRD Board on September 24, 2021, supports *Climate 2050*'s vision of a carbon neutral region by identifying the initial actions needed to meet the region's 2030 greenhouse gas target – a 45% reduction in GHG emissions from 2010 levels by 2030. All GHG reduction actions in the *Climate 2050 Buildings Roadmap* reflect actions that were adopted in the *Clean Air Plan*. The *Buildings Roadmap* includes additional actions for adaptation, also referred to as climate resiliency that are not found in the *Clean Air Plan*.

CONSIDERING FEEDBACK AND UPDATING THE *CLIMATE 2050 BUILDINGS ROADMAP*

In 2021, staff conducted public webinars and stakeholder workshops in coordination with the *Clean Air Plan* engagement process on emission reduction actions as they related to key GHG emitting sectors, including the buildings sector. Staff have incorporated feedback on the buildings-specific actions, and they are in alignment with the actions in the *Clean Air Plan*. Staff offered additional workshops and opportunities for feedback focused on the adaptation actions as these do not appear in the *Clean Air Plan*. The full draft roadmap was publically available on the Metro Vancouver website from June to September 2021, and the opportunity to provide feedback promoted through social media platforms. The key revisions to the draft roadmap include:

- Some actions were elevated to become Big Moves to highlight more clearly the actions with the highest impact.
- Some actions were modified to identify additional partners for implementation.
- Some actions were modified to clarify the focus on new vs. existing buildings, or both.

Based on feedback received, some additional revisions to the draft *Buildings Roadmap* include:

- Additional context on the role of the *Clean Air Plan* and its relationship to the greenhouse gas mitigation strategies and actions in the *Buildings Roadmap*.
- Additional context on the linkage between the *Buildings Roadmap* and the forthcoming *Nature and Ecosystems Roadmap*, including nature-based solutions.
- One new action "provide education on retrofit options that can increase resilience to heatwaves and wildfires" (included in Strategy 6).

Attachment 2 provides more detail on how feedback was considered in finalizing the *Climate 2050 Buildings Roadmap.*

ALTERNATIVES

1. That the MVRD Board:
   a) endorse the *Climate 2050 Buildings Roadmap* as attached to the report dated October 8, 2021, titled "Metro Vancouver's *Climate 2050 Buildings Roadmap*" as the initial Roadmap towards achievement of the *Climate 2050* vision, goals, and targets for greenhouse gas reduction and resilience in the buildings sector;
   b) direct staff to continue working with member jurisdictions and other partners to implement the actions in the *Climate 2050 Buildings Roadmap*; and
   c) direct staff to update the Roadmap, as needed, in response to changes in science, technology and policy.

2. That the MVRD Board:
   a) endorse the *Climate 2050 Buildings Roadmap* as attached to the report dated October 8, 2021, titled "Metro Vancouver's *Climate 2050 Buildings Roadmap*" as the initial Roadmap towards achievement of the *Climate 2050* vision, goals, and targets for greenhouse gas reduction and resilience in the buildings sector, with amendments proposed by the Climate Action Committee;
   b) direct staff to continue working with member jurisdictions and other partners to implement the actions in the *Climate 2050 Buildings Roadmap*; and
   c) direct staff to update the Roadmap, as needed, in response to changes in science, technology and policy.

3. That the MVRD Board receive for information the report dated October 8, 2021, titled "Metro Vancouver's *Climate 2050 Buildings Roadmap*" and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

The resources required to develop and engage on the *Climate 2050 Buildings Roadmap* were approved under the 2020 and 2021 budgets. Continued alignment of implementation activities and deliverables for the *Climate 2050 Buildings Roadmap* with the *Clean Air Plan* is intended to make the best use of resources available. As such, resource and cost implications will be brought back to the Committee and Board in coordination with the *Clean Air Plan* budgeting and work planning processes. The 2022 and subsequent annual budgets and five-year work plans will reflect the resource needs to begin implementation of actions in the *Clean Air Plan* and *Climate 2050 Buildings Roadmap*, as well as implementation of climate resiliency actions included in the *Climate 2050 Buildings Roadmap*.

CONCLUSION

Metro Vancouver's *Climate 2050 Buildings Roadmap* sets an ambitious path towards zero emissions and resilient buildings in the region by 2050. The *Buildings Roadmap* has been updated based upon feedback received in 2021. To achieve the 2030 and 2050 targets, Metro Vancouver and its partners need to start on the actions in the Buildings Roadmap as soon as possible, using the full extent of each agency's authority, while continuing to explore opportunities to further accelerate emission reductions and improve the resiliency of all buildings. Staff recommend Alternative 1, to endorse the *Climate 2050 Buildings Roadmap*.

Attachments *(48848146)*

1. *Climate 2050 Buildings Roadmap*
2. Feedback considered in finalizing the *Climate 2050 Buildings Roadmap*

Reference

1. Feedback Considered in Finalizing the Clean Air Plan

48479869

CLIMATE **2050 Roadmap**

Buildings

A Pathway to Zero Emissions and Resilient Buildings

October 2021

FRONT COVER: BROCK COMMONS, UNIVERSITY OF BRITISH COLUMBIA.
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Metrotower III, 4515 Central Boulevard, Burnaby, BC, V5H 0C6
www.metrovancouver.org

October 2021

The goals and targets at the heart of Metro Vancouver's climate-related plans are based on science. Reaching them is a top priority for the organization and the region. We must take bold action now to become a carbon neutral region by 2050, while recognizing that changes to our climate are already occurring, and that climate resilience must be a central consideration for the development of the region. The *Climate 2050 Transportation Roadmap* was prepared in 2020/2021 and introduced for stakeholder comment during the COVID-19 pandemic. Across the globe, the pandemic response has provided a glimpse of what is possible and what we can achieve with coordinated efforts and common goals in a time of crisis.

Metro Vancouver

Metro Vancouver is a federation of 21 municipalities, one Electoral Area and one Treaty First Nation, working collaboratively in planning and providing vital utility and local government services to 2.6 million people. Essential services include drinking water, sewage treatment, and solid waste disposal, along with regional services like regional parks, housing, land use planning and air quality management that help keep the region one of the most livable in the world.

Mission

Metro Vancouver's mission is framed around three broad roles.

1. **Serve as a Regional Federation**

Serve as the main political forum for discussion of significant community issues at the regional level, and facilitate the collaboration of members in delivering the services best provided at the regional level.

2. **Deliver Core Services**

Provide regional utility services related to drinking water, liquid waste and solid waste to members. Provide regional services, including parks and affordable housing, directly to residents and act as the local government for Electoral Area A.

3. **Plan for the Region**

Carry out planning and regulatory responsibilities related to the three utility services as well as air quality, regional planning, regional parks, Electoral Area A, affordable housing, labour relations, regional economic prosperity, and regional emergency management.

Building a Resilient Region

Building the resilience of the region is at the heart of Metro Vancouver's work. Each of Metro Vancouver's regional plans and strategies adopts a vision, guiding principles, goals, strategies, actions and key performance measures that will support a more resilient, low carbon and equitable future. Metro Vancouver's interconnected plans and strategies are guided by the Board Strategic Plan, which provides strategic direction for each of Metro Vancouver's legislated areas of responsibility and the Long-Term Financial Plan which projects total expenditures for capital projects and operations that sustain important regional services and infrastructure. Together these documents outline Metro Vancouver's policy commitments and specific contributions to achieving a resilient region.

REGIONAL MANAGEMENT PLANS/STRATEGIES

Metro Vancouver's Roles and Responsibilities for Climate Action

The three broad roles outlined in Metro Vancouver's mission each demonstrate responsibilities related to climate change. More specifically, under the *Environmental Management Act*, Metro Vancouver has the delegated authority to provide the service of air pollution control and air quality management and may, by bylaw, prohibit, regulate and otherwise control and prevent the discharge of air contaminants, including greenhouse gases. Through the regional growth strategy, Metro Vancouver, with its members, plans for compact, complete communities that are foundational to enabling a carbon neutral, resilient region. As part of delivering its core services, Metro Vancouver also generates and uses clean, renewable energy from its facilities and is working to ensure core regional services and infrastructure are prepared for and resilient to climate change.

In its role as a regional forum, Metro Vancouver builds and facilitates collaborative processes which engage the public and build partnerships to address significant regional issues like climate change. As part of this role, Metro Vancouver coordinates with and advocates on behalf of its member jurisdictions to other governments and partners on greenhouse gas management and climate change adaptation initiatives. Metro Vancouver will be looking to other governments and regional partners to lead the implementation of a number of key actions in the *Climate 2050 Roadmaps*, highlighting the importance of ongoing collaboration with others.

The Roadmap at a Glance

Buildings are where we spend most of our lives. They provide us shelter, places to play, create, congregate, and so much more. They are also contributing to climate change. One quarter of all greenhouse gas emissions in the region comes from burning natural gas to heat and cool our homes and buildings, produce hot water, and for some household appliances.

Buildings also last a long time. Decisions that we made a century ago about design and construction are affecting our greenhouse gas emission levels today. Similarly, the decisions we make today will determine the amount of emissions they create well beyond 2050.

The Climate 2050 Buildings Roadmap is about ambitious and necessary change in our buildings. It lays out seven key strategies and 37 actions that will reduce our greenhouse gas emissions and increase the resiliency of our new and existing buildings, in pursuit of a carbon neutral and resilient building stock by 2050.

VIEW FROM NORTH BURNABY

THE SEVEN STRATEGIES ARE:

1. Signal the Transition to Zero Emission Buildings through Requirements and Standards
2. Accelerate Demand for Zero Emission Buildings through Research, Education and Incentives
3. Shift to Zero Carbon District Energy Systems
4. Accelerate the Transition to Lower Embodied Emissions in Buildings
5. Support water conservation and non-potable water reuse to increase resilience to shifting precipitation patterns
6. Support the uptake of building design and retrofit solutions to reduce the impact of heatwaves and wildfires
7. Encourage the uptake of design and retrofit solutions that increase resilience to severe storms and flooding in buildings

To achieve a carbon neutral and resilient building stock in this region, we are going to have to make some difficult decisions and investments today, or risk passing them on to our children and grandchildren at higher cost and consequence.

We are not alone in this challenge. All over the world, cities are starting to make big decisions that will transition buildings to be more efficient, and to use clean and renewable energy. Here in our region, zero emissions buildings are possible today. Many of Metro Vancouver's member municipalities have committed to ambitious targets and bold leadership to respond to the global climate crisis. This plan responds to the challenge to come together, think big, and act now.

BURNABY METROTOWN

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Visioning Zero Emissions and Resilient Buildings in 2050

Our vision is that in 2050, Metro Vancouver residents live in resilient, healthy, zero emissions buildings across the region. Many buildings use so little energy that most of it can be generated on site, and some buildings even send unused energy back to the grid. Cities each retain their unique cultural, geographic and economic qualities, but are similarly compact in their development, with accessible and thriving local services. Buildings are healthy, comfortable and smart – allowing building occupants to easily control and automate equipment and appliances.

In response to climate change, flood protection, increased shading, air filtration and cooling have become a standard in nearly every building, and all public buildings are places for anyone seeking clean and cool air. Our region is known globally as a leader in zero emission and resilient buildings, and we are supported by a thriving circular economy and highly trained green buildings workforce.

Climate 2050 Buildings Roadmap

A pathway to zero emissions, resilient buildings in Metro Vancouver

The Challenge

This Roadmap is about ambitious and necessary change in our built environment. It presents a robust plan for this region to have a clean and sustainably powered building stock by 2050.

Buildings contribute approximately 25% of the greenhouse gas emissions in the region, mostly through burning natural gas for space and water heating. Buildings also last a long time – decisions that we made 100 years ago about the design, construction and retrofit of buildings are affecting our greenhouse gas emission levels today. Similarly, the decisions we make today will determine the amount of emissions they create well beyond 2050.

A carbon neutral region is the best option for future generations to maintain a good quality of life, beyond 2050. We have to make some difficult decisions and investments today or pass them on to our children and grandchildren at higher cost and consequence. Metro Vancouver and many of its member municipalities have committed to ambitious targets and bold leadership to respond to the climate crisis. This plan responds to the global challenge to come together, think big, and act now.

What is a Carbon Neutral Region?

A carbon neutral region means that we have achieved the deepest greenhouse gas emissions reductions possible across all economic sectors, and any emissions left are balanced out by the carbon dioxide removed from the atmosphere by the plants, trees, and soil in the region, as well as by potential carbon capture technologies that are under development.

Goals

Metro Vancouver's *Climate 2050 Strategic Framework* has set the following regional vision to guide the region's response to climate change::

- Metro Vancouver is a carbon neutral region by 2050
- Infrastructure, ecosystems, and communities are resilient to the impacts of climate change

It also sets an interim target of 45% reduction in greenhouse gas emissions from 2010 levels, by 2030.

Achieving this vision means setting goals in each of the Climate 2050 Roadmaps, in order to ensure that each sector in the region plays as strong a role as possible in getting to a carbon neutral, resilient region.

Metro Vancouver has set these goals for buildings in this region, out to 2030 and 2050.

Goal – Zero Emissions Buildings

All buildings are zero emissions from heating and cooling by 2050.

TARGETS

By 2030:

- A 35% reduction in greenhouse gas emissions from buildings, relative to 2010 levels.
- All new buildings are zero emissions in their operations.
- All new buildings produce 40% less embodied emissions from construction.

By 2050:

- All buildings are zero emissions in their operation, deriving all energy needs from 100% clean and renewable sources.
- All new buildings are carbon neutral in their embodied emissions from construction.

Goal – Resilient Buildings

Residents are protected by buildings that are resilient to high temperatures, harmful air quality, severe storms and flooding by 2050.

TARGETS

By 2030:

- All new buildings utilize world-leading water conservation methods.
- Metro Vancouver's most vulnerable residents in the region have access to buildings with cooling and clean air during extreme heat and wildfire events.
- All new buildings include cooling and air filtration adequate to protect against extreme heat and harmful outdoor air quality events.
- All new buildings are constructed to be resilient to riverine, coastal and urban flooding, and extreme storms.

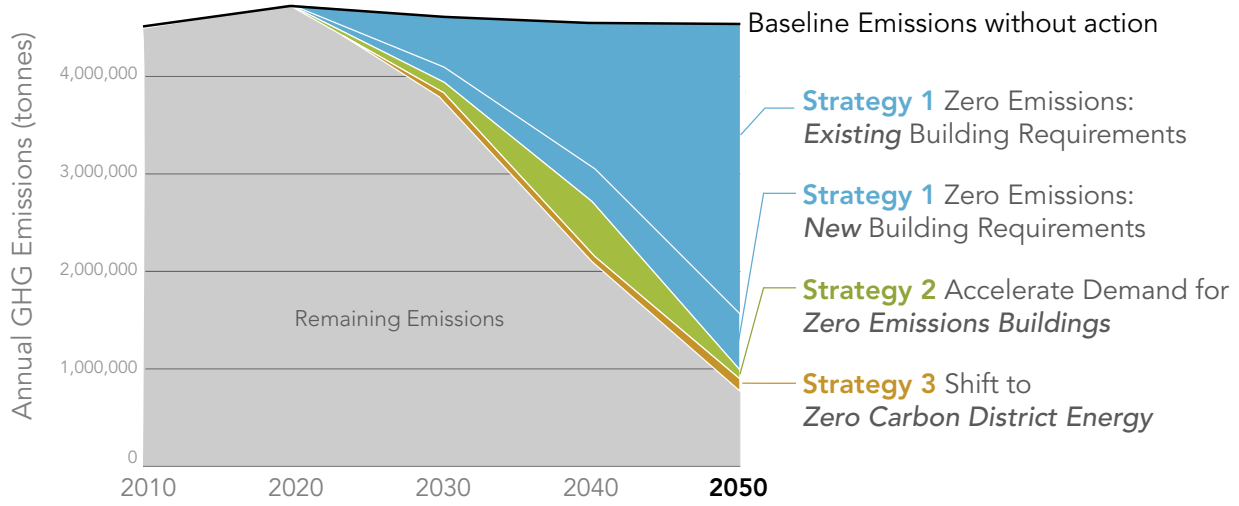
By 2050:

All Metro Vancouver's residents have access to buildings that:

- protect against extreme heat and harmful outdoor air quality events,
- are resilient to riverine, coastal and urban flooding, and extreme storms, and
- utilize world-leading water conservation methods.

The diagram below shows key strategies in this Roadmap that will significantly reduce GHGs and how, collectively, they will close the gap on a carbon neutral building stock.

GETTING TO CARBON NEUTRAL BUILDINGS: Impact of key strategies



Many of the actions identified in this Roadmap will need to be led by other levels of government (e.g., national, provincial, and local) and industry. Metro Vancouver has a long history of working with all levels of government towards common goals. Fortunately, many of the organizations needed to make this transition are already actively working toward similar goals, including: the Provincial Government and its CleanBC Plan; the Federal Government's recently strengthened climate plan called *A Healthy Environment and a Healthy Economy*; Metro Vancouver's member organization's own community and corporate climate plans; utilities; and, increasingly, industry associations.

HOWE SOUND TRAIL LOOKOUT, WEST VANCOUVER

The Connection between Climate and Air Quality

The *Clean Air Plan* is Metro Vancouver's air quality and greenhouse gas management plan. Actions in the *Plan* will reduce air contaminant emissions and impacts, including greenhouse gases, in our region **over the next 10 years**, and in doing so support the interim target of a 45% reduction in greenhouse gas emissions by 2030, and establish the foundation for the 30-year goal of a carbon neutral region by 2050. This management plan also addresses air quality targets for the region.

Residents in the region generally experience good air quality. However, health researchers have demonstrated that there are no known safe levels for some air contaminants that are harmful to human health. Through burning fuels for heating and hot water, buildings generate 9% of all nitrogen oxides emissions in the region and 25% of fine particulate matter emissions, both of which are health-harming air contaminants.

Actions in this Roadmap and the *Clean Air Plan* will help reduce all of these emissions to protect human health.

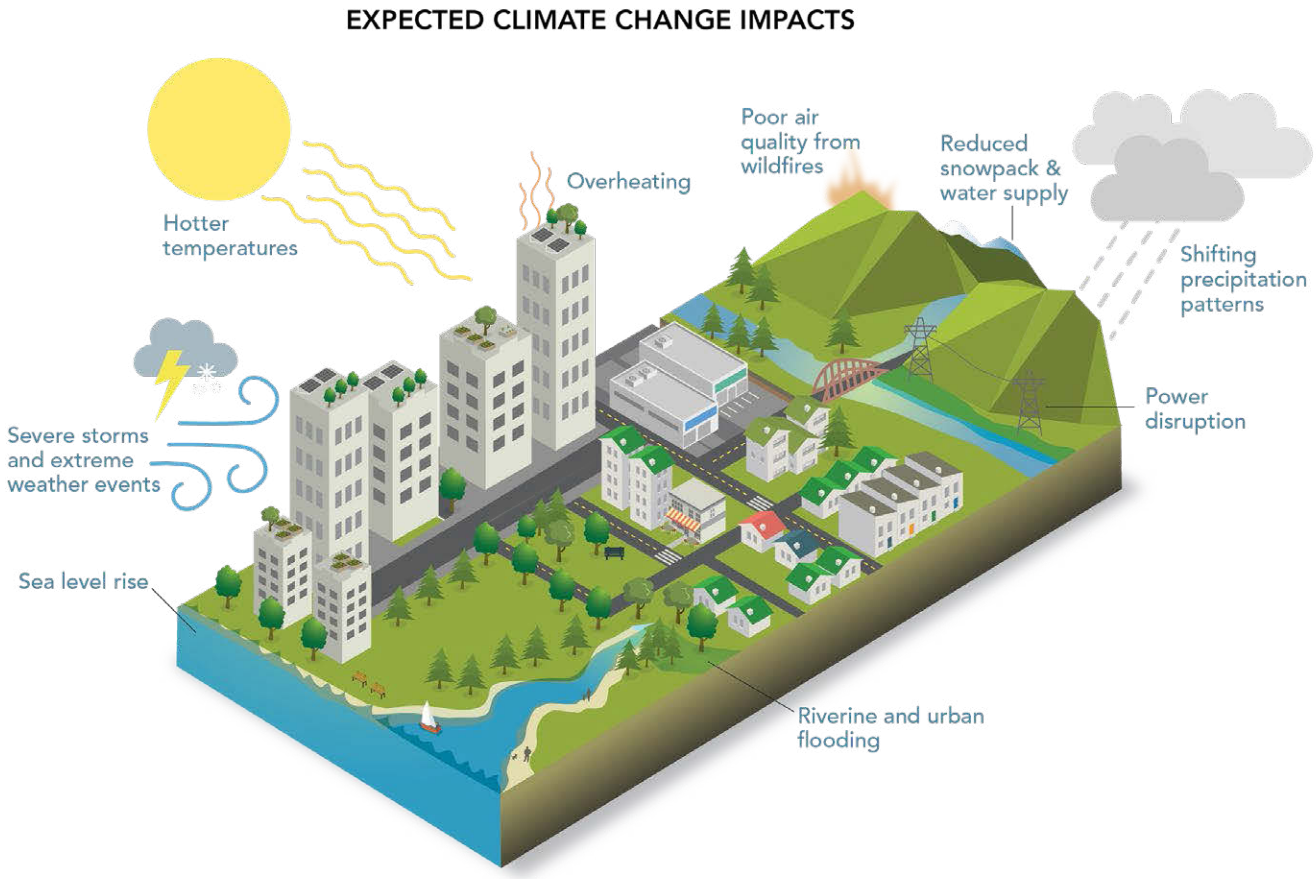
The Climate 2050 Buildings Roadmap and the *Clean Air Plan* will work together to reach a common goal of accelerating our path to a carbon neutral region. As a result, the plans share some strategies and actions. Here's what you will find similar and different in each of these plans:

CONNECTING THE *BUILDINGS ROADMAP* AND THE *CLEAN AIR PLAN*

Clean Air Plan	*Buildings Roadmap*
• Greenhouse gas reduction goals, strategies and actions. • Air quality goals, strategies and actions. • Goals, strategies and actions for other sectors such as transportation, industry, and agriculture.	• Greenhouse gas reduction goals, strategies and actions. • Resilient building strategies. • Challenges, opportunities and benefits of transitioning our buildings to become zero emissions and resilient.

Climate Impacts on Buildings

Climate change, while less evident day-to-day, is already impacting our health and our environment, and those impacts will become more evident in coming years. We spend most of our time in buildings and the impacts of a changing climate will also change how well our buildings work for us – the need for cooling in extreme heat, air filtration during wildfire smoke events, and water conservation and flood protection for droughts and severe storms. These impacts can harm some neighbourhoods, households and individuals more than others, and solutions must consider that some are better able to prepare for and protect themselves from climate change. Metro Vancouver's goal is that zero emission and resilient buildings be standard practice by 2050, both for new construction and major retrofits.



Based on climate projections to the 2050s we can expect the following changes and impacts:

Climate Changes

Hotter temperatures overall, with higher daytime and nighttime temperatures, and more hot summer days. This will lead to increased frequency and severity of heatwaves, wildfires and droughts.

Shifting precipitation patterns, including more rainfall in every season except the summer, and less precipitation falling as snow.

Severe storms and extreme weather events, including high winds and heavy rainfall.

Sea level rise, with 0.5 metres expected by 2050, which will impact coastal communities in our region. While sea level rise is an important aspect of climate change with significant regional impacts, it is not directly addressed in this report because it is being addressed through other Metro Vancouver initiatives.

Impacts Felt

Overheating in buildings where cooling solutions do not exist or are inadequate. This poses particular risk to vulnerable populations and those without the means to cope. Reducing this risk requires a thoughtful combination of passive and mechanical cooling measures.

Dangerous indoor air quality from wildfire smoke events, which can compound with existing sources of contamination (e.g., ground-level ozone, pollution from traffic and industry). Reducing this risk requires thoughtful ventilation and filtration design, and minimizing sources of pollutants wherever possible.

Reduced water supply as a result of reduced snowpack and hotter, drier summers strain drinking water supplies during times of year when demand is the greatest. Reducing this risk requires policies and measures to manage demand, support water conservation and facilitate non-potable water reuse.

Riverine and urban flooding from periods of extreme rainfall, which can cause immediate and long-term damage to buildings. This can be addressed through site selection, structural design decisions, strategic location of key mechanical systems, and careful materials selection.

Power disruption due to overloaded grids from increased demand from cooling, and from shock events including flooding and storms. This can be addressed through demand management and the installation of low-carbon backup power solutions.

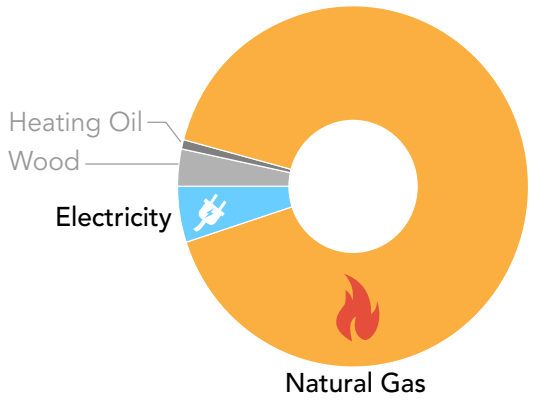
MAPLE RIDGE TOWNHOMES

Emissions from Buildings in Metro Vancouver

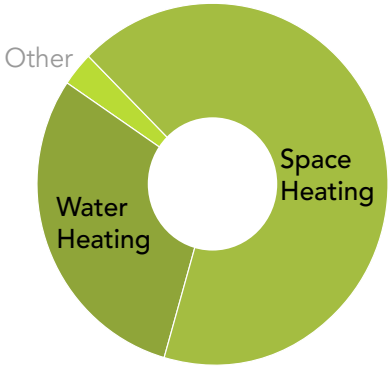
There are nearly 500,000 buildings throughout Metro Vancouver that collectively have more than 185 million square meters (2 billion square feet) of floor space.

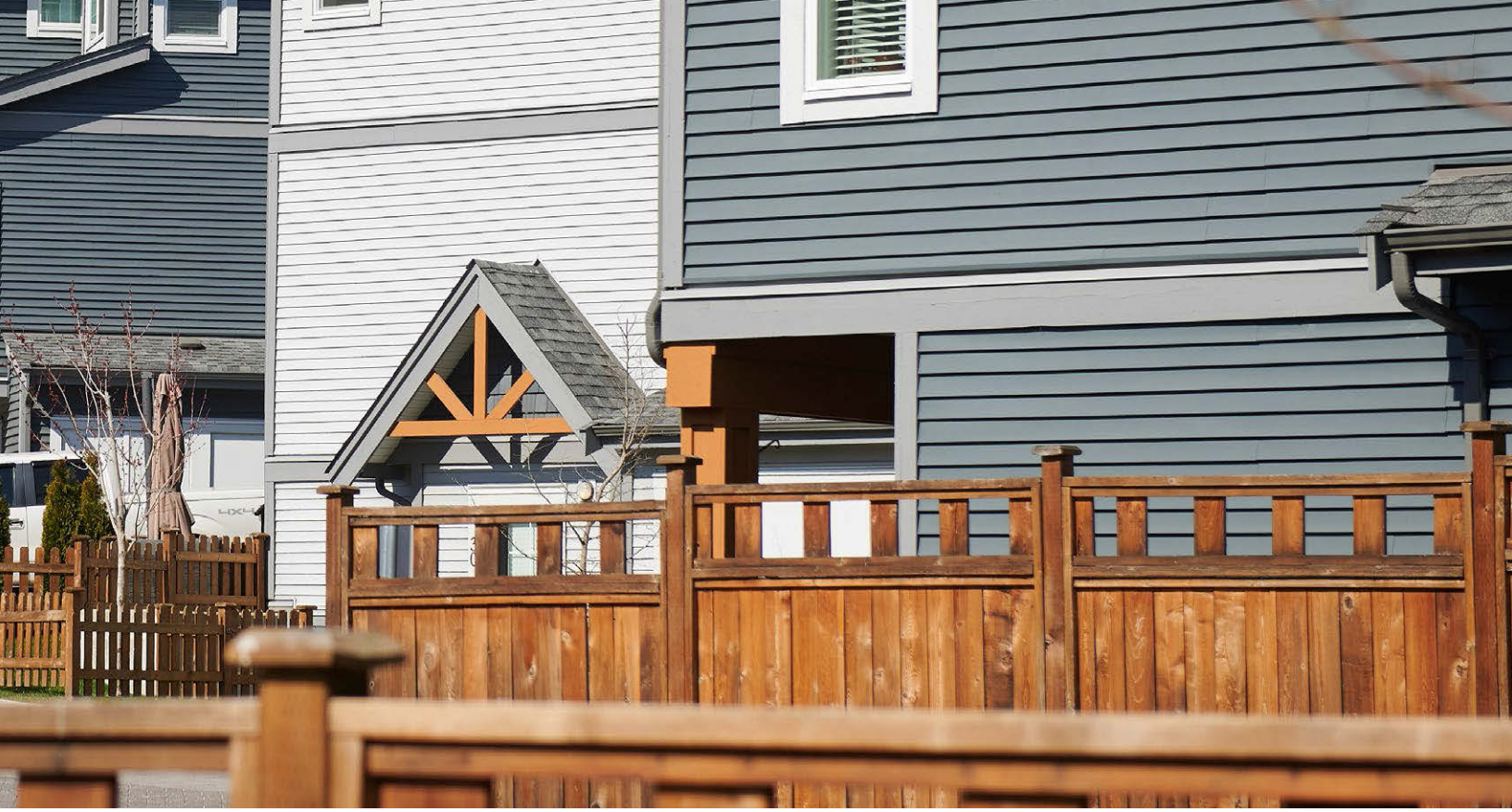
Together, these buildings are the second largest source of greenhouse gas emissions in Metro Vancouver after transportation, emitting over 4 million tonnes per year, which is approximately 25% of the region's total annual emissions. Even with programs and incentives in place, greenhouse gas emissions from buildings have actually risen 10% since 2010 in Metro Vancouver. This increase is due in large part to the widespread and continued use of natural gas to heat space and water in many of our new and existing buildings. The graphic below shows that in our region, over 90% of the greenhouse gas emissions from buildings come from burning natural gas while close to 3% comes from out-of-region electricity generation, and on the right, that space and water heating are responsible for nearly all of the natural gas use in buildings.

GHG EMISSIONS BY FUEL SOURCE



GHG EMISSIONS BY END USE





Natural Gas produces **16x** more Greenhouse Gases than Electricity

Electricity is also commonly used in certain building types for space and water heating. Hydro-produced electricity also produces some GHGs, but one unit of natural gas produces at least 16 times more GHGs than one unit of electricity, as shown below.

Given the above information, it is clear that to achieve our target of zero emissions buildings, we need to shift away from the use of natural gas in favour of clean and renewable energy for space and water heating in existing buildings.

For new construction, zero emissions space and water heating systems are available for nearly every type of home and building. It is also much more straightforward to design a new building to be zero emissions than it is to retrofit an existing one. New construction needs to move swiftly towards zero emissions space and water heating systems – for example, high-efficiency electric heat pumps. This will avoid yet more costly retrofits to get to zero emissions.

For existing buildings, technologies are also widely available to electrify most buildings that use natural gas for space and water heating. The transition for existing buildings will be more gradual primarily because space and water heating equipment is only replaced every 10 to 20 years, and even less frequently for large commercial, residential, and public sector buildings. This equipment lifetime makes it critical to ensure the right equipment goes in at the next opportunity.

Zero Emissions, Resilient Buildings

Zero emissions resilience involves considering and balancing, wherever possible, the three necessary sides of climate change action:

1 **Reducing greenhouse gas** emissions that are accelerating climate change,

2 **Increasing resilience** and our ability to recover by preparing for, and responding to the effects of climate change that we cannot avoid, and

3 **Protecting the health** of the occupants of buildings.

A "zero emissions and resilient building" is a building that emits no greenhouse gas emissions and better withstands the negative effects of a changing climate, ensuring occupant comfort and health are maintained.

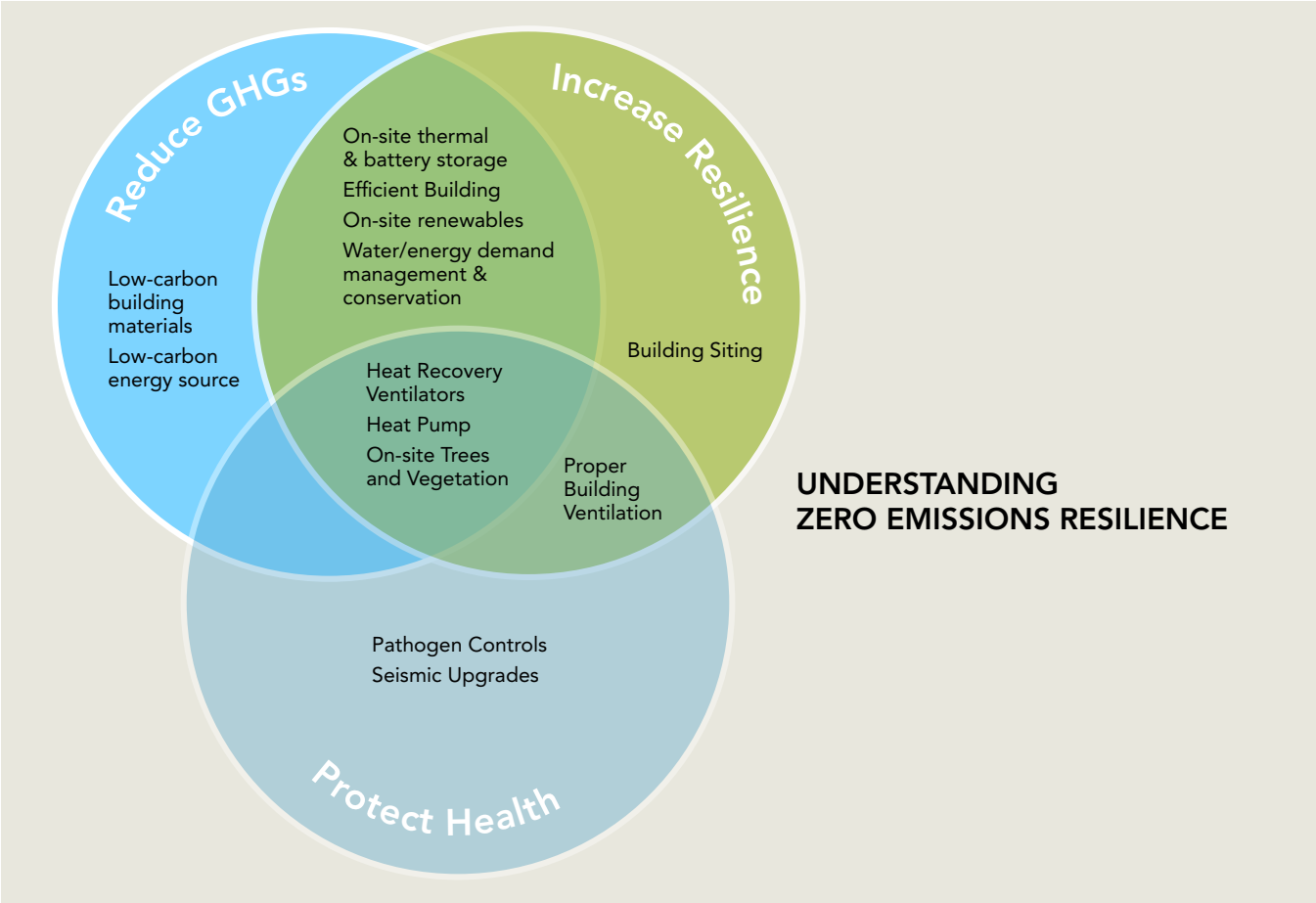
Looking to 2050, this Roadmap seeks to achieve a zero emissions and resilient building stock. By applying these desired outcomes simultaneously at the building and site level, we can identify ways to reduce emissions and vulnerability to climate change impacts at the same time.

What is the difference between "Zero Carbon", "Zero Emissions" and "Embodied Emissions"?

"Zero Carbon" or "Zero Carbon Emissions" refers to no greenhouse gas emissions at the point of use. A zero carbon fuel source either produces no greenhouse gas emissions, or any greenhouse gas emissions produced are offset by renewable energy (either generated onsite or purchased).

"Zero Emissions" means no greenhouse gases or other air contaminants are generated at the point of use. Zero emission includes zero carbon (see above) and also eliminates emissions of health-harming air contaminants (e.g., fine particulate matter and nitrogen oxides).

"Embodied Emissions" are greenhouse gas emissions associated with the construction of goods and products, including the raw materials and the transport of the good or product to where it is sold. Metro Vancouver is working to understand how embodied emissions – emissions from the construction and creation of materials for buildings – can be tracked to ensure we are reducing emissions beyond those created in our region.



The diagram above shows a number of different strategies for addressing greenhouse gas reductions and resilience. All of these strategies work together to provide both a carbon reduction and resilience benefit. The figure also shows which of these strategies contribute to direct health benefits for building occupants.

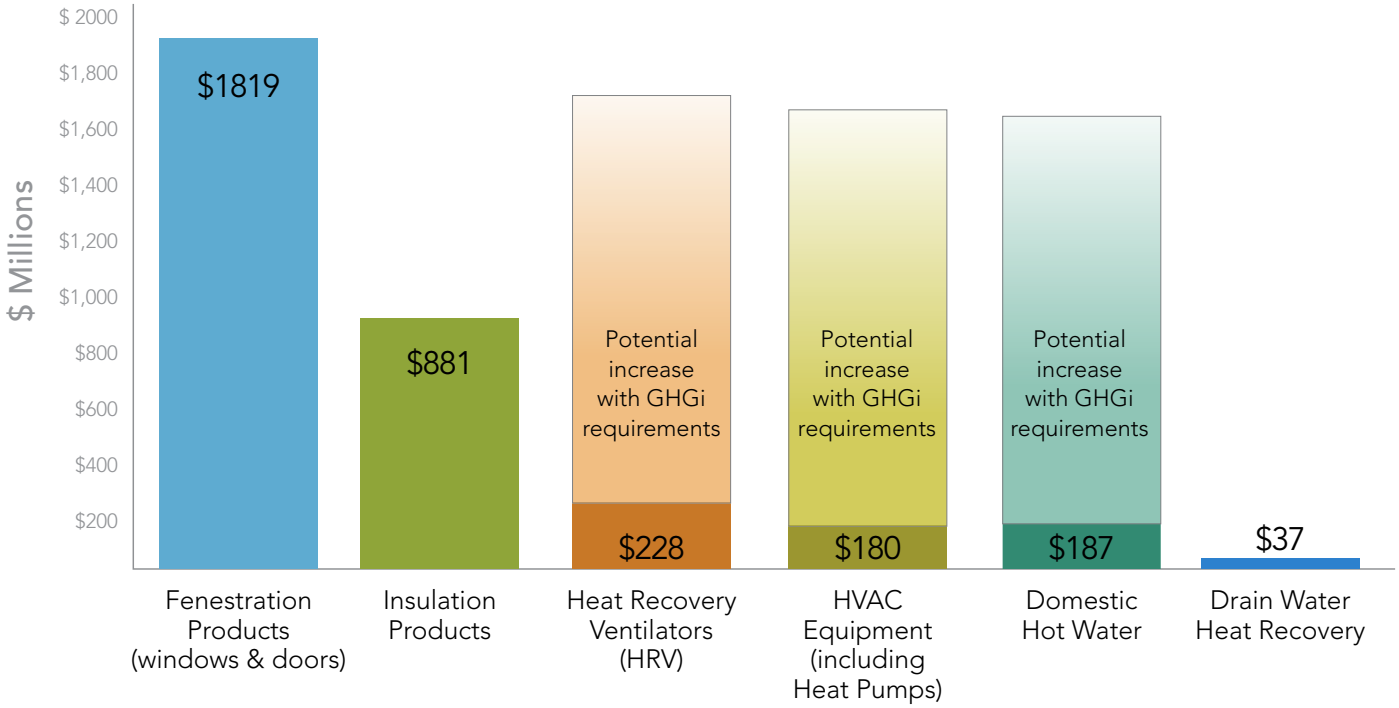
Applying a zero emissions resilience lens offers benefits, including:

- Identifying strategies that achieve emissions reductions and increased resiliency simultaneously (e.g., heat pumps can both reduce emissions and provide mechanical cooling; trees can sequester carbon, support on-site storm water management, and provide shading to buildings);
- Avoiding conflicting strategies (e.g., adding backup diesel generators to a building can enhance resilience, but will also increase greenhouse gas emissions and contribute to poor air quality);
- Prioritizing building strategies that lead to zero emissions resilience aligns climate action goals with public health and safety objectives.

Many opportunities to achieve a building stock that is both zero emissions and resilient exist today and all organizations should seek these multiple benefits.

$3.3B MARKET FOR GREEN BUILDING MATERIALS

Demand forecast, new construction, Metro Vancouver 2019-2032 (cumulative)



Economic Benefits of Zero Emissions Buildings

Recent studies show the broader economic benefit of improving building efficiency and reducing greenhouse gas emissions:

- The proposed BC Retrofit Code, which will require energy saving retrofits during renovations, is estimated to lead to the creation of more than 4,400 direct jobs and nearly 6,000 indirect jobs between 2019 and 2039 and contribute over $8.3 billion to the province's GDP. See the "Barriers and Opportunities to get to Zero Emissions Buildings" section to learn more about the BC Retrofit Code.
- The Vancouver Economic Commission estimates that the BC Energy Step Code could help unlock a $3.3 billion market for high-performance windows, insulation, and equipment in Metro Vancouver by 2032, as shown in in the chart below. High-efficiency mechanical equipment alone could support 770 local jobs on an annual basis from 2019-2032 and increase further if stricter greenhouse gas emissions requirements are put in place.

Economic benefits of accelerating building decarbonization must consider economic inequities. These might be costs, or access to training, employment, investment and innovation or others. Over time, factors such as increased supply, improved industry knowledge and capacity, and technology improvements should support equitable benefits.

Social Equity

Equity is the promotion of fairness, justice and the removal of structural barriers that may cause or aggravate disparities experienced by different groups of people. In some cases, shifting towards zero emissions and resilient buildings may cost some more than others, and we must ensure no one is left behind in this transition. Metro Vancouver will continue to incorporate the voices and needs of a full range of communities to ensure that fairness and equity are of the highest priority. Organizations responsible for building-related climate policies must consider whether inequity is created or magnified, and address these inequities to ensure a just transition. Actions that reduce emissions must also support an equitable distribution of benefits and avoid an inequitable distribution of costs.

Integrating equity into Metro Vancouver's air quality and climate change programs is a work in progress. Metro Vancouver will develop a strategic approach to assessing equity in the Climate 2050 *Buildings Roadmap*. This will include community input, health impact assessments and other equity evaluation tools so that all residents benefit from these changes.

Healthy Buildings

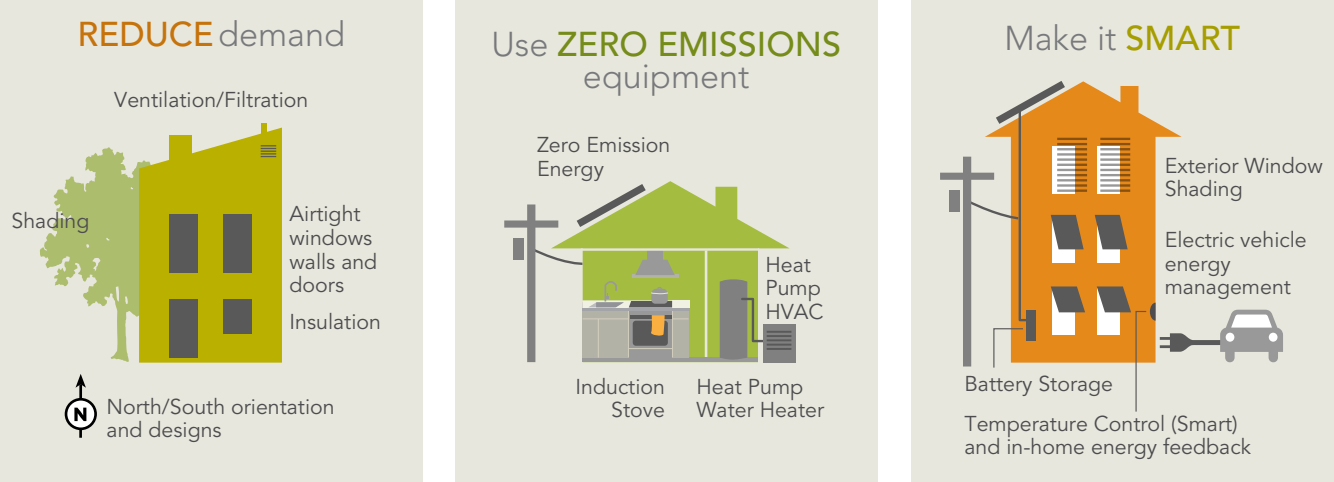
Health must be considered alongside emissions reductions and resiliency. Many of the ways that we make our buildings zero emissions and resilient are also the ways we make them healthier. Health outcomes will be a driving force behind how we craft our response.

We spend the majority of our lives indoors, so the quality of our buildings plays an ever greater role in our health and wellness. Fortunately, high-performance buildings can have a positive effect on the full spectrum of wellness, including our physical, mental, emotional and social health, including the following:

- **Thermal comfort:** Prolonged thermal discomfort can negatively impact physical health (e.g., overheating, heatstroke) and mental health for occupants. Ensuring that buildings remain comfortable in our warming climate requires analysis of future climate projections, and incorporation of passive and active cooling systems that meet future needs.
- **Air quality:** Indoor air quality plays a major role in health and wellbeing. Outdoor air pollution from wildfire smoke, traffic and other sources can enter buildings that have leaky envelopes. In new construction and retrofits, this can be limited by prioritizing an airtight envelope and ensuring that adequate ventilation and filtration systems are in place that promote energy efficiency as well as a healthy and safe indoor environment.
- **Acoustic comfort:** Better designed, insulated, and airtight buildings can reduce sound. Exposure to sounds such as traffic and mechanical systems can disrupt concentration and productivity, and has been linked to sleep disturbance and hypertension.

Taking a Whole Building Approach

Taking a whole building approach to achieving zero emissions and resilient buildings means looking for opportunities to reduce how much energy a building needs to operate, and how to improve its overall resiliency to a changing climate. This is in addition to using clean and renewable energy sources.



1. Reduce Energy Demand

One of the first steps to pursuing zero emissions and resilient buildings is to look for opportunities to reduce how much energy the building needs for heating and cooling. Measures that improve the envelope (or shell) of the building to keep hot or cold air inside, such as weather sealing, improved insulation and windows, and heat recovery systems, will have a direct reduction in energy demand. Since electricity is more expensive than natural gas in BC, keeping the heat inside the building will make the switch to zero emissions electric heat pumps a better economic choice. Measures at the building site, such as shade from trees and green or white roofs can also reduce the amount of energy needed to cool a building, and may even provide some insulation in colder months.

2. Use Zero Emissions Energy

With total energy demand reduced, the next important step is to select a heating system that uses low carbon or zero emissions energy. Although renewable fuel sources already exist (e.g., electricity and renewable gas), high-efficiency, all-electric buildings have a number of advantages. A building that uses BC's clean and renewable electricity for its space and water heating ensures long-term and deep greenhouse gas emissions reductions.

For buildings that will be harder to electrify, the same technologies used today for natural gas space and water heating can continue to be used over the next few years because renewable gas can be used to power this equipment without any modifications.

Metro Vancouver is considering what role clean, renewable sources of energy will play in the region's transition to carbon neutral within the Climate 2050 Energy Roadmap.

3. Make It Smart

In BC, electrifying many of our buildings will likely increase the amount of electricity needed during peak heating periods and place additional pressure on provincial and local electricity grids. Some of this pressure can be alleviated by taking advantage of smart grid features and other in-home technologies that automate some building systems to use less energy. For example, electric storage batteries located in buildings could be charged by on-site renewables or via the electricity grid during periods of low demand. This stored energy could then be used during times of high demand, making better use of the energy capacity that BC already has in place. Buildings with on-site energy storage and low energy demand will also be better equipped to withstand any short-term power losses that could result from major storm events.

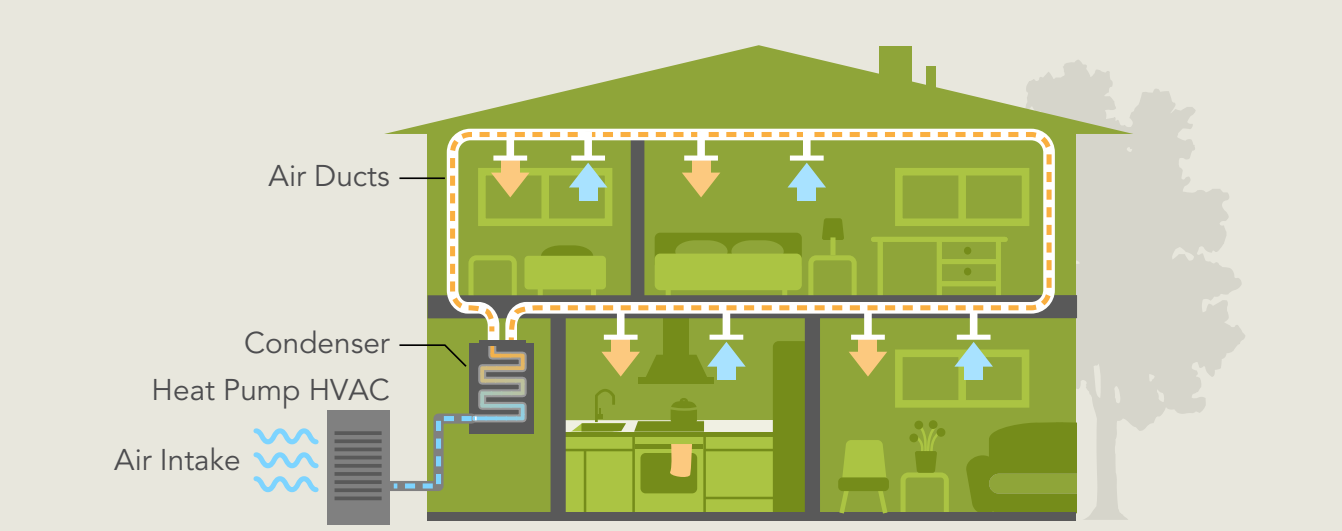
Similarly, appliances and water heaters equipped with demand response technologies could provide BC Hydro with an opportunity to encourage the use of this equipment during off peak periods and to help ensure services such as space heating and cooling are prioritized during periods of unusually high demand.

Given the high cost of upgrading provincial and local electricity grids, measures such as these can go a long way to maintaining competitive electricity rates and overall resiliency while a market-wide shift to zero emissions buildings takes place.

BC HYDRO ELECTRICITY

Zero Emissions Heating and Cooling

In most cases, installing high-efficiency electric heating and cooling equipment will be the quickest, most economical, and most permanent way to achieve a zero emissions building. Of the various categories of high-efficiency electric technologies already available, heat pumps carry the most promise for achieving significant emissions reductions in homes and buildings.



How do Heat Pumps Work?

Electric heat pumps provide both heating during the winter and cooling during the summer with the help of the air outside your home. A heat pump operates similarly to your refrigerator or air conditioner. In the winter, a heat pump extracts heat from the outside air (or ground, depending on the type) and brings it into your home. In the summer, it pulls heat from inside your home and moves it outside, effectively cooling the indoor space. By using refrigerants to help move the heat, heat pumps are by far the most energy efficient technology available for space heating and cooling and hot water heating. For every unit of energy it takes to run, a heat pump typically provides three to five units of heating or cooling, at temperatures above 0°C (in other words, they are 300-500% efficient). Low temperature heat pumps operate very well below 0°C, but efficiency gains get closer to conventional electric heating as temperatures drop. In contrast, an electric baseboard heater converts each unit of electrical energy into a single unit of heat energy (100% efficient), and a high performance natural gas furnace provides slightly less than a single unit of heat energy (about 95% efficient).

This very high efficiency means that electric heat pumps are not only a zero emissions solution for buildings, they also operate using less electricity while providing both heating and cooling to homes and other buildings.

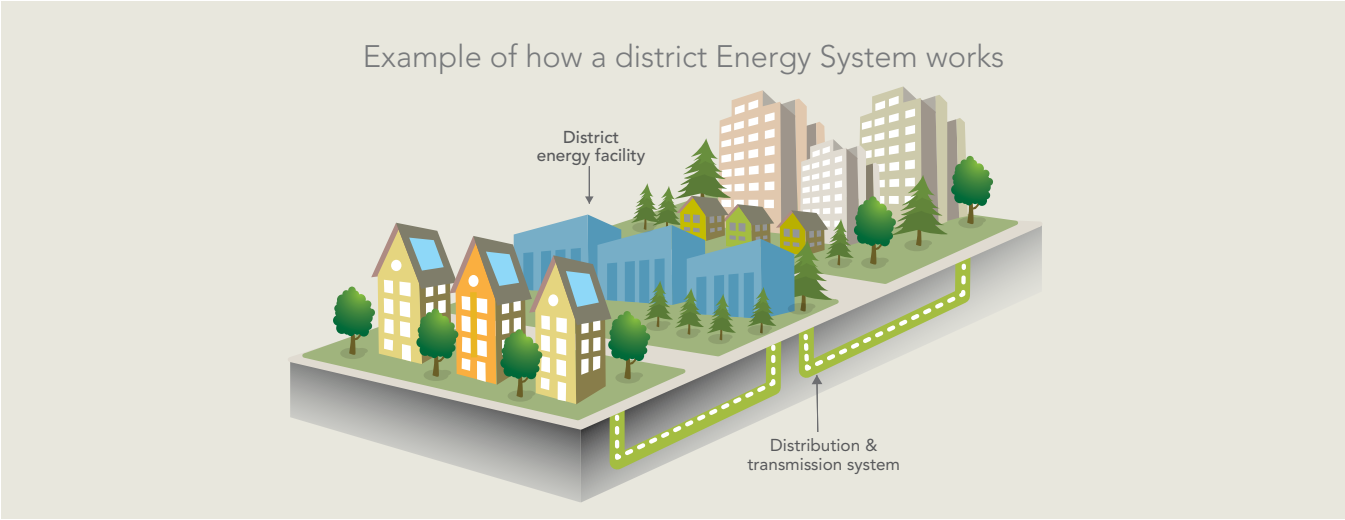
In addition to being zero emissions, heat pumps provide air conditioning in the summer. This makes these buildings more resilient to the longer, hotter, drier summers that are predicted for the Metro Vancouver region as a result of climate change.

Heat pumps also help to filter indoor air, a feature that is especially important during wildfire smoke events that are becoming increasingly common during the summer months. During a wildfire smoke event it is also important that buildings remain cool and comfortable with the windows closed, because of the need to minimize the amount of unfiltered outdoor air that enters the building. Maintaining a comfortable indoor air temperature is easily achieved with a heat pump. Although a conventional air conditioning unit could provide similar services, it is often more straightforward and economical to have a single system that can do both the heating and cooling for a building.

Managing Refrigerants to Reduce Greenhouse Gas Emissions

As heat pumps become more widely used in BC, it will be important to work with other government and industry partners to ensure that the refrigerants used in this equipment do not create unintended environmental harm. Many of the refrigerants permitted today have very high "global warming potential" – or GHG emissions equivalent. Releasing a single kilogram of these gases into the atmosphere can equal the impact of hundreds or thousands of kilograms of carbon dioxide, the most common greenhouse gas.

Fortunately, international efforts are underway to reduce the global warming potential of refrigerants, and the Government of Canada requires industry to participate in refrigerant management stewardship, but more needs to be done to further reduce releases of refrigerants from existing equipment In the meantime, more and more models of heat pumps with low global warming potential refrigerants are becoming available.



District Energy Systems

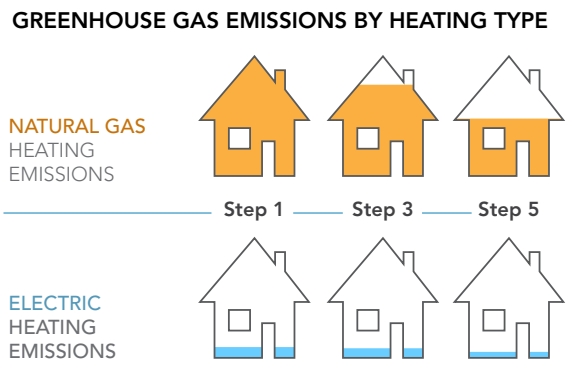
Metro Vancouver is home to at least 18 different District Energy Systems. A District Energy System is a utility that provides heating services to buildings within a concentrated geographic area (e.g., university campus, hospital, downtown core, high-density neighbourhood). Pipes carry hot water or steam from a centralized heating plant to the system's connected building network. Different renewable and non-renewable fuel sources are used by district energy systems, but the most common fuel used is natural gas. In order to achieve zero emissions for buildings connected to district energy system, all new and existing systems will need to convert to clean and renewable sources of energy such as electricity and waste heat, heat from data centres, air conditioning, and Metro Vancouver's sewer pipes. Once converted, all of the buildings connected to the district energy system will minimize their own emissions and will benefit from the emissions reductions at the plant. These systems present unique opportunities to decarbonize clusters of buildings throughout the region.

Barriers and Opportunities

New Construction

For new construction, most of the technologies to make new residential and commercial buildings zero emissions are already commercially available. Modern, high-efficiency building techniques and technologies also mean far less energy is needed to meet a building's space and water heating needs than in the past. Many of the region's local governments have adopted the BC Energy Step Code and have signaled their intention to continue to increase energy performance requirements, but challenges remain in the new buildings sector, including the following:

- **The Energy Step Code does not include GHG emission limits.** Local governments are not currently permitted to include GHG emissions limits that would restrict the use of fossil fuels in new buildings. As a result, many of the high-efficiency new homes built in the region are being built with natural gas heating systems that will emit higher levels of GHG emissions for the foreseeable future. As shown in the image below, even at Step 1, the lowest step, electric heating results in a more than 90% reduction in GHGs compared to natural gas heating, due to BC's clean, renewable hydroelectricity. The BC Government has signaled an intent to regulate the GHG performance of new buildings. Ensuring this happens is a critical step towards zero emissions buildings.



ENERGY STEPCODE
BUILDING BEYOND THE STANDARD

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. There is a big opportunity for the Step Code to include GHG limits in new buildings.

- **Embodied emissions aren't being measured.** Embodied emissions are currently a blind spot for the building industry. The greenhouse gas emissions generated from the production and installation of building materials can have a significant impact on the overall emissions of the building. Government and the building industry needs to better understand the impact that building material choice has on the embodied emissions of a building and work to reduce it.
- **Building knowledge and capacity in skilled trades.** As bold policies are introduced for zero emission buildings, the real pace of change will be set by the people who build them. Knowledge building and training through schools and trade associations will help to ensure that everyone working in the sector has the skills they need to confidently make every new building zero emissions.

Existing Buildings

Although many of the solutions needed to convert existing buildings to zero emissions are readily available, the transition will be more gradual and challenging for existing buildings. Some of the main reasons for this are listed below:

- **Existing heating equipment is only replaced every 10 to 20 years.** One of the Building Roadmap's biggest logistical challenges is that the transition will require most existing natural gas space and/or water heating systems to be replaced with high-efficiency electric heat pumps. Most of these systems only get replaced once every 10 to 15 years for water heaters and 15 to 20 years for furnaces. Requiring these systems to be replaced more rapidly than this would place a financial burden on many building owners.
- **No limits on greenhouse gas emissions from buildings.** New buildings are constructed to the requirements in the Building Code, which locks in the greenhouse gas emissions and energy use of the building until it undergoes a major renovation. Other than the City of Vancouver, there are virtually no regulatory requirements in BC to encourage building owners to take action to reduce the greenhouse gas emissions in their building at the point of renovation.

BC Retrofit Code

As of 2021, the BC Government is considering a code for alterations to existing buildings that would include energy efficiency, earthquake safety, and occupant health and safety, to be introduced in 2024. This code would follow and harmonize with the introduction of a Government of Canada model code for retrofits in 2022. Existing buildings are a much larger source of greenhouse gas emissions than new buildings. Placing greenhouse gas limits on retrofits is a game-changing opportunity to transition to zero emissions buildings.

- **Complexity and cost impede decision-making.** For many home and building owners, the steps needed to reduce the greenhouse gas emissions from their building can be time consuming and overwhelming, and can dissuade them from switching to clean, renewable energy. These issues are compounded for older buildings where additional steps may need to be taken to improve their overall efficiency (such as improved insulation, air leak sealing, high-efficiency windows, heat recovery, or converting a steam heating system to a lower temperature one) before an electric heat pump can be effectively used.
- **Availability of clean, renewable energy.** Electrification is a key decarbonization strategy for buildings to meet emission reduction targets, and provides co-benefits such as reduced emissions, improved air quality, cooling in homes and increased energy efficiency. Electricity in BC is currently abundant, but as more buildings electrify, there may be capacity constraints for electrical supply that need to be resolved. For some existing heating systems that are harder to electrify quickly, such as district energy and high-temperature water or steam boilers, a viable path to reduce greenhouse gas emissions will be to use renewable natural gas. The main challenge will be to ensure that there is a sufficient supply of cost-competitive renewable natural gas if it is to be used as a strategy to decarbonize large portions of the building sector. The provincial CleanBC Plan has set a goal for renewable gas to make up 15% of the province's natural gas supply by 2030. It currently makes up less than 0.5% of FortisBC's total gas supply. Given the scale of the challenge to decarbonize buildings, every available clean, renewable form of energy will play an important role.
- **Costs of retrofitting to zero emissions.** Similar to the new construction sector, many zero emissions solutions are available for most building types, but the cost of providing these solutions can be considerably higher when compared to simply replacing one fossil fuel system with another. Costs can be higher in a building with high heating demand, which is often older buildings. Affordability is exacerbated in rented or leased spaces. In these cases, a key cost reduction measure is to retrofit the building to reduce heating demand before replacing the heating systems. For many buildings in the region, incentives to support both the capital cost of retrofits as well as the ongoing energy costs will need to be explored.

Low Awareness of the Benefits of Constructing and Renovating to Zero Emissions Standards

Across new and existing buildings, there is a low level of awareness about the benefits of electrification and other low and zero emissions building options. For example, most people are not aware that natural gas is responsible for almost all of the greenhouse gas emissions that come from buildings. Nor are they aware of the climate, health and resiliency benefits associated with high-efficiency electric heat pumps. Often the zero emissions and resiliency solutions for any new or existing building are hidden inside and behind the walls. A huge opportunity exists to amplify the benefits and success stories of zero emissions buildings.

Each of the barriers that have been raised here are addressed within the strategies and actions in the next section of this *Roadmap*.

The Journey to Zero Emissions, Resilient Buildings

Linkages to other Climate 2050 Roadmaps

There are many linkages between buildings and other issue areas. You can find additional information on some topics in the following:

Waste Roadmap – additional consideration of embodied emissions, building materials as part of the circular economy, and final disposal of building materials.

Land-use and Growth Management Roadmap – ideas that shape the form and location of buildings in the region, which influences their emissions and resilience.

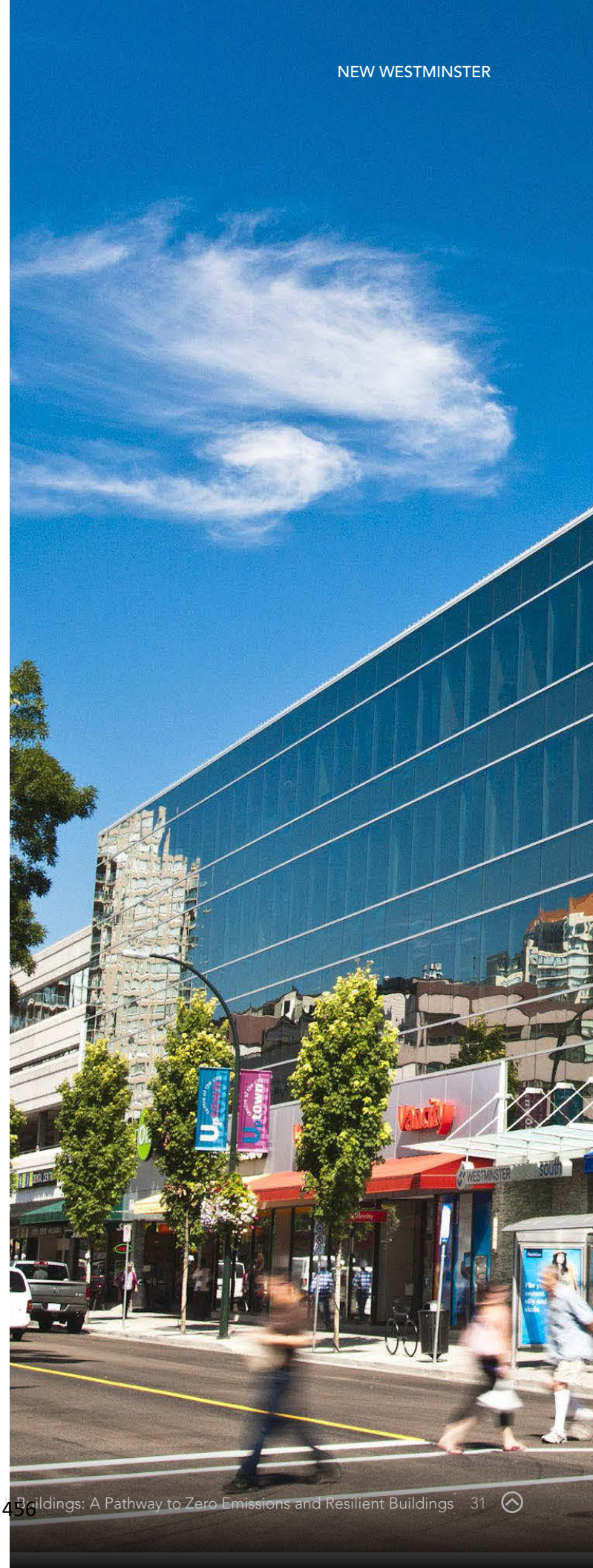
Energy Roadmap – availability of clean, renewable energy for use by buildings between now and 2050.

Industry Roadmap – emissions produced in the construction and demolition of buildings.

Nature and Ecosystems Roadmap – the importance of natural systems to reducing emissions from buildings, and increasing the resiliency of the built environment.

Linkage to Metro Vancouver's *Clean Air Plan*

Zero Emissions Buildings Strategies 1-4 (and all the associated actions) appear in both the *Buildings Roadmap* and the *Clean Air Plan*. These two plans are working together to achieve a carbon neutral region. Linking these strategies and actions in both plans ensures a clear action plan for Metro Vancouver and its partners.

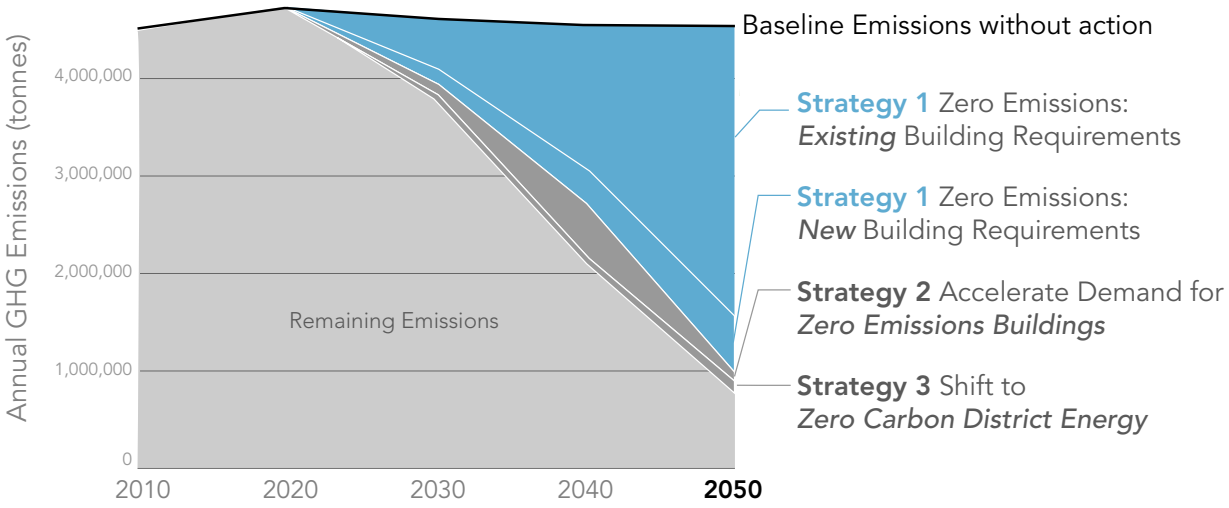


Zero Emissions Buildings Strategies

STRATEGY 1: Signal the Transition to Zero Emission Buildings through Requirements and Standards.

Space and water heating using natural gas contributes about 25% of the greenhouse gas emissions in the region. To meet our targets we must send clear and early signals about future requirements for buildings. The BC Energy Step Code and upcoming BC Retrofit Code will improve the energy performance of new and renovated buildings, and both should require that most heating and cooling uses clean, renewable electricity. Equipment efficiency standards and the climate impacts of refrigerants must also be addressed, along with a clear mandate for BC Hydro to support electrification of buildings, will accelerate the transition to zero emissions buildings.

POTENTIAL IMPACT OF STRATEGY 1 ON GHG EMISSIONS



STRATEGY 1	Potential Impacts of Strategy	Key Partners
	Reduce annual greenhouse gases by up to **650,000** tonnes in 2030 Reduce annual greenhouse gases by up to **3.5 million** tonnes in 2050	• Federal Government • BC Government • Member jurisdictions • BC Hydro

1.1 Greenhouse Gas Performance Requirements for Existing Large Buildings.

BIG Move

Develop regulatory requirements for existing large buildings to meet greenhouse gas emission performance targets, which would reach zero carbon emissions before 2050. Requirements would apply to all existing large commercial and large residential buildings, and would include energy consumption benchmarking, reporting and performance requirements in coordination with BC Government regulatory requirements. These requirements would help to achieve Metro Vancouver's air quality objectives and align with emissions requirements for district energy systems. (see Strategy 2.4). Public sector organizations could play a leadership role by establishing zero emission targets for their own existing buildings earlier.

1.2 Greenhouse Gas Performance Requirements for Existing Houses and Townhomes.

BIG Move

Develop regulatory requirements for existing homes and townhomes to meet greenhouse gas emission performance targets, which would reach zero carbon emissions before 2050 in coordination with BC Government regulatory requirements. These requirements could be developed with member jurisdictions, and would also help with achieving Metro Vancouver's ambient air quality objectives.

1.3 New Buildings are Highly Efficient and Electric.

BIG Move

Work with the BC Government to establish greenhouse gas performance requirements for new buildings, through the BC Energy Step Code or other legislation, reaching zero emissions (i.e., electric heating and cooling) by 2030. These requirements should allow local governments to voluntarily establish zero emission targets earlier. These requirements would apply to new homes, townhomes, commercial buildings, and large residential buildings. Public sector organizations should play a leadership role by establishing zero emission targets for their own new buildings in advance of provincial requirements.

1.4 Require Greenhouse Gas Reductions During Renovations.

BIG Move

Advocate to the BC Government to establish the BC Retrofit Code with increasingly stringent greenhouse gas performance requirements for buildings undergoing significant renovations.

1.5 Building Electrification Mandate for BC Hydro.

BIG Move

Advocate to the BC Government to direct BC Hydro and the BC Utilities Commission to promote and accelerate building electrification and to reduce emissions from buildings. A clear mandate could also support the development of electricity rates for residents who wish to switch to electricity.

1.6 Energy Labels for Homes and Buildings.

Work with the BC Government to require every building and home in the region to obtain an energy and greenhouse gas emissions label. The label must be disclosed publicly when a property is constructed or listed for sale, rental or lease. This should include outreach and training with real estate agents, property assessors, insurance providers and other related professions. Such labels would provide information to accelerate low carbon updates for buildings.

1.7 Manage Indoor Air Quality in Building Codes.

Work with the BC Government, health authorities and member jurisdictions to ensure that indoor air quality impacts of air tight buildings are safely managed in future updates to building codes.

1.8 High Performance Heating and Cooling Equipment Import and Sale Standards.

Advocate to the Government of Canada and the BC Government to establish energy efficiency standards for new and imported heating and cooling equipment. The standards should require a rated energy performance of 100% or more, and greenhouse gas requirements for refrigerants, both by 2030. The standards would help buildings conserve energy while reducing emissions.

1.9 Significantly Reduce Refrigerant Leaks in Building Equipment.

Advocate to the BC Government to improve compliance with the requirements of the *BC Ozone Depleting Substances and other Halocarbons Regulation*. This is expected to involve enhanced outreach to help safely reduce refrigerant leaks and ensure effective refrigerant management in heating and cooling systems in buildings.

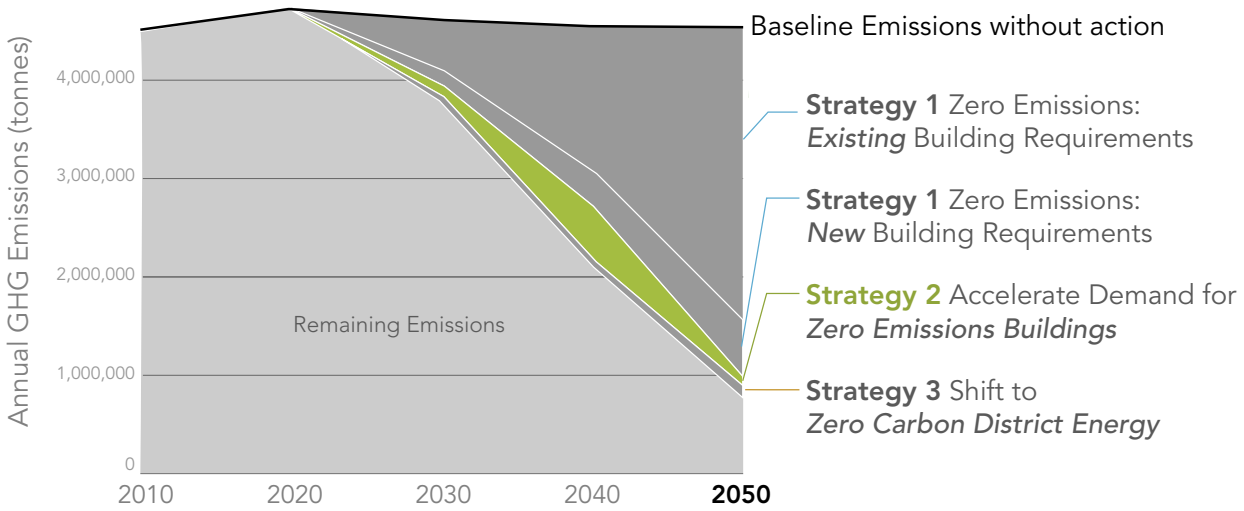
1.10 Accurately Value Zero Emission and Resilient Buildings.

Replace with "Work with the BC Government and the Government of Canada to establish guidelines for the valuation of low and zero emission, and resilient buildings. This would support lenders, appraisers and insurers in providing competitive products for low and zero emission, and resilient buildings, such as "Green Mortgages" and "Green Loans".

STRATEGY 2: Accelerate Demand for Zero Emission Buildings through Incentives, Education and Research.

Many technologies, like heat pumps and heat recovery systems, exist today to electrify most buildings that currently use natural gas for heating. Current technical support programs and incentives help home and building owners to adopt these technologies, as well as to improve the energy performance of buildings. A regional Building Decarbonization Coalition will help significantly expand existing programs so more home and building owners can reduce their building emissions. These programs must work directly with community partners to identify the best ways to involve all communities in the region so everyone can benefit from zero emission buildings. Increased technical support and expanded incentives will underpin greenhouse gas requirements by supporting home and building owners to make informed decisions and reduce their emissions.

POTENTIAL IMPACT OF STRATEGY 2 ON GHG EMISSIONS



STRATEGY 2	Potential Impacts of Strategy	Key Partners
	Reduce annual greenhouse gases by up to **110,000** tonnes by 2030 Reduce annual greenhouse gases by up to **90,000*** tonnes by 2050 *annual reductions in 2050 are lower because the effectiveness of Strategy 2 peaks around 2040 (up to 540,000 tonnes) as shown in the graph above.	• Federal Government • BC Government • Member jurisdictions • BC Hydro

CONSTRUCTION IN WHITE ROCK

2.1 Expand Low Carbon Upgrade Incentives.

BIG Move

Advocate to the BC Government and the Government of Canada to increase funding for fuel-switching and energy efficiency incentives, to the scale required to transition to zero emission buildings in the region and the province. The funding (e.g., incentives, tax credits) should support more building electrification solutions for older homes and buildings, and should complement financing tools under Action 2.5. Specific incentives should also support rental and non-market housing building owners to conduct low carbon upgrades while avoiding increased evictions or significant cost increases for renters

2.2 Online Decision Support Tools for Low Carbon Upgrades in Buildings.

BIG Move

Work with the BC Government, the Government of Canada and member jurisdictions to develop innovative online decision support tools to help significantly increase public awareness of low carbon solutions. These tools would help home and building owners choose these solutions by simplifying the planning, financing and execution of low carbon upgrades in buildings. These tools would be supported by energy advisor services under Action 2.3

2.3 New Financing Tools for Low Carbon Upgrades.

Work with member jurisdictions, BC Government, Government of Canada, energy utilities and other partners to develop strategic financing tools for home and building owners to accelerate low carbon building upgrades. These tools allow owners to spread the cost of a retrofit over a longer period, making the retrofits more affordable. Examples include Property Assessed Clean Energy (PACE) financing, on-bill financing and other related mechanisms. The tools should be available for homes, townhomes, and large commercial and residential buildings.

2.4 Building Decarbonization Coalition.

Work with governments, energy utilities, construction industry, academic institutions, non-governmental organizations and other regional partners to develop a Building Decarbonization Coalition. The Coalition would collaborate to address major barriers (e.g., supply constraints for zero emission building equipment) and create opportunities to accelerate the transition to zero emission homes and buildings. The Coalition would also align its work with the regional working group focused on reducing embodied emissions in new and existing buildings (see Action 4.4).

2.5 Energy Advisor Services for Homes and Large Buildings.

Work with the BC Government and the buildings industry to enhance energy advisor services for home and building owners energy advisor services for home and building owners. The expansion would help simplify the customer journey for home and building owners considering retrofits, so they can more easily access technical support and financial incentives.

2.6 Make Electricity Upgrades Faster and Cheaper.

Advocate to BC Hydro to work with member jurisdictions, trade associations and other regional partners to streamline electricity service upgrades, to reduce costs and installation timelines.

2.7 Increase Public Awareness of the Benefits of Zero Emissions and Resilient Buildings.

Work with member jurisdictions, the BC Government, health authorities, and other partners to deliver awareness and educational programs that encourage home and building owners to choose zero emissions and resilient buildings solutions. These programs would highlight how health is improved by reducing emissions of indoor aircontaminants; the benefits of using qualified installers; permitting requirements for heating, cooling and ventilation systems; and the consumer protections provided by municipal permits.

2.8 Training and Education in Zero Emissions and Resilient Buildings.

Work with industry stakeholders and other governments to ensure industry training and certification meets the growing market demand for zero emissions and resilient building design, technology, installation and operation, for both new builds and retrofits of existing buildings.

2.9 Share Lessons from Transitioning Metro Vancouver Corporate Buildings to Zero Emissions.

Corporate LEADERSHIP

Develop and promote case studies about low carbon upgrades completed at Metro Vancouver corporate buildings, including Metro Vancouver Housing buildings, to show the benefits and feasibility of electric and resilient buildings.

2.10 Test New Zero Emission Building Technologies.

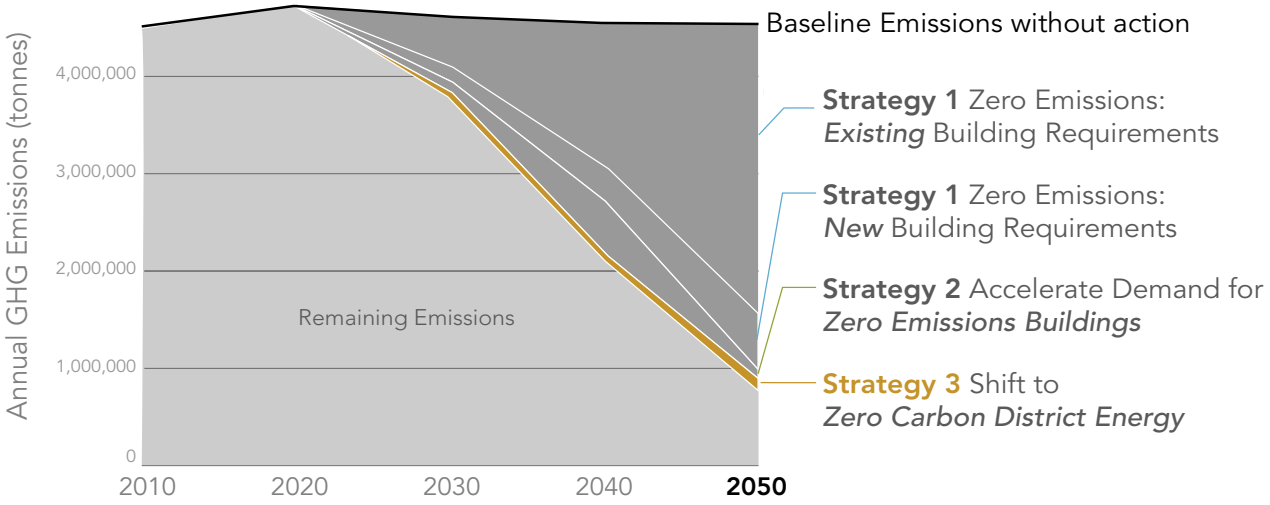
Corporate LEADERSHIP

Test new zero emission building technologies in Metro Vancouver corporate buildings, including Metro Vancouver Housing buildings. These pilot projects would include the installation, use and monitoring of building technologies that are not yet widely used in the region.

STRATEGY 3: Shift to Zero Carbon District Energy Systems.

District energy systems provide heating and cooling to a network of residential and commercial buildings more efficiently and generally with lower greenhouse gas emissions than individual building heating and cooling systems. There are currently 18 district energy systems in the region, running on natural gas, recovered heat and biomass, and more systems are under development. Developing a long-term emissions pathway to transition district energy systems to clean, renewable energy will set a path for entire district energy neighbourhoods to become zero emissions in the future. Metro Vancouver is currently exploring opportunities to provide clean, renewable energy to district energy systems.

POTENTIAL IMPACT OF STRATEGY 3 ON GHG EMISSIONS



STRATEGY 3	Potential Impacts of Strategy	Key Partners
	Reduce annual greenhouse gases by up to **80,000** tonnes by 2030 Reduce annual greenhouse gases by up to **110,000** tonnes by 2050	• Member jurisdictions • Energy utilities

3.1 Emissions Requirements for District Energy Systems.

BIG Move

Develop a regulatory pathway to achieve zero carbon district energy systems by 2050, working with member jurisdictions, BC Government and energy utilities. Regulatory design will also support Metro Vancouver's air quality objectives. These requirements should align with Action 1.1 on large buildings.

3.2 Low Carbon District Energy Policies.

Work with member jurisdictions with district energy systems to assess the feasibility of using sewer heat and biogas generation from Metro Vancouver and other member jurisdictions.

STRATEGY 4: Accelerate the Transition to Lower Embodied Emissions in Buildings.

Embodied emissions are the greenhouse gas emissions associated with resource extraction, manufacturing and distribution of buildings products. Using construction materials with lower embodied emissions will reduce global emissions of greenhouse gases. Local governments in the region are establishing requirements for embodied emissions of construction materials. Establishing a regional embodied emissions working group, and setting requirements in the building code and for new public buildings, will help accelerate the transition to lower embodied emissions in buildings.

STRATEGY 4	Potential Impacts of Strategy	Key Partners
	To be developed as Strategy is implemented	• Member jurisdictions • BC Government • Construction/ Renovation industry

4.1 Incorporate Embodied Emissions into the BC Building Code.

BIG Move

Advocate to the BC Government that future BC Building Code and Retrofit Code updates should include stringent embodied emissions performance targets for new construction and retrofits, and would incentivize the use of materials with low embodied emissions through consideration of cost and material availability.

4.2 Use Building Materials with Low Embodied Emissions.

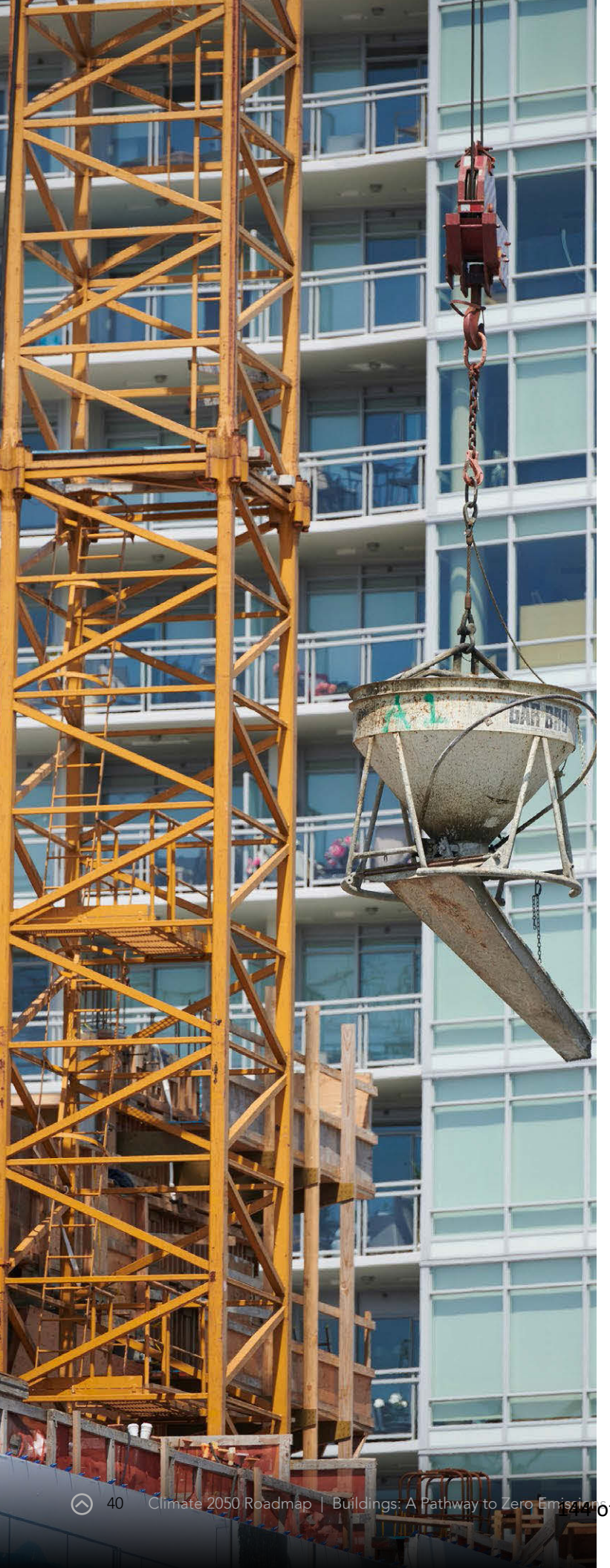
Work with the BC Government and member jurisdictions to update or create policies (e.g., procurement, design guidelines, zoning) to prioritize the use of building materials with low embodied emissions, including BC forest products. This should include development and maintenance of widely-supported standard calculations for the life cycle emissions of common building products.

4.3 New Public Buildings Set Embodied Emission Reduction Targets.

Advocate to public sector organizations in the region to establish embodied emission reduction targets for new construction projects, ahead of BC Building Code and Retrofit Code changes.

Buildings and the circular economy

The construction, retrofit and demolition of buildings creates a lot of unnecessary emissions and waste. In our current "take-make-dispose" economy, demolition material is too damaged to use in new construction. New approaches such as thinking of buildings as "material banks" could help the region transition to a circular economy that keeps building materials circulating at their highest potential value. Through circular design and circular business models we can decrease embodied emissions while increasing economic activity for deconstruction. A small building deconstruction economy is already starting in Metro Vancouver – by setting embodied emissions targets in buildings we can support further growth of the circular economy for the built environment in our region.



4.4 Regional Working Group to Reduce Embodied Emissions in Buildings.

Work with member jurisdictions, BC Government, construction industry and other regional partners to develop a regional working group focused on reducing the embodied emissions in new construction and building retrofits. The working group should support accelerated policy development, establish a regional baseline for embodied emissions, and would also align with the Building Decarbonization Coalition (see Action 2.4).

4.5 Strengthen Metro Vancouver's Corporate Sustainable Design Requirements.

Corporate LEADERSHIP

Update Metro Vancouver's Sustainable Infrastructure and Buildings Policy to include increasingly stringent embodied emissions requirements and greenhouse gas performance limits. These requirements should align with the corporate low carbon procurement policies in Action 4.2.

Resilient Buildings Strategies

STRATEGY 5: Support water conservation and non-potable water reuse to increase resilience to shifting precipitation patterns

As summers become hotter and drier in the future and water supply is impacted, the region will look to buildings to play a role in better water conservation practices. On-site non-potable water systems have a great deal of potential to reduce demand for potable water in Metro Vancouver. To make these systems more viable, however, there is a need to improve industry understanding on how to appropriately install and maintain them. Guides and resources aimed at key industry and stakeholder groups will support the training that will be required for successful implementation.

5.1 Apply Leading Water Efficiency Standards to Buildings.

BIG Move

Advocate for updates to the BC Building and Plumbing Code to require the highest efficiency standards for water use in buildings. Ongoing updates to strengthen standards for water efficiency in buildings should reflect the continuous improvement in technologies and practices for construction and plumbing.

5.2 Broaden Applications of Non-Potable Water Use in Buildings.

Advocate to member jurisdictions and other agencies for the development of standardized on-site non-potable water use (e.g., non-food green roof irrigation, toilets, make-up water for boiling and cooling systems), working towards a One Water approach. Metro Vancouver will support member jurisdictions to identify barriers and solutions for the application of these standards new and existing buildings.

5.3 Support Capacity Building of Non-Potable Water Use Applications on Building Sites.

Work with member jurisdictions, the BC Government, industry and other regional partners to develop educational resources for the public, building industry and trades that increase the capacity to install and maintain on-site non-potable systems, which have a high potential to reduce demand for potable water in Metro Vancouver. This work should be integrated with the industry training and education work in action 2.8, 6.6, and 7.2.

A One Water Approach is where water and wastewater utilities shift away from the traditionally separated silos of drinking water, waste water and storm water, towards an integrated systems approach. This is based on the fundamental concept that all water systems are interconnected and opportunities exist to leverage the interconnections of our water resources.

STRATEGY 6: Support the uptake of building design and retrofit solutions to reduce the impact of heatwaves and wildfires

Metro Vancouver has already experienced the challenges of heatwaves and extended periods of poor air quality from wildfires, and this is expected to increase in the future. These events carry with them a host of health and safety risks (e.g., overheating, and aggravating existing respiratory diseases), especially for populations with pre-existing health conditions and limited access to resources. To reduce the impact that heat and wildfire smoke has on our residents, we need a network of publicly accessible buildings that can provide cool, clean indoor air, where people can seek shelter. At the same time, our new and existing buildings will need to meet higher standards for cooling, airtightness and filtration. Nature-based solutions are central to low carbon resiliency, including using green roofs that can dissipate heat and planting deciduous trees that can shade buildings in the summer, and let light through in the winter.

6.1 Require Cooling Measures in New Buildings and Major Retrofits.

BIG Move

Advocate to BC Government to require cooling measures in new construction and significant retrofits to meet current and future cooling demands.

6.2 Apply Leading Standards for Ventilation and Filtration in New Buildings.

BIG Move

Advocate to the BC Government to establish increasingly stringent code requirements for ventilation and filtration systems in new construction. These requirements will reduce the impacts of poor indoor air quality, including wildfire smoke events.

6.3 Expand the Network of Public Buildings that can serve as Cool, Clean Air Centres.

Work with regional partners to conduct public outreach about buildings that our most vulnerable residents can rely on for cool and clean air during extreme heat events and periods of poor air quality, and identify facilities or other building site green spaces that could be feasibly improved to serve this function.

6.4 Understand Climate Risk and Resilience for Public Buildings Across the Region.

Work with member jurisdictions, health authorities and other regional partners to conduct a regional vulnerability assessment for public buildings in Metro Vancouver to understand where risks are the highest and where adaptive capacity already exists.

Cooler Buildings for a Hotter Future

As the climate warms, enhanced cooling will be necessary to ensure thermal comfort for building occupants. Starting with passive design is key to simultaneously reducing cooling demand and energy costs, through strategies such as orientation, solar shading (e.g., window covers, tree canopy) and high-performance glazing. After maximizing passive measures, mechanical systems such as heat pumps can help to meet additional cooling needs. These measures should be applied in combination at new construction projects and major retrofits, with designs that account for both present and future conditions.

STRATEGY 6 continued

6.5 Integrate Resiliency into Low Carbon Upgrade Solutions.

Work with member municipalities, BC Government and other regional partners to integrate resiliency solutions for existing buildings into the support services proposed in Strategy 2.

6.6 Provide Education on Retrofit Options that can Increase Resilience to Heatwaves and Wildfires

Work with member municipalities, BC Government and other regional partners to communicate to the public and industry the retrofit solutions that reduce the risks associated with severe heat and wildfire events.This work should be integrated with training and education work in actions 2.8, 5.3 and 7.2.

STRATEGY 7: Encourage the uptake of design and retrofit solutions that increase resilience to severe storms and flooding in buildings

As our climate changes, severe storms with heavy precipitation and high winds will occur more frequently and with greater magnitude. It will be important to ensure that new buildings are designed to withstand the impact of these shock events, and to reduce damage and avoid financial burden. Metro Vancouver and its partners can serve as key actors in developing and disseminating information on these options to industry and other stakeholders.

Different kinds of flooding in the region

Metro Vancouver is expected to see increased flooding in the future. There are three types of flooding that can impact buildings in our region:

Coastal flooding happens when strong winds push ocean waves beyond the natural tidal area. Low lying areas can be particularly vulnerable to coastal flooding.

Riverine flooding happens when water levels run over the natural or artificial banks of a stream or river, such as the Fraser.

Urban flooding happens when severe precipitation overwhelms the drainage system of a city or town and causes water to collect in the streets, causing damage to buildings and infrastructure.

7.1 Update Climate Projections to Future-Proof Buildings.

Work with the BC Government to update planning and design tools for building design, based on future climate modeling, to ensure buildings are capable of withstanding anticipated climate conditions, including heavy precipitation, flooding and increased wind speeds.

7.2 Provide Education on Retrofit Options that can Increase Resilience to Severe Storms and Flooding.

Work with member municipalities, BC Government and other regional partners to communicate to the public and industry the retrofit solutions that reduce the risks associated with severe storms and flooding. This work should be integrated with the industry training and education work in action 2.8. 5.3, and 6.6.

SEA WALL IN VANCOUVER

Setting the Path Ahead

The "Setting the Path Ahead" section will eventually be found on Metro Vancouver's Climate 2050 webpages under "Buildings", and will serve as a companion to the Buildings Roadmap. This will allow Metro Vancouver to track progress towards targets, and add and adjust strategies and actions in response to performance measurement.

Zero emissions, efficient buildings are better for the environment and better for the people who work, live and play in them. There is strong potential and a critical need to achieve significant greenhouse gas emissions reductions in Metro Vancouver's building sector over the next three decades. The first place to start is to ensure that all new buildings constructed are zero emissions.

By expediently addressing new construction, all levels of government, utilities, and industry can then focus on the longer-term task of decarbonizing the region's existing building stock. Achieving this will require careful coordination between key stakeholders, and increased market awareness about the opportunities and benefits of efficient buildings powered by clean and renewable energy. Support for training and knowledge sharing will make it easier for building owners and building professionals to make this shift, backed by effective regulations to ensure that all buildings eventually participate.

The timeline below includes all of the actions included in this Roadmap. Although there is much work to be done, there are a few critical actions that, if started over the next two years, will make a major difference to accelerating the region's drive to zero emission and resilient buildings.

CLIMATE 2050 BUILDINGS ROADMAP ACTION TIMELINE

STRATEGY	2021-2023	2024-2029	2030-BEYOND
STRATEGY 1 Signal the Transition to Zero Emission Buildings Through Requirements and Standards	New Buildings Efficient and Electric	GHG Performance Requirements for Existing Large Buildings	High Perform. Heating and Cooling Equip.
	Building Electrification Mandate for BC Hydro	GHG Performance Requirements for Existing Houses & Townhomes	
	Energy Labels for Homes and Buildings	Require Greenhouse Gas Reductions During Renovations	
	Manage Indoor Air Quality in Building Codes		
	Significantly Reduce Refrigerant Leaks in Building Equipment		
		Accurately Value Zero Emissions and Resilient Buildings	
STRATEGY 2 Accelerate Demand for Zero Emissions Buidlings through Reearch, Education & Funding	Expand Incentives for Low Carbon Upgrades		
	Online Decision Support Tools for Low Carbon Upgrades in Buildings		
	New Financing Tools for Low Carbon Upgrades		
	Building Decarbonization Coalition		
	Energy Advisor Services for Homes and Large Buildings		
	Make Electricity Upgrades Faster and Cheaper		
	Increase Public Awareness of the Benefits of Zero Emissions and Resilient Buildings		
	Training and Education in Zero Emissions and Resilient Buildings		
	Share Lessons from Transitioning Metro Vancouver Corporate Buildings to Zero Emissions		
	Test New Zero Emission Building Technologies		
STRATEGY 3 Shift to ZeroCarbon District EnergySystems	Low Carbon District Energy Policies	Emissions Requirements for District Energy Systems	
STRATEGY 4 Accelerate the Transition to Lower Embodied Emissions in Buildings	New Public Buildings Set Embodied Emission Reduction Targets	Incorporate Embodied Emissions into BC Building Code	
	Use Building Materials with Low Embodied Emissions		
	Regional Working Group to Reduce Embodied Emissions in Buildings		
	Strengthen Metro Vancouver's Corporate Sustainable Design Requirements		
STRATEGY 5 Water Conservation & Non-Potable Water Reuse	Broaden Applications of Non-Potable Water Use in Buildings	Apply Leading Water Efficiency Standards to Buildings	
	Support Capacity Building of Non-Potable Water use Applications on Building Sites		
STRATEGY 6 Design & Retrofit Solutions for Heatwave and Wildfire Resiliency	Expand the Network of Public Buildings that can serve as Cool, Clean Air Centres	Require Cooling Measures in New Buildings and Major Retrofits	
	Understand Climate Risk and Resilience for Public Buildings Across the Region	Apply Leading Standards for Ventilation and Filtration in New Buildings	
	Integrate Resiliency into Low Carbon Upgrade Solutions		
	Provide Education on Retrofit Options that can Increase Resilience to Heatwaves and Wildfires		
STRATEGY 7 Design & Retrofit Solutions for Storm and Flooding Resiliency	Update Climate Projections to Future-Proof Buildings		
	Provide Education on Retrofit Options that can Increase Resilience to Severe Storms and Flooding		

Measuring our Progress

The table below lists examples of some of the performance indicators that could be used to help Metro Vancouver measure regional progress towards meeting the targets set out for this purpose. The performance indicators used will depend on the availability of this information from other organizations. Because the Buildings Roadmap is calling for actions from many different partners and stakeholders, data sharing will be foundational to understanding the pace of progress towards our common goals, and will help governments to continue to shape equitable and cost-effective pathways to a zero emissions future. Additional work is underway to understand what key performance indicators and data effectively measure progress towards regional resilience (noted in the table below as "TBD").

ROADMAP ELEMENT	KEY PERFORMANCE INDICATOR	DATA SOURCE	DATA IS CURRENTLY COLLECTED
Regional GHG impact	tCO_2e attributed to the building sector	Regional GHG inventory	Yes
	tCO_2e attributed to the building sector	Aggregated utility data for building energy sales	Yes
Zero Emissions Buildings Standards	Number of municipalities adopting minimum GHG performance requirements (medium term)	BC Government	No
	Number of retrofit code permits with energy/climate measures	Local Governments	No
Demand for Zero Emissions Buildings	Numbers of high-efficiency electric equipment sold in BC	HRAI & CIPH shipment data Technical Safety BC Municipal mechanical system permits	No
	New buildings with low-carbon energy systems	Local Government building permits	Yes
	Distribution of building level GHG intensity scores (medium term KPI)	Building Energy Benchmarking Home Energy Scores	No
	Number of incentives (number of incentives and total dollar value).	CleanBC, Utilities	Yes
	Number of self-reported heat pump systems and fuel switches	Residential End Use Survey & Commercial End Use Survey (medium term KPI)	Yes
	Number of installed heat pump systems	Local government and Technical Safety BC Installation Permits	Yes
	Number of builders and retrofit trades companies operating in BC	North American Industry Classification Systems (NAICS) company registry	Yes
	Number of CleanBC Program Registered Contractors in different regions of BC	Utilities, Home Performance Stakeholder Council (HPSC)	Yes
	Number and sector distribution of Building Electrification Coalition members	Coalition	Yes
	Number of products, efficiency ratings and purchase cost	Shelf/industry survey	Yes
	Net present value of newly installed high-efficiency electric systems in buildings	Various	No

ROADMAP ELEMENT	KEY PERFORMANCE INDICATOR	DATA SOURCE	DATA IS CURRENTLY COLLECTED
Demand for Zero Emissions Buildings (cont.)	Number of new products – year over year	Shelf/industry survey	No
	Number and types of products going through certification process	Canadian Standards Association (CSA)	No
Zero Carbon District Energy Systems	tCO_2e attributed to district energy systems	Metro Vancouver District Energy Reporting Data	Yes
Lower Embodied Emissions	TBD	TBD	TBD
Water Conservation & Reuse	TBD	TBD	TBD
Heatwave & Wildfire Resilience	Numbers of high-efficiency electric equipment sold in BC	HRAI & CIPH shipment data Technical Safety BC Municipal mechanical system permits	No
	Number of new buildings with low-carbon energy systems	Local Government building permits	Yes
	Percentage of buildings self-reporting heat pump systems and fuel switches	Residential End Use Survey & Commercial End Use Survey (medium term KPI)	Yes
	Percentage of buildings self-reporting mechanical air filtration systems	Residential End Use Survey & Commercial End Use Survey (medium term KPI)	No
	Number of installed heat pump systems	Local government and Technical Safety BC Installation Permits	Yes
Storm and Flooding Resilience	TBD	TBD	TBD

Glossary

Carbon dioxide (CO_2) is the primary driver of climate change, and is produced primarily by burning fossil fuels.

Carbon neutral region means that the region generates no net greenhouse gas emissions. This is achieved through the deepest greenhouse gas emissions reductions possible across all economic sectors, and any remaining emissions are balanced out by the carbon dioxide that the plants, trees, and soil of the region remove from the atmosphere, or potentially through technological means

Carbon sequestration is the removal of carbon dioxide from the air and the long-term storage of carbon to mitigate climate change.

Clean, renewable energy is low or zero emission energy that is replenished over days or years. In Metro Vancouver, clean, renewable energy is primarily electricity from renewable sources such as hydro or solar.

Climate resilience describes the capacity of ecosystems, infrastructure, economies, and communities to absorb the impacts of climate change while maintaining essential services and functions needed to support health and well-being. In some cases, climate resilience involves changing services and functions so they are more sustainable.

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, ground-level ozone, nitrogen dioxide, sulphur dioxide, and ammonia.

Embodied emissions are greenhouse gas emissions associated with the construction of goods and products, including the raw materials and the transport of the good or product to where it is sold.

Equity is the promotion of fairness, justice and the removal of structural barriers that may cause or aggravate disparities experienced by different groups of people.

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. Fine particulate matter can damage people's health by aggravating existing lung and heart diseases, increasing the risk of cancer and reducing life expectancy.

Global Warming Potential refers to the ability of a greenhouse gas to trap heat into the atmosphere over a specific period of time (usually 100 years). In other words, how many kilograms of carbon dioxide released into the atmosphere would it take to equal a single kilogram of the refrigerant gas, if released. Some of the most common refrigerants used in heat pumps today can have GWPs that exceed 750 (e.g., R410a, R407c and R134a).

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, halocarbons, 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").

Low carbon building upgrades include upgrading building insulation and windows, sealing out drafts and switching to electric heating and cooling. These upgrades can significantly reduce energy consumption and emissions.

Nitrogen oxides (NOx) are a group of gases, which includes nitrogen dioxide, that are produced during high-temperature fuel combustion, and can contribute to the formation of ground-level ozone and fine particulate matter.

Renewable natural gas is a renewable form of natural gas with a low carbon intensity. Sources of renewable natural gas include landfill gas and organic waste.

Vulnerability is the degree to which ecosystems, economies, infrastructure and communities are susceptible to, or unable to cope with, the adverse effects of climate change. Vulnerability varies based on exposure, sensitivity and adaptive capacity. Geographic location, socio-economic conditions, and other factors can impact susceptibility to harm and adaptive capacity.

Vulnerability assessments identify areas or populations most likely to be impacted by projected changes in climate and build 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 target potential adaptation measures.

Zero carbon or **zero carbon emissions** are emissions that generate no net greenhouse gas emissions at the point of use. A zero carbon fuel source either produces no greenhouse gas emissions or any greenhouse gas emissions produced are offset by renewable energy (either generated on-site or purchased).

Zero emission means no greenhouse gas or other air contaminants are generated at the point of use. Zero emission includes zero carbon (see above), and also eliminates emissions of health-harming air contaminants (e.g., fine particulate matter and nitrogen oxides).

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

Additional Feedback Considered in Updating the *Climate 2050 Buildings Roadmap*

Note: *Feedback considered for the greenhouse gas reduction related actions found in the Climate 2050 Buildings Roadmap are referenced in the Clean Air Plan feedback. A copy of the feedback can be found in the MVRD September 24th Board Agenda Package: Clean Air Plan (Section E3.1, Attachment 2)*

Climate 2050 Buildings Roadmap **Section/Topic**	**Feedback**	**Metro Vancouver Feedback Response**
The Challenge		
Goals	The Roadmap includes goals for 2030, but the rest of the Roadmap consistently emphasizes the 2050 targets and 30-year time horizon.	Call out box added to clarify the relationship between the *Clean Air Plan*, as the 10-year air quality and greenhouse gas management plan, and *Climate 2050 Buildings Roadmap* as the overarching regional buildings climate strategy.
Buildings Goals	Cooling retrofits for the rental stock are particularly challenging and could lead to renovation issues if not carefully planned.	Metro Vancouver recognizes that retrofits to improve low carbon resilience in rental buildings pose unique challenges to both building owners and tenants. The implementation of many actions in the *Climate 2050 Buildings Roadmap* must consider how to reduce or eliminate "renovations" and exacerbating the housing crisis while pursuing our 2030 and 2050 Goals.
The Journey to Carbon Neutral, Resilient Buildings		
Linkages to Other *Climate 2050* Roadmaps	Clarity needed on the relationship between the *Clean Air Plan* and *Climate 2050 Roadmaps*.	Call out box added to clarify the overlap in actions between the *Clean Air Plan* and *Climate 2050 Buildings Roadmap*.
Resilient Buildings Strategies		
Strategy 5: Support water conservation and non-potable water reuse to increase resilience to shifting precipitation patterns		
Strategy 5 "Support water conservation and non-potable water reuse to increase resilience to shifting precipitation patterns"	Strategy 5 should note the potential negative impacts that non-potable water systems may have on potable supply.	Consideration of the viability of non-potable water systems in different building types is noted in the description of Strategy 5. This could be considered as part of the implementation of this Strategy.
Strategy 5 "Support water conservation and non-potable water reuse to increase resilience to shifting precipitation patterns"	Work to ensure codes and water treatment standards enable non-potable solutions without a lot of redundant infrastructure.	Proposed changes to codes and standards will be considered as part of the implementation of this Strategy.
Strategy 5, Action 5.2 "Broaden Application of Non-Potable Water Use in Buildings"	Need solutions to retrofit existing buildings. These buildings are challenged to make business cases for non-potable water, and often have electrical supply pinch points.	The wording of this action was changed to clarify the need for solutions in new and existing buildings.

Strategy 5, Action 5.2 "Broaden Application of Non-Potable Water Use in Buildings"	Will need to work with Health Authorities and Ministry of Health on non-potable water use recommendations to ensure we do not increase risk of pathogens such as legionella, e-coli etc. Vancouver Coastal Health and City of Vancouver have worked closely on this but there are opportunities for further work and collaboration.	Action 5.2 includes advocacy to "member jurisdictions and other agencies" which could include health authorities and provincial or federal ministries.
Strategy 5, Action 5.3 "Support Capacity Buildings of Non-Potable Water Use Applications on Buildings Sites"	Consider an action to undertake education and public engagement for Strategy 5, similar to action 7.2.	The wording in action 5.3 was changed to clarify that educational resources could be considered for the general public in addition to the identified audiences.
Strategy 6: Support the uptake of building design and retrofit solutions to reduce the impact of heatwaves and wildfires		
Strategy 6 “Support the uptake of building design and retrofit solutions to reduce the impact of heatwaves and wildfires”	Awareness building on heatwaves and wildfires could be a specific action in Strategy 6.	New action 6.6 (Provide Education on Retrofit Options that can Increase Resilience to Heatwaves and Wildfires) was added to reflect this feedback.
Strategy 6 “Support the uptake of building design and retrofit solutions to reduce the impact of heatwaves and wildfires”	More support / education needed about FireSmart practices	This could be considered as part of implementation of new Action 6.6 "Provide Education on Retrofit Options that can Increase Resiliency to Heatwaves and Wildfires".
Strategy 6, Action 6.1 "Require Cooling Measures in New Buildings and Major Retrofits"	Energy efficiency requirements for cooling will be needed.	This will be considered as part of the implementation of this action. Additionally, Action 1.7 identifies that Metro Vancouver will advocate for the rated energy performance of cooling and heating equipment to meet or exceed 100% efficiency, in addition to using low carbon refrigerants.
Strategy 6, Action 6.1 "Require Cooling Measures in New Buildings and Major Retrofits"	Concerned that adding cooling requirements will increase operational costs for building owners.	Metro Vancouver recognizes that cooling would be a new service for most buildings in the region and would have associated costs. Demand for cooling may be driven by comfort, health or safety concerns of building occupants and owners. The Province of BC develops and administers the BC Building Code including any new cooling requirements. Metro Vancouver understands that any proposed changes to the BC Building Code for new or existing buildings will be assessed against multiple outcomes including cost to building owners and tenants, health, safety, accessibility and greenhouse gas emissions reductions, and would include public engagement.

Strategy 6, Action 6.2 "Require Cooling Measures in New Buildings and Major Retrofits" and 6.6 "Integrate Resiliency into Low Carbon Upgrade Solutions"	There is a need to incentivize planning for electrifying heating, cooling and EV charging.	Incentives will be considered as part of the implementation of these actions along with actions in Strategy 1 and 2 related to requirements to reduce carbon emissions in buildings, and the development of planning tools for home and building owners.
Strategy 6, Action 6.3 "Expand the Network of Public Buildings that can serve as Cool, Clean Air Centres"	Support municipalities with resources to incorporate resilience measures in new/retrofitted community facilities (e.g. resilience hubs/cooling centres)	As part of the implementation of Action 6.3, Metro Vancouver will work with member municipalities and other partners to identify research, best practices and funding that can improve the low carbon resilience of community facilities and provide cool air refuge.
Strategy 6, Action 6.3 "Expand the Network of Public Buildings that can serve as Cool, Clean Air Centres"	What is the interaction between using public sector buildings as cooling centres and implementing cooling across all buildings - is there a tradeoff to provide homeowners or building owners longer timelines to implement cooling at the building level if public cooling centres are available?	Cooling in both public buildings and all other occupied buildings will likely be needed. The costs, benefits and timing of adding cooling to existing buildings will be considered in the implementation of Actions 6.1 and 6.3
Strategy 6, Action 6.3 "Expand the Network of Public Buildings that can serve as Cool, Clean Air Centres"	Consider how publicly accessible clean/cool air centres could address overnight excess heat and accessibility barriers for vulnerable populations.	These issues will be considered as part of implementation of this action.
Strategy 6, Action 6.4 "Understand Climate Risk and Resilience for Public Buildings Across the Region"	Baseline metric of how to understand level of resiliency of buildings for different archetypes (e.g. SFD, multi family, commercial)	Development of resiliency metrics will be considered as part of the implementation of the resiliency actions in the *Climate 2050 Buildings Roadmap*.
Strategy 7: Encourage the uptake of design and retrofit solutions that increase resilience to severe storms and flooding in buildings		
Strategy 7, Action 7.2 “Provide Education on Retrofit Options that can Increase Resilience to Severe Storms and Flooding”	Clarify that educational resources could be considered for the general public in addition to the identified audiences.	The wording in action 7.2 was changed to clarify that educational resources could be considered for the general public in addition to the identified audiences.
General Roadmap Feedback		
General Feedback	People at highest risk for heat and smoke health impacts may be more likely to live in older rental buildings. We must address these older rental buildings.	Equity is a key focus of the *Climate 2050 Buildings Roadmap* and will be central to the development of policies and programs during implementation.

General Feedback	There are no actions regarding First Nations / Indigenous needs	The *Climate 2050 Buildings Roadmap* proposes policies that may include many partners, including First Nations governments, communities and businesses.
General Feedback	Comments queried the extent of the engagement, including specifically if Metro Vancouver has considered First Nations in the Buildings Roadmap, and how outreach will include a broader audience as we move into implementation.	The engagement to develop the *Climate 2050 Buildings Roadmap* focused on audiences most likely to contribute to the technical discussions, be impacted by the actions, and play a key role in implementation. The project team shared progress and received feedback from some First Nations on buildings and other climate related topics. As we move to implementation, outreach will broaden to seek a supportive constituency on the rationale and opportunities to reduce emissions and be prepared for climate impacts.
General Feedback	Policies should consider standards that integrate non-climate resilience objectives (e.g. seismic considerations).	Metro Vancouver is taking a "Zero Emissions Resiliency" approach to the buildings sector, which brings together multiple objectives including emissions reductions, climate adaptation, improved health, equity and others. Metro Vancouver will continue to work with many partners to balance these objectives and seek opportunities that optimize positive outcomes.
General Feedback	The Roadmap should include an action for nature-based solutions that provide resiliency outcomes such as cooling and water conservation.	The wording of key sections in the roadmap ("Zero Emissions, Resilient Buildings", "The Journey to Zero Emissions, Resilient Buildings"), including actions 5.2 and 6.3 was changed to include examples of nature-based solutions at the building and building site level.
General Feedback	Consider a strategy to connect this roadmap with other roadmaps	There are many linkages between buildings and other issue areas. The "Journey to Zero Emissions, Resilient Buildings" section of the Buildings Roadmap includes a description of some of these linkages to other *Climate 2050 Roadmaps*.

To: MVRD Board of Directors

From: Climate Action Committee

Date: November 8, 2021 Meeting Date: November 26, 2021

Subject: **Metro Vancouver's *Climate 2050 Transportation Roadmap***

CLIMATE ACTION COMMITTEE RECOMMENDATION

That the MVRD Board:

a) endorse the *Climate 2050 Transportation Roadmap* as attached to the report dated October 8, 2021, titled "Metro Vancouver's *Climate 2050 Transportation Roadmap*" as the initial Roadmap towards achievement of the *Climate 2050* vision, goals, and targets for greenhouse gas reduction and resilience in the transportation sector, with the amendments proposed by the Climate Action Committee, <u>including amending:</u>
<u>i) Section 1.10 and Section 2.4 to explicitly include various types of e-mobility;</u>
<u>ii)Section 4.2 to include the impacts on high volume active transportation routes;</u>

b) direct staff to continue working with member jurisdictions and other partners to implement the actions in the *Climate 2050 Transportation Roadmap*; and

c) direct staff to update the Roadmap, as needed, in response to changes in science, technology and policy.

At its November 5, 2021 meeting, the Climate Action Committee considered the attached report titled "Metro Vancouver's *Climate 2050 Transportation Roadmap*", dated October 8, 2021. The Committee subsequently amended the recommendation as presented above in underline style.

The Committee discussed amending the *Climate 2050 Transportation Roadmap* to specifically include all forms of e-mobility in the strategies related to active transportation and fleet electrification and the impacts on high volume active transportation routes in order to more fully address the Climate 2050 goals. Staff advised that attachment 1 of the report will be revised to reflect the amendments made by the Committee.

This matter is now before the Board for its consideration.

Attachment

"Metro Vancouver's *Climate 2050 Transportation Roadmap*", dated October 8, 2021

47390813 FINAL

To: Climate Action Committee

From: Morgan Braglewicz, Air Quality Planner
Parks and Environment Department

Date: October 8, 2021 Meeting Date: November 5, 2021

Subject: **Metro Vancouver's *Climate 2050 Transportation Roadmap***

RECOMMENDATION

That the MVRD Board:

a) endorse the *Climate 2050 Transportation Roadmap* as attached to the report dated October 8, 2021, titled "Metro Vancouver's *Climate 2050 Transportation Roadmap*" as the initial Roadmap towards achievement of the *Climate 2050* vision, goals, and targets for greenhouse gas reduction and resilience in the transportation sector;
b) direct staff to continue working with member jurisdictions and other partners to implement the actions in the *Climate 2050 Transportation Roadmap*; and
c) direct staff to update the Roadmap, as needed, in response to changes in science, technology and policy.

EXECUTIVE SUMMARY

The *Transportation Roadmap* is one in a series of ten *Climate 2050 Roadmaps* that will guide the transition to a carbon neutral and resilient region by 2050. Transportation is the largest source of regional greenhouse gas emissions, currently contributing over 40% of the region's overall GHGs. The *Transportation Roadmap* complements the recently adopted Clean Air Plan and the transportation-related actions contained therein to meet the region's 2030 greenhouse gas and air quality targets. The *Roadmap* identifies 13 big moves and includes 6 strategies and 52 actions to significantly accelerate the reduction of emissions and ensure that the regional transportation system is resilient to a changing climate by 2050. A draft *Climate 2050 Transportation Roadmap* was presented to the Climate Action Committee and Board in April 2021. Staff have since completed engagement through a number of avenues, and have included feedback highlights in this report that have been considered in finalizing the *Climate 2050 Transportation Roadmap*. This report seeks endorsement of the *Climate 2050 Transportation Roadmap* by the MVRD Board.

PURPOSE

This report presents the *Climate 2050 Transportation Roadmap*, seeking endorsement by the MVRD Board.

BACKGROUND

Following the MVRD Board adoption of the *Climate 2050 Strategic Framework* in September 2018, staff were authorized in October 2019 to begin an integrated engagement process for *Climate 2050* and the *Clean Air Plan*, using a series of issue area discussion papers related to the roadmaps. A discussion paper on the *Climate 2050 Transportation Roadmap* was received by the Climate Action Committee at its October 2019 meeting, followed by a draft Transportation Roadmap at the April 16,

2021 meeting. With the completion of engagement on the draft, staff have now finalized the *Climate 2050 Transportation Roadmap*, and are seeking endorsement by the Board.

CLIMATE 2050 STRATEGIC FRAMEWORK

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 gases (GHGs) 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*, as well as forthcoming updates to the regional growth strategy and management plans such as liquid waste, solid waste, drinking water and regional parks. For actions that are within the jurisdiction or responsibility of others, Metro Vancouver can play a supporting and convening role, working closely with other orders of government, First Nations, and member jurisdictions, along with other key stakeholders, to advance implementation.

METRO VANCOUVER'S *CLIMATE 2050 TRANSPORTATION ROADMAP*

The *Climate 2050 Transportation Roadmap* (Attachment 1) is Metro Vancouver's pathway to ambitious and necessary change in our transportation system over the next 30 years. The Roadmap sets the goals that regional transportation is carbon neutral by 2050, with personal transportation being zero emission. It also sets a goal for regional transportation to be resilient to climate impacts by 2050.

Potential Greenhouse Gas Reductions

The *Climate 2050 Transportation Roadmap* establishes greenhouse gas emissions reductions targets for each transportation subsector. The target for personal transportation is a 65% reduction by 2030, with all others modes – medium and heavy duty vehicles, marine, rail, and aviation – reducing emissions by 35% by 2030. The 2050 target for personal transportation is zero emissions. For medium and heavy duty vehicles and rail, it is a 100% reduction in greenhouse gas emissions, achieved through zero emissions technologies and renewable, low carbon fuels. Marine and aviation target a 75% reduction in emissions by 2050.

Modelling estimates that actions in the Roadmap could reduce all transportation-related GHG emissions by approximately 1.8 million tonnes by 2030 relative to 2010 and 5.2 million tonnes by 2050. This represents a reduction of approximately 30% by 2030 from 2010 and almost 90% by 2050. While this is a significant reduction of GHG emissions in the region, it still falls short of meeting the 2030 and 2050 science-based transportation targets adopted by the Metro Vancouver Board, which reflect the level of GHG reduction needed to limit global warming to 1.5 degrees Celsius. Achieving these targets presents a significant challenge as well as opportunities for the region.

Metro Vancouver and its partners will continue to explore opportunities to further accelerate emission reductions during the detailed planning and implementation of the actions. It is expected that actions in the *Transportation Roadmap* and other Roadmaps may need to be updated in the

future, in response to major changes in science, technology, policy and progress towards the targets. In order to ensure that there is alignment with Roadmaps that are under development, staff will also revisit any previously developed Roadmaps once all ten have been completed to reflect any necessary changes. The Committee will be provided with regular updates on the Roadmaps. For any significant changes that may need to be incorporated (such as enhanced or additional action items), staff will come back to Committee with the update to the respective Roadmap.

Implementation of the *Climate 2050 Transportation Roadmap*

The actions in the *Climate 2050 Transportation Roadmap* will be implemented through Metro Vancouver's regulatory and planning authority, delivery of regional services, and its role as convener of and advocate for issues of regional significance. The Roadmap also identifies actions for implementation by other governments and organizations. Metro Vancouver's resources available for implementation will be focused on the priority "Big Moves". Progress on achieving the goals and targets will be measured against recommended key performance indicators, and reported publically.

Big Moves in the *Climate 2050 Transportation Roadmap*

The *Climate 2050 Transportation Roadmap* identifies 13 Big Moves, which are foundational actions needed to achieve the goals and targets identified in the Roadmap:

1. Enhance and improve regional transit
2. Use pricing to reduce driving and emissions
3. Expand active transportation networks
4. Accelerate sales targets for new electric passenger vehicles
5. Develop regional emission requirements for passenger vehicles
6. Make electric vehicles more affordable
7. Regulate existing medium and heavy trucks
8. Require zero emission sales targets for new medium and heavy trucks
9. More Stringent Low Carbon Fuel Standards
10. Accelerate emission reductions from marine vessels
11. Support Regional Emergency Management Planning
12. Minimize Risk Exposure for New Transportation Infrastructure
13. Create Flexible Transportation Networks

Relationship between the *Transportation Roadmap* and *Clean Air Plan*

The *Clean Air Plan*, approved by the MVRD Board on September 24, 2021, supports *Climate 2050*'s vision of a carbon neutral region by identifying the initial actions needed to meet the region's 2030 greenhouse gas target – a 45% reduction in greenhouse gas emissions from 2010 levels by 2030. All GHG reduction actions in the *Climate 2050 Transportation Roadmap* reflect actions that were adopted in the *Clean Air Plan*. The Roadmap also includes additional actions for climate adaptation (referred to as climate resiliency) that are not found in the *Clean Air Plan*.

CONSIDERING FEEDBACK AND UPDATING THE *CLIMATE 2050 TRANSPORTATION ROADMAP*

In 2021, staff conducted public webinars and stakeholder workshops in coordination with the *Clean Air Plan* engagement process on emission reduction actions as they related to key GHG emitting sectors, including transportation. Staff have incorporated feedback on the transportation-specific

actions, and they are in alignment with the actions in the *Clean Air Plan*. Staff offered additional workshops and opportunities for feedback focused on the adaptation actions as these do not appear in the *Clean Air Plan*. The full draft roadmap was publically available on the Metro Vancouver website from June to September 2021, and the opportunity to provide feedback promoted through social media platforms. The key revisions to the draft roadmap include:

- The Big Moves in the *Roadmap* have been updated to align with the Big Moves identified in the *Clean Air Plan* to more clearly highlight the most important and high impact actions.
- Strategy 2 (reducing driving) was switched with Strategy 1 (accelerating vehicle electrification) for greater emphasis on the hierarchy of actions to reflect an "efficiency first" approach, given the multiple co-benefits of active transportation and transit.
- Three new actions were created to address gaps identified during the engagement process.
- Many existing actions were modified to reflect alignment with other organizations and initiatives, identify additional implementation partners, enhance clarity, and broaden or refine the actions' scope.

Based on feedback received, some additional revisions made to the context sections and climate resilience sections of the draft *Climate 2050 Transportation Roadmap* include:

- Additional context on the role of the *Clean Air Plan* and its relationship to the greenhouse gas mitigation strategies and actions in *Climate 2050 Transportation Roadmap*.
- Additional context on linkages between transportation infrastructure and other resilience priorities, and the other *Climate 2050 Roadmaps* that will address these.
- Two new actions under Strategy 6, Develop Climate Resilient Transportation Networks:
    - An action identifying the importance of developing complete, compact communities to build low carbon resilience.
    - An action to consider possible synergies between and co-location of transportation networks with infrastructure designed to address resilience priorities such as storm water management, flooding, and seismic risk.

Attachment 2 provides more detail on how feedback was considered in finalizing the *Climate 2050 Transportation Roadmap.*

ALTERNATIVES

1. That the MVRD Board:
    a) endorse the *Climate 2050 Transportation Roadmap* as attached to the report dated October 8, 2021, titled "Metro Vancouver's *Climate 2050 Transportation Roadmap*" as the initial Roadmap towards achievement of the *Climate 2050* vision, goals, and targets for greenhouse gas reduction and resilience in the transportation sector;
    b) direct staff to continue working with member jurisdictions and other partners to implement the actions in the *Climate 2050 Transportation Roadmap*; and
    c) direct staff to update the Roadmap, as needed, in response to changes in science, technology and policy.

2. That the MVRD Board:
   a) endorse the *Climate 2050 Transportation Roadmap* as attached to the report dated October 8, 2021, titled "Metro Vancouver's *Climate 2050 Transportation Roadmap*" as the initial Roadmap towards achievement of the *Climate 2050* vision, goals, and targets for greenhouse gas reduction and resilience in the transportation sector, with amendments proposed by the Climate Action Committee;
   b) direct staff to continue working with member jurisdictions and other partners to implement the actions in the *Climate 2050 Transportation Roadmap*; and
   c) direct staff to update the Roadmap, as needed, in response to changes in science, technology and policy.

3. That the MVRD Board receive for information the report dated October 8, 2021, titled "Metro Vancouver's *Climate 2050 Transportation Roadmap*" and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

The resources required to develop and engage on the *Climate 2050 Transportation Roadmap* were approved under the 2020 and 2021 budgets. Continued alignment of implementation activities and deliverables for the *Climate 2050 Transportation Roadmap* with the *Clean Air Plan* is intended to make the best use of resources available. As such, resource and cost implications will be brought back to the Committee and Board in coordination with the *Clean Air Plan* budgeting and work planning processes. The 2022 annual budget will reflect the initial resource needs to begin implementation of actions in the *Clean Air Plan* and *Climate 2050 Transportation Roadmap*, as well as implementation of climate resiliency actions included in the *Climate 2050 Transportation Roadmap*.

CONCLUSION

Metro Vancouver's *Climate 2050 Transportation Roadmap* sets an ambitious pathway to a carbon neutral and resilient transportation system by 2050. The Roadmap has been updated based on feedback received in 2021. To achieve 2030 and 2050 targets, Metro Vancouver and its partners need to start on the actions in the Roadmap as soon as possible, using the full extent of each agency's authority, while continuing to explore opportunities to further accelerate emission reductions. Staff recommend Alternative 1, to endorse the *Climate 2050 Transportation Roadmap*.

Attachments *(48847284)*

1. *Climate 2050 Transportation Roadmap*
2. Additional feedback considered in finalizing the *Climate 2050 Transportation Roadmap*

Reference

1. Feedback Considered in Finalizing the Clean Air Plan

47390813

CLIMATE **2050 Roadmap**

Transportation

A pathway to carbon neutral transportation in Metro Vancouver

November 2021

FRONT COVER: GOLDEN EARS BRIDGE

Metrotower III, 4515 Central Boulevard, Burnaby, BC, V5H 0C6
www.metrovancouver.org

November 2021

The goals and targets at the heart of Metro Vancouver's climate-related plans are based on science. Reaching them is a top priority for the organization and the region. We must take bold action now to become a carbon neutral region by 2050, while recognizing that changes to our climate are already occurring, and that climate resilience must be a central consideration for the development of the region. The *Climate 2050 Transportation Roadmap* was prepared in 2020/2021 and introduced for stakeholder comment during the COVID-19 pandemic. Across the globe, the pandemic response has provided a glimpse of what is possible and what we can achieve with coordinated efforts and common goals in a time of crisis.

Metro Vancouver

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.

Mission

Metro Vancouver's mission is framed around three broad roles.

1. **Serve as a Regional Federation**

Serve as the main political forum for discussion of significant community issues at the regional level, and facilitate the collaboration of members in delivering the services best provided at the regional level.

2. **Deliver Core Services**

Provide regional utility services related to drinking water, liquid waste and solid waste to members. Provide regional services, including parks and affordable housing, directly to residents and act as the local government for Electoral Area A.

3. **Plan for the Region**

Carry out planning and regulatory responsibilities related to the three utility services as well as air quality, regional planning, regional parks, Electoral Area A, affordable housing, labour relations, regional economic prosperity, and regional emergency management.

Building a Resilient Region

Building the resilience of the region is at the heart of Metro Vancouver's work. Each of Metro Vancouver's regional plans and strategies adopts a vision, guiding principles, goals, strategies, actions and key performance measures that will support a more resilient, low carbon and equitable future. Metro Vancouver's interconnected plans and strategies are guided by the Board Strategic Plan, which provides strategic direction for each of Metro Vancouver's legislated areas of responsibility and the Long-Term Financial Plan which projects total expenditures for capital projects and operations that sustain important regional services and infrastructure. Together these documents outline Metro Vancouver's policy commitments and specific contributions to achieving a resilient region.

REGIONAL MANAGEMENT PLANS/STRATEGIES

Metro Vancouver's Roles and Responsibilities for Climate Action

The three broad roles outlined in Metro Vancouver's mission each demonstrate responsibilities related to climate change. More specifically, under the *Environmental Management Act*, Metro Vancouver has the delegated authority to provide the service of air pollution control and air quality management and may, by bylaw, prohibit, regulate and otherwise control and prevent the discharge of air contaminants, including greenhouse gases. Through the regional growth strategy, Metro Vancouver, with its members, plans for compact, complete communities that are foundational to enabling a carbon neutral, resilient region. As part of delivering its core services, Metro Vancouver also generates and uses clean, renewable energy from its facilities and is working to ensure core regional services and infrastructure are prepared for and resilient to climate change.

In its role as a regional forum, Metro Vancouver builds and facilitates collaborative processes which engage the public and build partnerships to address significant regional issues like climate change. As part of this role, Metro Vancouver coordinates with and advocates on behalf of its member jurisdictions to other governments and partners on greenhouse gas management and climate change adaptation initiatives. Metro Vancouver will be looking to other governments and regional partners to lead the implementation of a number of key actions in the *Climate 2050 Roadmaps*, highlighting the importance of ongoing collaboration with others.

The Roadmap at a Glance

We rely on our regional transportation system every day to work, study, play, and access important services. This system also ensures that goods move efficiently and reliably through our region. However, transportation is the largest source of greenhouse gas emissions in our region as a result of the fossil fuels used to power cars, trucks, trains, boats, and aircraft.

Although it is currently the largest source of regional greenhouse gas emissions, transportation is one of the best opportunities to start reducing emissions, particularly for personal transportation. The region is well positioned to continue with intentional land use planning that supports walking, cycling, transit, and other shared mobility modes. Electric vehicles are widely available and ready to be used on a regional scale.

As personal transportation transitions to being zero emission, medium and heavy trucks, marine vessels, aviation, and rail will become the largest sources of transportation greenhouse gas emissions in the region. Accelerating ongoing actions that support rapid development and scale-up of zero emission and low carbon options for these sectors, as well as new innovations in technology, will ensure that the transportation sector as a whole can transition to carbon neutrality by 2050.

Even as we reduce emissions from transportation, it is critical that we develop a transportation network that is resilient to the impacts of a changing climate. Some impacts from climate change are locked in, and will create vulnerabilities in our existing system. We must protect existing networks and infrastructure, and develop a resilient transportation system moving forward to ensure that regional transportation continues to be safe, reliable, and comfortable.

The *Transportation Roadmap* lays out 52 actions for reducing emissions and increasing resiliency, organized under the following six strategic areas:

1. Reduce Driving through Active Transportation and Public Transit
2. Accelerate the Transition of the Passenger Vehicle Fleet to Electric Vehicles
3. Reduce Heavy Truck Emissions and Support Early Adoption of Zero Emission Heavy Trucks
4. Reduce Marine, Rail, and Aviation Emissions
5. Protect Existing Transportation Networks from Future Climate Impacts
6. Develop Climate Resilient Transportation Networks

Although there is much work to be done, there are some important actions that need to be started soon in order to make a major difference in accelerating the region's drive to carbon neutral and resilient transportation. It is critical that the actions to reduce emissions identified in this *Roadmap* are implemented rapidly to set this transition in motion as soon as possible. Taking early action to reduce emissions can also help improve air quality, support health and well-being through exercise, and enhance low carbon resilience sooner rather than later.

We are not alone in this challenge. The actions in this *Roadmap* demonstrate the importance of working collectively to reach climate objectives, and will complement other plans guiding regional transportation. Working closely with TransLink, the BC government, member jurisdictions, and other key partners will be critical to effectively implement the actions in this *Roadmap*. Together, we can create a carbon neutral and resilient regional transportation system.

CHARGING STATION, BURNABY

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Visioning Carbon Neutral Transportation in 2050

In 2050, everyday movement of people around the region in cars and trucks has transitioned from being the largest source of greenhouse gas emissions in the region to being completely emissions free. More Metro Vancouver residents live in walkable urban centres, can comfortably walk, roll or bike for many of their day-to-day trips, and access convenient, reliable public transit to key destinations. Cars, trucks, and SUVs are powered by electricity and are zero emission, creating almost no air pollution and less noise. The regional transportation system integrates different modes and vehicle charging networks, creating a diverse range of clean, affordable transportation options for residents.

Local goods movement and transit produce no greenhouse gas emissions, with almost all vehicles powered by electricity or hydrogen. Large trucks, trains, marine vessels, and aircraft moving goods and people in and out of the region use low or zero emission engines and fuels. The Metro Vancouver region is a leader in the use of innovative technologies for trains, marine vessels, and aircraft, and is a hub for low emission goods movement. Transportation networks are located and designed to be resilient to the impacts of a changing climate, ensuring safe and reliable transportation of people and goods in the region.

Climate 2050 Transportation Roadmap

A pathway to carbon neutral transportation in Metro Vancouver

The Challenge

Transportation is the largest source of emissions in the region, but also has great potential to drastically reduce those emissions in the next 30 years. Reducing emissions from this sector is critical in order to reach climate targets for both 2030 and 2050. The majority of transportation emissions in our region come from fossil fuels used to power cars and trucks. Once a car or truck is purchased, it usually stays on the road for at least 10 years; most vehicles bought today will be in use in 2030. Trains, marine vessels, and aircraft also produce greenhouse gas emissions. The larger engines used in these modes of transportation pose an even greater challenge, as they are designed to last even longer and are very costly to replace.

Making it comfortable and easy to get around the region by walking, cycling, or using transit, and transitioning to zero emission engines and biofuels as soon as possible is critical in order for transportation to go from being the largest source of emissions to one of the smallest.

A carbon neutral region is the best option for future generations to maintain a good quality of life beyond 2050. We have to make some difficult decisions and investments today to avoid passing them on to our children and grandchildren at higher cost and consequence. Metro Vancouver and many of its member municipalities have committed to ambitious targets and bold leadership to respond to the climate crisis. This plan responds to the global challenge to come together, think big, and act now.

What is a Carbon Neutral Region?

A carbon neutral region means that we have achieved the deepest greenhouse gas emission reductions possible across all economic sectors, and any emissions left are balanced out by the carbon dioxide removed from the atmosphere by the plants, trees, and soil in the region, as well as by potential carbon capture technologies that are under development.

Goals

Metro Vancouver's *Climate 2050 Strategic Framework* has set the following regional vision to guide the region's response to climate change:

- Metro Vancouver is a carbon neutral region by 2050
- Infrastructure, ecosystems, and communities are resilient to the impacts of climate change

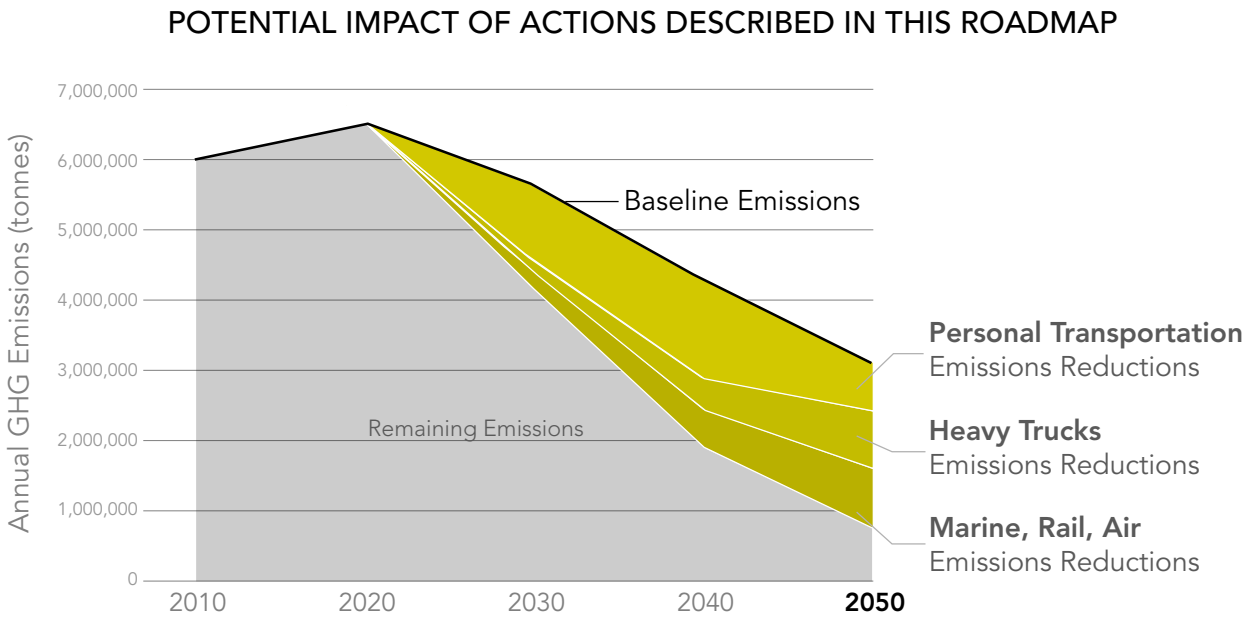
It also sets an interim target of 45% reduction in greenhouse gas emissions from 2010 levels, by 2030.

Achieving this vision means setting goals in each of the *Climate 2050 Roadmaps*, in order to ensure that each sector in the region plays as strong a role as possible in getting to a carbon neutral, resilient region.

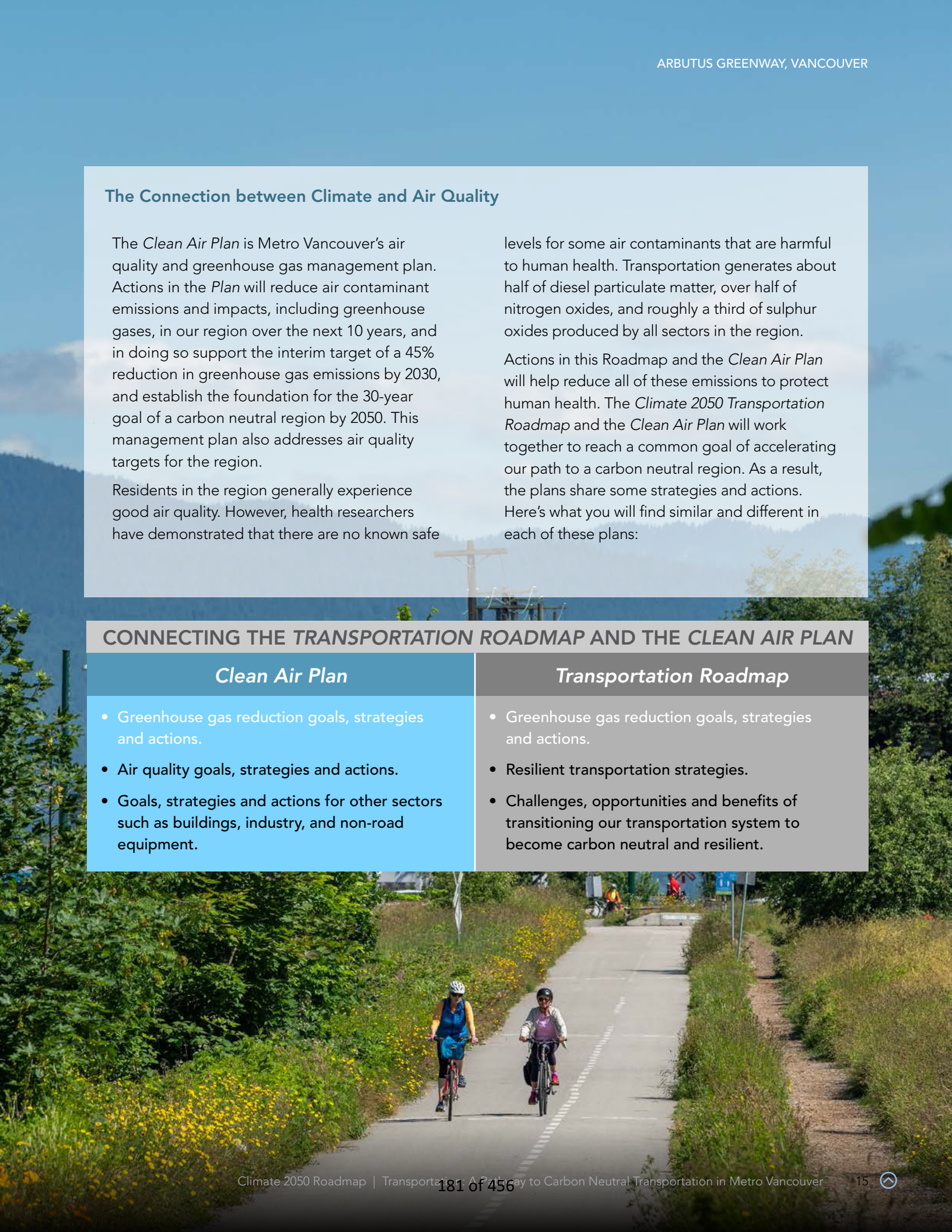
Metro Vancouver has set these goals for transportation in this region, out to 2030 and 2050.

Goals	Targets
All personal travel within the region is made by active transportation or using zero emission technologies powered by clean, renewable energy.	By 2030: • 65% reduction in greenhouse gas emissions, from 2010 levels By 2050: • 100% reduction in greenhouse gas emissions • All passenger vehicles on the road are zero emission, powered by clean, renewable electricity or hydrogen
All medium and heavy duty trucks and rail locomotives operating within the region use zero emission technologies powered by clean, renewable energy.	By 2030: • 35% reduction in greenhouse gas emissions, from 2010 levels By 2050: • 100% reduction in greenhouse gas emissions • All medium duty trucks are zero emission, powered by clean, renewable electricity or hydrogen • All heavy duty trucks and rail locomotives use either zero emission technologies or biofuels
All aircraft and marine vessels operating in the region use low emission and zero carbon technologies powered by clean, renewable energy.	By 2030: • 35% reduction in greenhouse gas emissions, from 2010 levels By 2050: • 75% reduction in greenhouse gas emissions, from 2010 levels
The regional transportation system is safe, reliable, and resilient to the current and future impacts of climate change.	By 2030: • All major transportation infrastructure projects are located outside of areas with known, unmitigated climate hazards By 2050: • All transportation networks and infrastructure are protected from current and future impacts of climate hazards

The graph below compares a baseline scenario – the pathway we are on now – with the possible impacts of the actions described in this *Roadmap*.



Reaching these ambitious goals will require extensive collaboration with key partners. Many of the actions identified in this *Roadmap* will be led by other governments (e.g., national, provincial, local, First Nations), TransLink, and industry. Metro Vancouver has a long history of working with all levels of government towards common goals. Fortunately, many of the organizations needed to make this transition are already actively working toward similar goals, including the Provincial Government and its *CleanBC* plan, the Federal Government's climate plan called *A Healthy Environment and a Healthy Economy*, Metro Vancouver's member jurisdictions, community and corporate climate plans, TransLink, utilities, First Nations, and, increasingly, industry associations.



ARBUTUS GREENWAY, VANCOUVER

The Connection between Climate and Air Quality

The *Clean Air Plan* is Metro Vancouver's air quality and greenhouse gas management plan. Actions in the *Plan* will reduce air contaminant emissions and impacts, including greenhouse gases, in our region over the next 10 years, and in doing so support the interim target of a 45% reduction in greenhouse gas emissions by 2030, and establish the foundation for the 30-year goal of a carbon neutral region by 2050. This management plan also addresses air quality targets for the region.

Residents in the region generally experience good air quality. However, health researchers have demonstrated that there are no known safe levels for some air contaminants that are harmful to human health. Transportation generates about half of diesel particulate matter, over half of nitrogen oxides, and roughly a third of sulphur oxides produced by all sectors in the region.

Actions in this Roadmap and the *Clean Air Plan* will help reduce all of these emissions to protect human health. The *Climate 2050 Transportation Roadmap* and the *Clean Air Plan* will work together to reach a common goal of accelerating our path to a carbon neutral region. As a result, the plans share some strategies and actions. Here's what you will find similar and different in each of these plans:

CONNECTING THE *TRANSPORTATION ROADMAP* AND THE *CLEAN AIR PLAN*

Clean Air Plan

- Greenhouse gas reduction goals, strategies and actions.
- Air quality goals, strategies and actions.
- Goals, strategies and actions for other sectors such as buildings, industry, and non-road equipment.

Transportation Roadmap

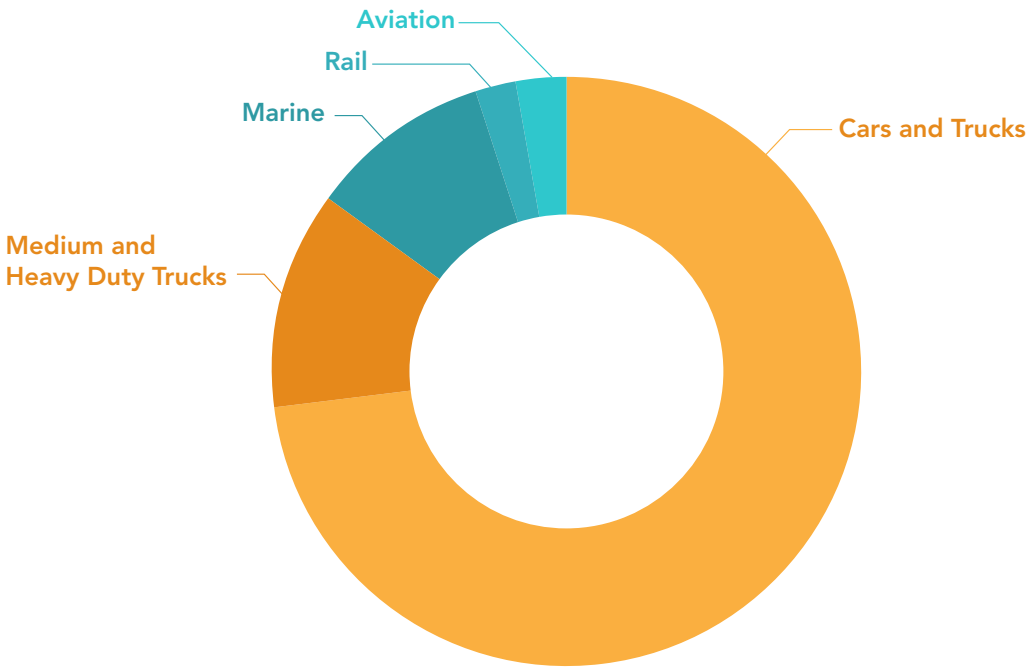
- Greenhouse gas reduction goals, strategies and actions.
- Resilient transportation strategies.
- Challenges, opportunities and benefits of transitioning our transportation system to become carbon neutral and resilient.

Emissions from Transportation in Metro Vancouver

The movement of people and goods – whether by car, truck, train, aircraft or boat – is the largest source of greenhouse gas emissions in Metro Vancouver, accounting for over 40% of total annual regional greenhouse gas emissions. The 1.5 million passenger cars and trucks, including SUVs, registered in the region make up most of those emissions, accounting for almost 75% of transportation emissions. 40,000 medium and heavy duty trucks registered in the region (plus the trucks registered elsewhere that travel in and out of the region) generate over 10% of regional transportation emissions.

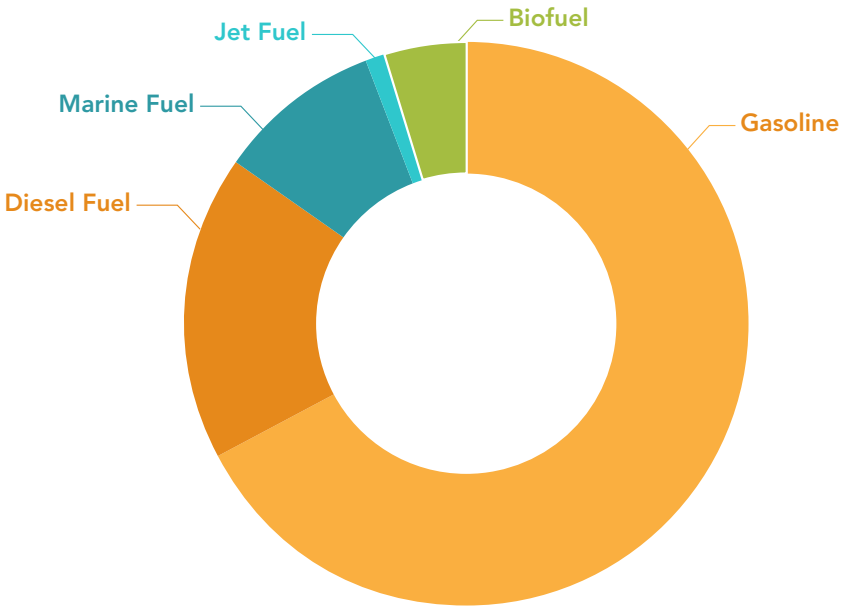
Around 150 million tonnes of cargo are handled at port terminals in the region every year, supporting the regional economy. This cargo movement is the main driver of marine vessel emissions in the region, though passenger ferries, cruise ships, harbour vessels, and pleasure craft are also sources of emissions. Together, marine transportation causes about 10% of transportation emissions. Trains used for goods movement accounts for most rail emissions in the region. Along with a small amount of passenger rail travel, this contributes about 2% of transportation emissions. Airports in the region handle 25 million passengers per year, which generate about 3% of regional transportation emissions. While aviation and marine emissions account for a relatively small amount of local greenhouse gas emissions, they are a significant source of emissions globally.

BREAKDOWN OF METRO VANCOUVER TRANSPORTATION GREENHOUSE GAS EMISSIONS



Virtually all of the energy used to power transportation is fossil fuel based, the majority of which is gasoline and diesel used in cars and trucks. A small amount of natural gas is used as a fuel for compressed natural gas vehicles, such as transit buses. Marine vessels and aircraft use specialized fossil fuels. Most of the trains in the region use diesel, though the SkyTrain network runs on electricity. In recent years, the advent of electric vehicles and biofuels have introduced the use of some zero emission vehicles and low carbon biofuels, but these still account for a very small proportion of overall energy use in transportation.

BREAKDOWN OF BREAKDOWN OF TRANSPORTATION ENERGY USE



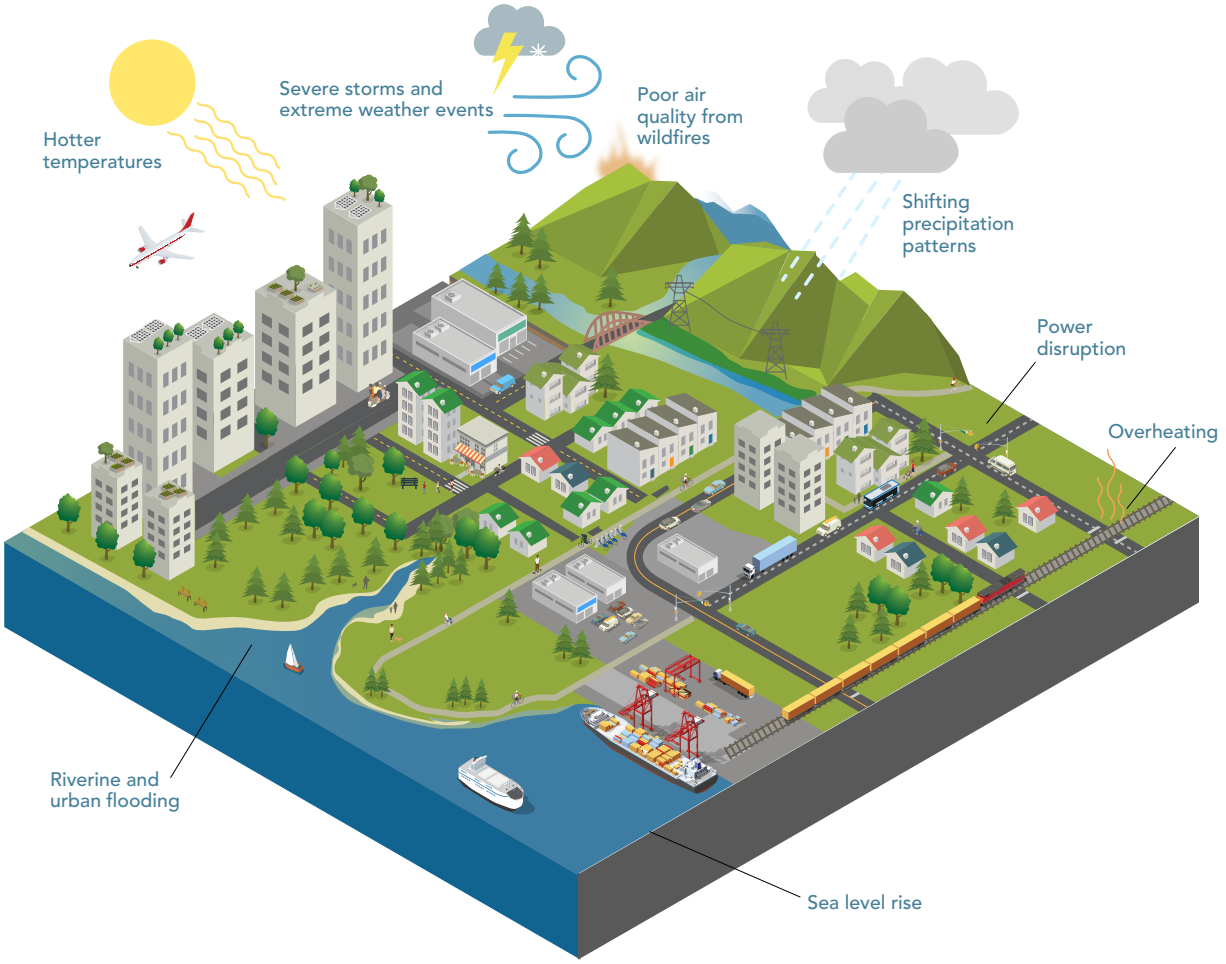
Compressed natural gas not shown as it accounts for less 1% of total energy use. Electricity is not shown; currently, electricity use for transportation is estimated to be small relative to other fuel types.

In addition to creating direct greenhouse gas emissions through fossil fuel use, the transportation sector is connected to emissions embodied in materials used for vehicles and other transportation equipment, upstream energy production, and construction and maintenance of roads, rail lines, and other parts of the transportation system. These emissions are not the subject of this *Roadmap*, but have considerable overlap with related sectors such as industry, waste, and energy production.

Climate Change Impacts on Transportation

We rely on our transportation system to reliably and comfortably get around the region and beyond, and for the supply of goods that we use every day. Ensuring that the transportation system is resilient to the impacts of a changing climate is essential. Transportation networks function smoothly due to infrastructure including roads, bridges, rail lines, transit, bike lanes, sidewalks, ports, ferry terminals, and airports. Most of this infrastructure lasts for decades, but has not always been designed to accommodate the anticipated impacts of climate change.

EXPECTED CLIMATE CHANGE IMPACTS



Transportation and Regional Resilience

While the resilience sections of this *Roadmap* focus on adapting transportation to impacts of climate change, transportation infrastructure itself can exacerbate climate change impacts. For instance, asphalt and concrete in roads and sidewalks often displaces natural ground cover, and these impervious surfaces can worsen the impacts of extreme heat and floods. Solutions to these issues will be addressed in their respective *Roadmap* issue areas, such as infrastructure, land use and growth management, and nature and ecosystems.

Metro Vancouver Climate Change Projections

While reducing regional greenhouse gas emissions will contribute to the global effort against climate change, some impacts from a changing climate are locked in and are likely to occur even with drastic emission reductions. There are already a number of projected changes to local climate conditions in Metro Vancouver:

Warmer temperatures: with increasing daytime and nighttime temperatures, there will be more hot summer days and fewer winter days with frost or ice.

Longer summer dry spells: summer rainfall will decline by nearly 20%, with increased likelihood of extended drought periods.

Wetter fall and winters: although on average the total annual rainfall is expected to increase by just 5%, there will be a large increase in rainfall during fall and winter.

More extreme precipitation events: more rain will fall during the wettest days of the year and the frequency of extreme rainfall events will increase.

Decreased snowpack: the deep spring snowpack in the mountainous watersheds is expected to decrease by over 50% compared to present day.

Sea level rise: in addition to these weather-related changes predicted in our region, warming global temperature is projected to bring at least 1 metre of sea level rise by 2100, which will impact coastal areas in the region.

FRESHET

KING TIDES, WEST VANCOUVER

Climate Change Impacts on Regional Transportation

Existing and new transportation infrastructure will need to adapt to increasing impacts from:

- **Riverine and urban flooding** caused by periods of heavy rainfall during extreme weather events such as storms, or as a result of major spring freshets (snow melts) linked to changing snowpack. This can lead to localized flooding, power failures, landslides, and disruptions to the transportation system.
- **Sea level rise**, which will impact coastal areas in our region, threatening low elevation parts of the transportation network with flooding. Sea level rise can also magnify the impact posed by other hazardous conditions in coastal areas such as subsidence (land sinking), king tides and storm surges, and heavy winds and precipitation caused by storms.
- **Heatwaves, wildfires, and droughts** caused by warmer temperatures and changing precipitation patterns can impact the safety and comfort of walking, cycling, and taking transit. Major wildfire events could also disrupt inter-regional travel.

These impacts could have consequences to this region's transportation networks in numerous ways, such as:

- **Provincial highways and municipal arterial roads** around the Fraser River and Burrard Inlet may be susceptible to flooding that could disrupt emergency services, delay goods movement, and isolate residents and workers. Wildfires and landslides pose additional threats by affecting transportation access in and out of the region.

DROUGHT CONDITIONS WITH WILDFIRE SMOKE, LIONS GATE BRIDGE

- **Public transit** across the region could be impacted by flooding through disruptions to services and infrastructure for SkyTrain, West Coast Express, SeaBus terminals, and roads used by transit buses which would prevent residents and workers from travelling for work, school, recreation, and access to other services.
- **The Vancouver International Airport** is located at sea level so its runways, terminal grounds, and access roads are vulnerable to flooding and sea level rise. Flooding could also impact smaller regional airports such as Boundary Bay Airport, Pitt Meadows Airport and Delta Heritage Air Park.
- **Truck routes and rail lines** servicing the Vancouver Fraser Port Authority and industrial lands in the region could be damaged or disrupted by flooding, sea level rise, storm surges and heat waves, which could have cascading effects for supply chains.
- **BC Ferries terminals** could be susceptible to sea level rise, flooding, and increased delays from high winds, impacting passenger transportation as well as goods movement.
- **Bike lanes and regional greenways** could be prone to flooding if they are located near natural areas or along the Fraser River. Additionally, hotter temperatures and degraded air quality from wildfire activity may result in dangerous conditions for walking, rolling, and cycling.

Zero Emission, Low Carbon Transportation

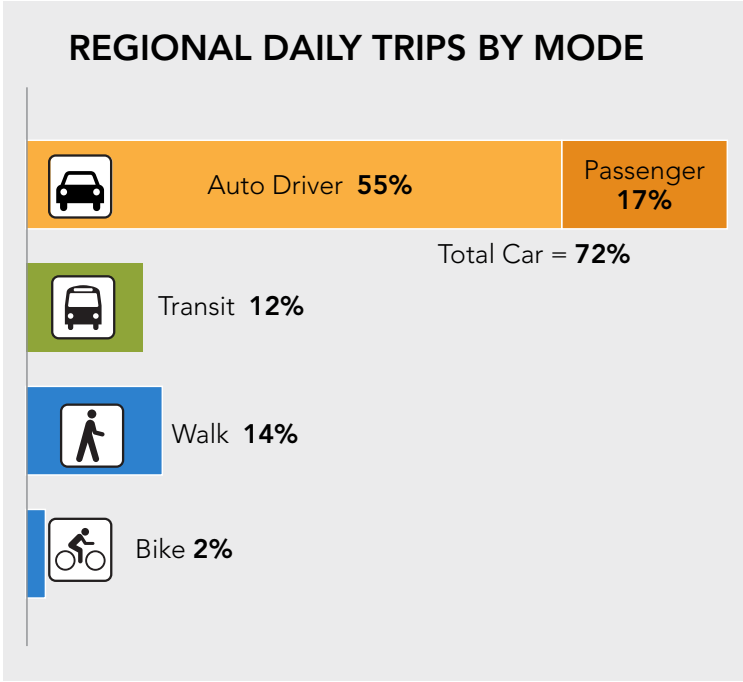
Emissions from transportation are caused by engines using fossil fuels, such as gasoline and diesel. The two key pathways to reducing emissions in transportation are to shift trips to active transportation, transit, and more energy efficient vehicles, reducing the use of fossil fuels, and to increase the use of zero emission vehicles and biofuels. Reducing the amount of driving in cars and trucks is a first step towards reducing transportation emissions, but achieving significant emission reductions in transportation will also mean switching from fossils fuels to clean, renewable energy that is zero emission or low carbon and replenished over days or years. Some modes of transportation, like cars, SUVs, and small trucks, are rapidly developing electric options. Other types of vehicles, such as heavy trucks used for goods movement, are more technologically challenging to electrify, and may rely more on the use of hydrogen or biofuels to reduce greenhouse gas emissions. Trains, ships, and aircraft are large, complex pieces of equipment that move between regions and countries, and face some unique challenges.

Reducing Driving

Over 70% of all trips in the region are made by car, and most of those are made by cars with a single occupant, the driver. However, there are many ways residents and visitors can make their daily trips: walking, rolling, cycling, taking transit, and driving with or without other passengers. These different modes have different impacts on greenhouse gas emissions. When people walk or cycle to their destination, they do not produce any emissions. On transit, one bus or train replaces several individual car trips. Carpooling also reduces the number of cars on the roads. New technologies and services like electric bicycles, car sharing, and ride hailing help reduce the need for people to drive or own their own car. These are all ways to reduce emissions by driving less. Driving less also means using less energy in cars, freeing up clean, renewable energy for use in other modes of transportation or sectors.

NEW WESTMINSTER

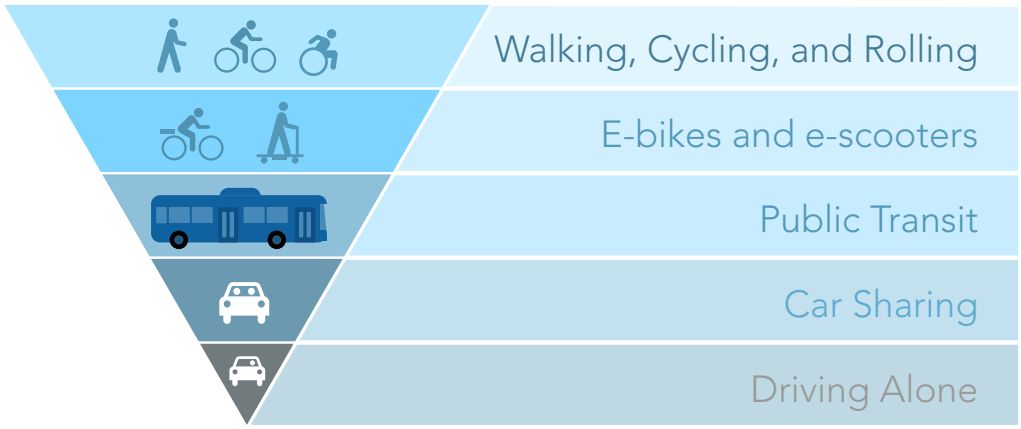
Many of the modes which produce little to no greenhouse gas emissions also have significant co-benefits. People who walk, roll, cycle, and and ride transit enjoy lower transportation costs and improved health and well-being. Reduced driving can lessen road congestion. Having multiple ways to get to and from key destinations also helps create a system that is more resilient to climate impacts.



Land Use

By shaping our neighbourhoods and communities with effective urban design, land use, zoning, and allocation of road space, we can create complete, compact communities that make walking, rolling and cycling well connected and comfortable for most short trips, and result in more efficient trips by car. Complete communities also support a frequent and efficient transit network that connects key destinations with comfortable, reliable service. This facilitates a multi-modal system where transit, active modes, car sharing, and other transportation options are efficiently integrated for convenient trips. However, even as the region continues to build towards well-connected, compact communities served by transit, many trips will be taken by vehicles. In order to eliminate greenhouse gas emissions from personal transportation, we need to find ways to make our vehicles zero emissions.

BETTER TRANSPORTATION CHOICES



Working Together to Reduce Regional Transportation Emissions

Strong regional land use policies are foundational to achieving the targets in the *Climate 2050 Transportation Roadmap*. There are several organizations that manage regional land use and transportation planning:

Metro Vancouver, in partnership with its member jurisdictions, manages regional land use and growth through the *Regional Growth Strategy*, which is being updated to extend to 2050 (*Metro 2050*). The *Strategy* outlines a vision for a compact region with a network of complete communities well connected by public transit.

TransLink is responsible for regional transportation planning, managing regional road networks, and delivering transit services. TransLink is currently developing *Transport 2050*, the region's long range regional transportation strategy, which will guide investment and planning decisions for the regional transportation system over the next 30 years. Together, *Metro 2050* and *Transport 2050* will shape how we live and move.

The **BC Government** is responsible for major transportation infrastructure such as highways, provides funding for capital projects, and sets policy to meet provincial environmental and economic objectives.

The *Transportation Roadmap* links together land use, transportation planning, and emissions reducing technologies to identify a pathway to reaching a carbon neutral and resilient transportation sector. This includes actions by other organizations that affect the regional transportation system.

Zero Emission Transportation Options

Electricity is a well-known zero emission source of energy that we already encounter every day. In British Columbia, almost all of the electricity that we use is generated from hydropower, making electricity a form of clean, renewable energy. When electricity is used as a source of energy to power vehicles in Metro Vancouver, there are no emissions from the tailpipe. Electric vehicles have become an increasingly familiar sight on the road, and are the best known type of zero emission vehicles. TransLink's fleet of transit vehicles also makes use of electric trolleys with overhead wires, and they have committed to transitioning to a 100% renewably powered fleet by 2050 through the *Low Carbon Fleet Strategy.*

British Columbia has world-leading legislation in place (the *BC Zero-Emission Vehicles Act*) that requires that more new cars and small trucks sold in British Columbia are zero emission, reaching 100% of new vehicle sales by 2040. However, because most vehicles stay on the road for at least 10 years after they are purchased, it will take a long time for gasoline and diesel powered vehicles purchased over the next two decades to reach the end of their lifecycle and be replaced with new zero emission vehicles. Additionally, these sales targets allow for the use of plug-in hybrid vehicles. As these vehicles use gasoline or diesel as a fuel in addition to electricity, they are not truly zero emission, but can be a low emission alternative to conventional fossil fuel-powered vehicles.

While electric vehicles are an important technology to reduce emissions from transportation, not all modes of transportation are ready to move to fully electric technologies. Electrifying some types of medium and heavy duty trucks is more challenging due to the heavier loads they carry, specialized operating needs, long driving ranges, and lack of rapid electrical charging in dispersed, remote destinations outside of the region. Electric options for ferries and small aircraft are available, but still very much under development. Larger marine vessels and aircraft are difficult to electrify due to the long distances they travel and specific operating demands, and no fully electric options are available for the largest and most complex of these. Electric rail locomotives are used widely in other parts of the world, such as Europe. However, transitioning inter-provincial railways to these zero emission fuels is costly and requires coordination at the provincial and national level.

Hydrogen can also be a zero emission fuel. Hydrogen technologies are emerging for all transportation modes, and could play an important role in helping some modes that are challenging to electrify transition to zero emission technologies. While hydrogen engines generally produce zero tailpipe greenhouse gas emissions, hydrogen can be produced using carbon intensive means that affect its overall carbon footprint. When produced using clean, renewable energy, hydrogen can be a zero emission and low carbon transportation fuel.

Hydrogen: A Zero Emission Fuel?

There are several different means of production for hydrogen that determine how emission intensive it is:

- **Grey hydrogen** is produced using natural gas, creating significant greenhouse emissions and a reliance on fossil fuels.
- **Blue hydrogen** is also produced using natural gas, but the emissions created during production are captured and stored.
- **Green hydrogen** is produced using electricity, and can be a zero emission and zero carbon fuel if the electricity used is generated from clean, renewable sources.

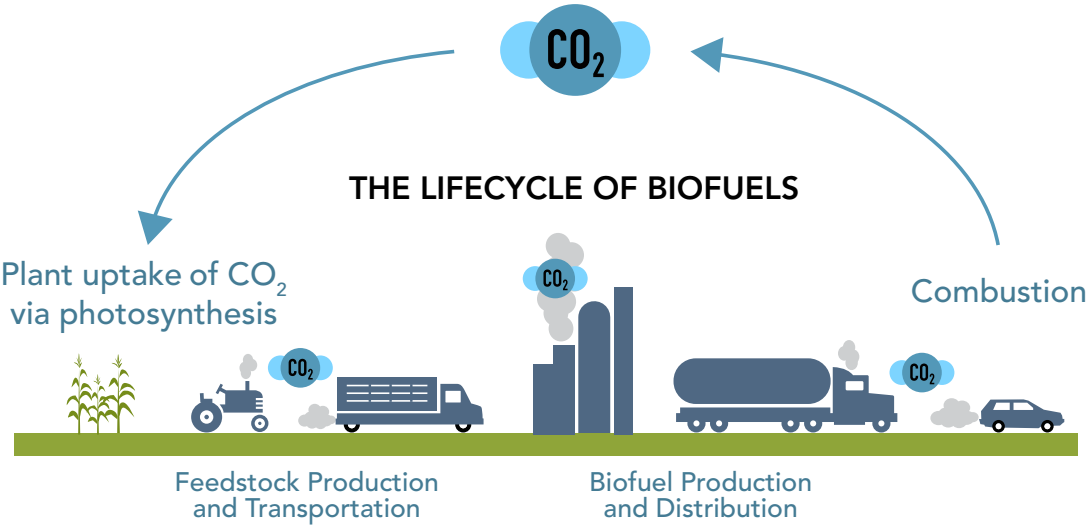
In the transportation sector, hydrogen can be used to power vehicles, marine vessels, trains, and more as fuel for **hydrogen fuel cells or specially designed internal combustion engines.** These technologies release water vapor from the tailpipe, and don't produce direct greenhouse gas emissions. However, hydrogen combustion engines may produce some nitrogen oxides, a health-harming air contaminant.

Strategic Use of Low Carbon Biofuels

In addition to zero emission sources of energy such as electricity and hydrogen, there are a number of fuels that have a low carbon footprint and are produced from organic matter derived from biomass such as plants. These biofuels are renewable and can be a low carbon source of energy. To use some of these fuels, specialized engines may be required, whereas others can be used directly in regular gasoline and diesel combustion engines. While not as visible as electric cars on the road, this is another example of a climate solution we already encounter every day. As a result of the *BC Low Carbon Fuel Standard* and federal requirements, a small proportion of biofuels are blended into the regular gasoline and diesel that we use in British Columbia.

Though biofuels can be low carbon alternatives to gasoline and diesel, they still produce tailpipe greenhouse gas emissions as well as air contaminants that can have negative impacts for public health and the environment. Feedstocks must be carefully managed to ensure that greenhouse gas emissions are balanced with carbon uptake in order for biofuels to be truly low carbon. Additionally, there are a number of ways in which biofuels generate greenhouse gas emissions throughout their lifecycle, from the use of fossil fuel-based fertilizer in feedstock growth to distribution. Some biofuels and renewable gas are produced in the region, including production at a number of Metro Vancouver facilities. However, biofuels produced outside of the region will be needed to meet demand. While biofuels are currently available and used in limited quantities, widespread use could have consequences for the way that we use agricultural land, forests, and other ecosystems. A lifecycle view of the carbon emissions from biofuels is needed to ensure that they are a low carbon alternative to fossil fuels and do not have unintended ecological impacts.

If used strategically, biofuels have the potential to displace the use of fossil fuels in large and specialized trucks, rail locomotives, aircraft, and marine vessels that are difficult to electrify, especially in the short term while new zero emission technologies are developed. Biofuels can also lower the carbon footprint associated with hybrid technologies that are not solely powered by electricity.



Low Carbon Transportation Biofuels

Low carbon diesel fuels include biodiesel and renewable diesel:

- **Biodiesel** is made from vegetable oils (such as canola) and waste animal fats. It can be blended in fossil diesel in amounts up to 20% and used in conventional diesel engines. When used in higher amounts, a specialized engine is required.
- **Renewable diesel** is also made from vegetable oils and animal fats, but is produced using a different process that makes the end fuel identical to fossil diesel. Because there is no chemical difference from fossil diesel, renewable diesel can be used directly in conventional diesel engines in amounts up to 100% without requiring engine modifications.

Ethanol is the most common renewable alternative to gasoline. Made from plants such as corn or sugar cane, it can be blended in regular gasoline in amounts up to 10% before a different engine is required. Flex fuel vehicles that can accommodate gasoline blends with up to 85% ethanol have become increasingly common in North America.

Renewable natural gas is produced from decomposing waste, and can be used in compressed natural gas vehicles and other equipment as a renewable, low carbon alternative to fossil natural gas.

There are specialized types of renewable fuels for aircraft and marine vessels, such as **sustainable aviation fuel**.

Low Carbon Aircraft, Trains, and Ships

All modes of transportation move in and out of the region some of the time, but aircraft, trains, and ships almost exclusively travel in and out of the region.They often travel long distances that cross provincial and international borders. Marine and air movement between countries is governed by international organizations such as the International Maritime Organization and the International Civil Aviation Organization. Policies and standards adopted by these organizations, action taken by other countries, and actions by the federal government are key determinants of whether and how these sectors will reduce greenhouse gas emissions. Rail transport faces similar challenges, as rail lines coming into and out of the region are subject to federal regulations and, when they cross the American border, the United States' regulations. National and international cooperation is essential to find ways to reduce emissions in these sectors.

Working Across Borders to Reduce Emissions

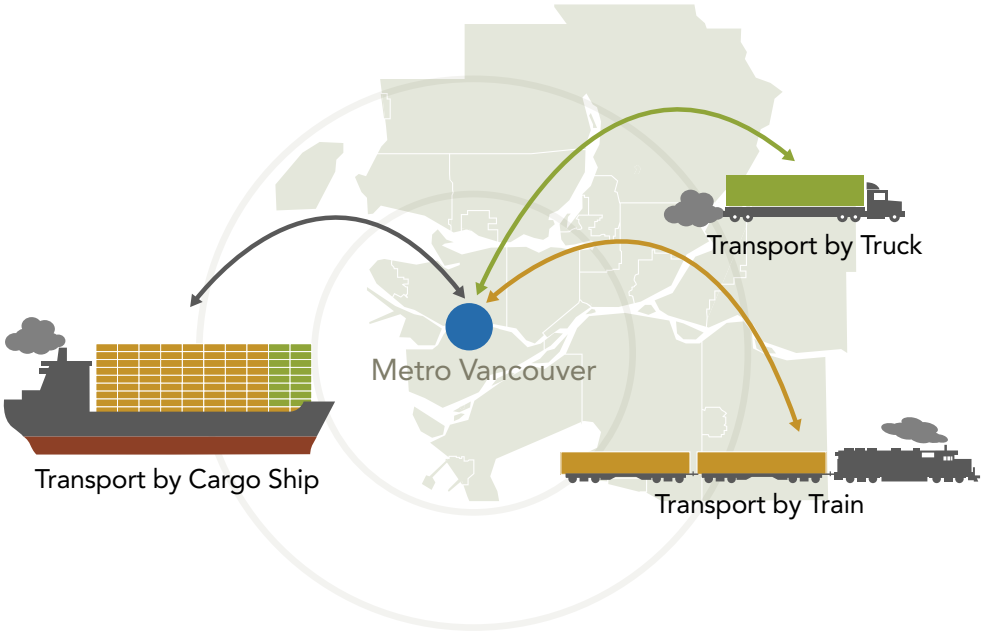
The **International Maritime Organization (IMO)** is a United Nations agency with responsibility for the prevention of marine and atmospheric pollution by ships, as well as their safety and security. It has committed to a target of reducing total annual greenhouse gas emissions from international shipping by at least 50% by 2050 (compared to 2008). The Federal Government is responsible for adopting, implementing, and enforcing IMO requirements within Canada.

The **Northwest Ports Clean Air Strategy (NWPCAS)** is a shared strategy for reducing air contaminants and greenhouse gases from the Port of Vancouver and ports in the state of Washington. Participating ports have committed to implementing port-specific plans to implement the NWPCAS vision of reaching net zero emissions by 2050.

The **International Civil Aviation Organization (ICAO)** is a United Nations agency that facilitates regulatory alignment between 193 member nations. It has adopted the aspirational goals of carbon neutral growth for the international aviation sector from 2020 onwards, as well as 2% annual fuel efficiency improvement from 2021 to 2050. Member nations are responsible for developing their own regulatory approaches to reaching these goals.

Canadian National Rail and **Canadian Pacific Rail** are the two major freight railways in Canada, both of which operate in the Metro Vancouver region. They are subject to legislation and regulation by the federal government. While Transport Canada has regulations in place to manage air contaminants from rail, there is no federal strategy in place to significantly reduce greenhouse gas emissions from rail. Some rail lines in the region also cross the American border, creating a need for international alignment.

The Metro Vancouver region is also a key hub for goods movement and air travel in Canada and the Pacific Northwest through Canada's largest port, The Port of Vancouver (operated by the Vancouver Fraser Port Authority), as well as Canada's second busiest airport, the Vancouver International Airport. The region can leverage this position and accelerate change in these sectors by creating opportunities that support the use of zero emission technologies and biofuels. Developing supply chains for biofuels, offering access to infrastructure for zero emission engines and biofuels, using zero emission technologies for smaller vessels and shorter in-region trips, and establishing requirements for trains, planes, and ships that service the region are important components of a larger national and international approach to reducing emissions in these sectors. Actions taken in the region can help reduce aviation and marine emissions well beyond Metro Vancouver's borders.



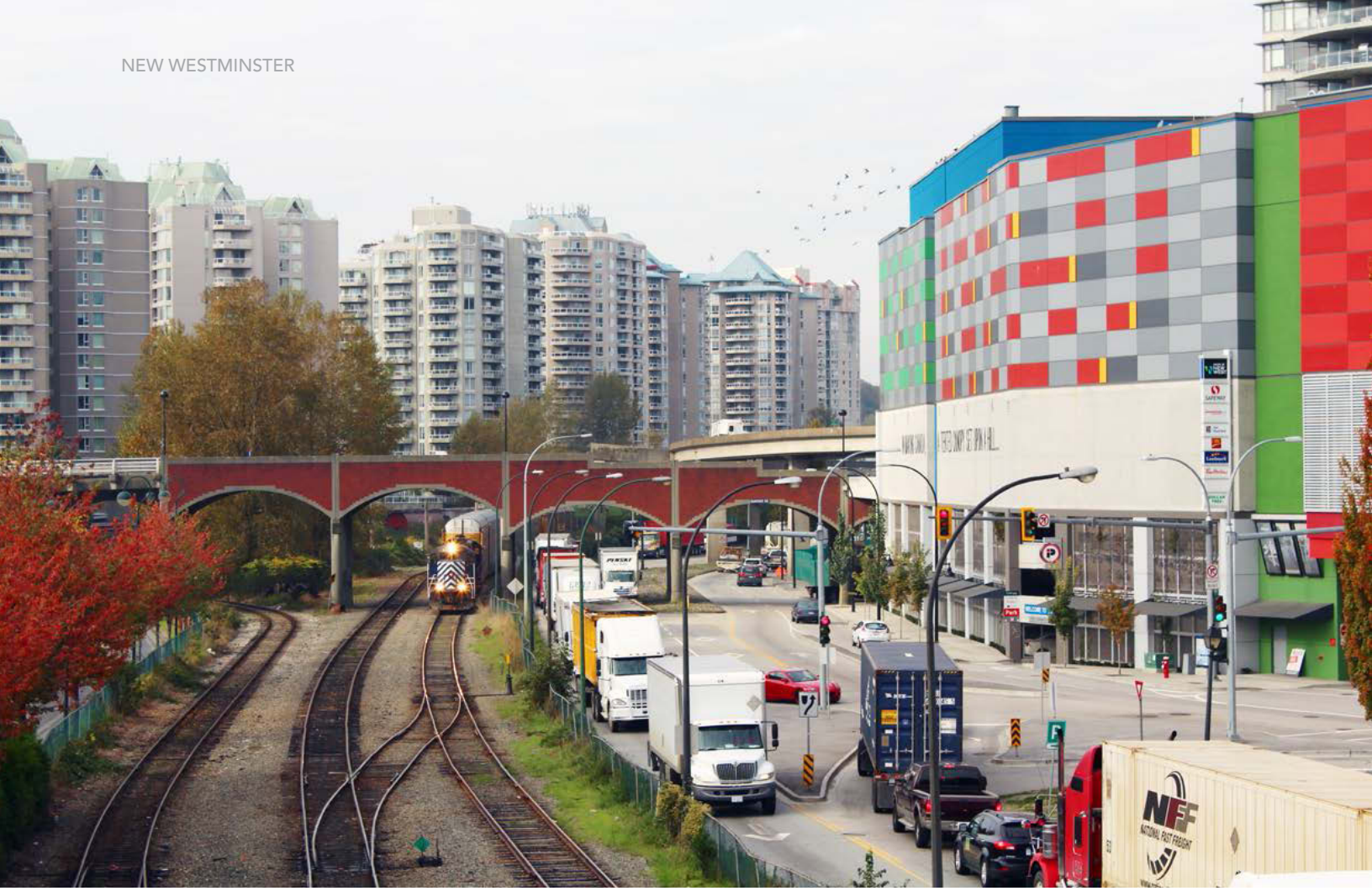
Ferries and local airlines move passengers between Metro Vancouver and neighbouring regions. Some of these, such as BC Ferries and Harbour Air, have introduced the use of innovative zero emission technologies. BC Ferries operates a number of battery-equipped ships on shorter routes. The ships are designed for full electric operation, but are fitted with hybrid technology that bridges the gap until shore charging infrastructure becomes available. Harbour Air has demonstrated the world's first fully electric commercial aircraft in a short test flight, and is advancing this technology for use in full length commercial flights in the future.

In addition to reducing greenhouse gas emissions from air, marine, and rail sources, it is critical that key transportation corridors and facilities such as ports, airports, and rail lines are resilient to the impacts of future climate hazards to minimize disruptions to goods movement, supply chains, and personal travel. Ships and aircraft used for goods movement, as well as ferries and rail lines used for passenger travel, must be adapted to a changing climate to ensure that connections to neighbouring regions and islands are reliable and safe.

Social Equity

Equity is the promotion of fairness, justice and the removal of structural barriers that may cause or aggravate disparities experienced by different groups of people. We must ensure no one is left behind in the transition to a carbon neutral and resilient region. Metro Vancouver's efforts to move towards zero emission and low carbon transportation will continue to incorporate the voices and needs of a full range of communities to ensure that fairness and equity are of the highest priority. Organizations responsible for transportation related climate policies must consider whether inequity is created or magnified, and address these inequities to ensure a just transition. Actions that reduce emissions must also support an equitable distribution of benefits and avoid an inequitable distribution of costs.

Integrating equity into Metro Vancouver's air quality and climate change programs is a work in progress. Metro Vancouver will develop a strategic approach to assessing equity in assessing equity in the *Climate 2050 Transportation Roadmap*. This will include community input, health impact assessments and other equity evaluation tools so that all residents benefit from these changes.



Barriers and Opportunities

The transportation sector presents an important opportunity to reduce regional greenhouse gas emissions in the next ten years and beyond, leading early emission reduction efforts in the region. Many member jurisdictions and the BC government are global leaders in taking action to reduce transportation emissions, and have put in to place a number of policies that provide a strong foundation. However, additional action is needed to leverage this opportunity to its full potential.

Reduce Driving through Compact Communities

Underpinning shifts in the technologies and fuels we use to move people and goods will be the continued development of a compact region. Existing compact communities along transit networks and around transit hubs bring people closer to the places they wish to go and facilitate some of the highest public transit ridership levels in North America. However, the population of Metro Vancouver is expected to grow from 2.7 million to 3.8 million, an increase of over 40%, from 2020 to 2050. It is critical that regional growth is concentrated in compact, transit serviced areas to minimize growth in car use and driving distances. Ensuring that more people live in compact communities that are well-connected to work, school, services, and amenities will enable a more affordable, resilient, and efficient transition to zero emission day-to-day trips.

Accelerating Uptake of Low and Zero Emission On Road Transportation Options

A number of the technology solutions and strategies to reduce emissions from on road transportation are already familiar to us. Electric vehicles and biofuels are already in use, and electric and hydrogen vehicle technologies are rapidly continuing to develop. Switching to lower emission modes for both personal transportation and goods movement is supported through existing and emerging regional transportation plans. However, this transition needs to happen faster

in order to meet regional climate targets. Actions such as the establishment of low emission zones can accelerate local uptake of low and zero emission transportation options including transit, active transportation, and zero emission vehicles. Reducing emissions from on road transportation sooner rather than later will also benefit the region by improving air quality, enhancing the resilience of transportation networks, and creating comfortable, affordable transportation options.

Rapid Uptake of Electric Vehicles

Electric vehicle and charging technologies have advanced substantially in recent years. Costs continue to decline, driving ranges are getting longer, and charging is getting faster. More makes and models will soon be available for larger vehicles. However, there are still barriers to rapidly increasing the amount of electric vehicles on the road:

- **Lack of affordable used electric vehicles.** Electric vehicles for personal use are widely available, inexpensive to charge, and declining in up front cost, but they still cost more than their fossil fuel counterparts and there is not yet an affordable used market for them. This creates inequities for lower income groups, and slows down the uptake of electric vehicles.
- **Diverse vehicle models are needed.** A greater variety of different electric vehicle models, such as SUVs, vans, and pickup trucks, are needed to meet diverse needs. Electric options are under development and will be available in coming years, but are not yet widely available for purchase.
- **Access to charging in large buildings can be challenging.** It can be expensive and complicated to access and install charging in large commercial and residential buildings like condos, townhomes, and multi-unit rentals. Better access to charging in these types of buildings is needed to support widespread electric vehicle uptake.
- **Infrastructure to support electric vehicle charging is needed.** As more people start using electric vehicles, new public fast charging stations and networks will be needed to support longer trips. A modernized electricity grid that integrates smart grid technologies can also help to support vehicle charging as electricity demand changes as a result of widespread electric vehicle use.
- **Accelerating electric vehicle uptake.** While the *BC Zero-Emission Vehicles Act* mandates sales targets for new electric vehicles, every new gasoline or diesel car sold in 2021 is likely to remain on the road until at least 2030. Additionally, market demand in the Metro Vancouver region has already exceeded regulated sales targets for early years. Finding ways to further accelerate electric vehicle uptake beyond the Provincial minimums to get more electric vehicles on the road earlier is a critical pathway to drastically reduce greenhouse gas emissions over the next ten years and beyond.

Reducing Emissions from Medium and Heavy Duty Trucks

Medium and heavy duty trucks used commercially will be slower and more difficult to transition to zero emission technologies than smaller vehicles used for personal transportation. It is unlikely that all of these vehicles will be ready to transition to zero emission technologies by 2050, creating a need for low carbon alternatives to bridge that gap. There are a number of barriers to wider adoption of zero emission and low carbon commercial vehicles:

- **Availability of zero emission vehicles is limited**. While there are several electric and hydrogen models developed for medium and heavy duty trucks, very few are in use and they are not yet widely available in British Columbia. The market for these vehicles must be expanded to make it possible to purchase zero emission vehicles in large quantities for a variety of commercial purposes.

- **Existing technologies have high up front costs**. The up front cost of zero emission vehicles is considerably higher than their conventional fossil fuel counterparts. As the market develops and production scales up, these costs are likely to follow trends in passenger vehicles and drop quickly. However, action is needed to accelerate market demand. Financial support will be needed to facilitate this transition.
- **Biofuel supply and availability is not yet developed**. Though some biofuels are already in use in gasoline and diesel used in the Metro Vancouver region, a significant ramp up of supply, production, and distribution of these fuels is needed before they can be deployed on a wider scale. As these supply chains develop, carbon intensity requirements are needed to ensure that biofuels have a lifecycle climate benefit.
- **Recharging and refueling infrastructure requires a multi-jurisdiction approach.** Recharging and refueling options for zero emission and low carbon vehicles will be more difficult to access for commercial vehicles that travel in and out of the region to far or remote destinations where access to fast electric charging, hydrogen refueling, and biofuels may not develop at the same pace as regional infrastructure.

Zero Emission and Low Carbon Technologies for Marine Vessels, Rail Locomotives, and Aircraft

As on-road vehicles transition to zero emission technologies and biofuels, marine vessels, rail locomotives, and aircraft will become the largest remaining sources of regional transportation greenhouse gas emissions. Additionally, as our economy grows, goods movement within and through the region will continue to grow, compounding the need to reduce emissions from marine and rail while maintaining a competitive local economy. However, reducing emissions from these sources is challenging for a number of reasons:

- **Innovative zero emission and low carbon technologies are still under development.** While there are some electric and hydrogen options developed for rail locomotives and small ferries, zero emission options for aircraft, harbour tugs, and large marine vessels are virtually non-existent. Rapid innovation in these modes is needed to develop and scale up production of viable zero emission technologies, especially as many of these engines last for decades and will still be in use in 2050.
- **Global demand for biofuels requires complex supply chains and large quantities of feedstocks.** Widespread use of biofuels for global marine and air movement will require huge amounts of these fuels and a high degree of coordination at production and refueling facilities around the world. A better understanding of global supply and production constraints is needed to effectively build a role for biofuels in sectors with significant international connections.
- **National and international cooperation is needed to effectively reduce emissions.** Cooperating with research institutions, industry partners, international agencies such as the IMO and ICAO, and other governments – locally, provincially, federally and internationally – will be key to developing new technologies and building reliable refueling and recharging networks. A shared vision for emission reductions is needed to ensure these sectors are on a pathway to carbon neutrality.

The Journey to Carbon Neutral, Resilient Transportation

Linkages to Other Climate 2050 Roadmaps

There are many linkages between transportation and other *Climate 2050* issue areas. Some of the related issue areas for transportation include:

Land use and growth management – policies that support more compact, complete communities influence the form and location of the transportation network, how people move and how goods are transported;

Infrastructure – the regional transportation network includes infrastructure such as roads, rail lines, bridges, and bike paths;

Energy – availability of clean, renewable energy to power regional transportation;

Human health and well-being – active transportation modes improve public health;

Buildings – home and workplace charging for electric vehicles will become more common, and;

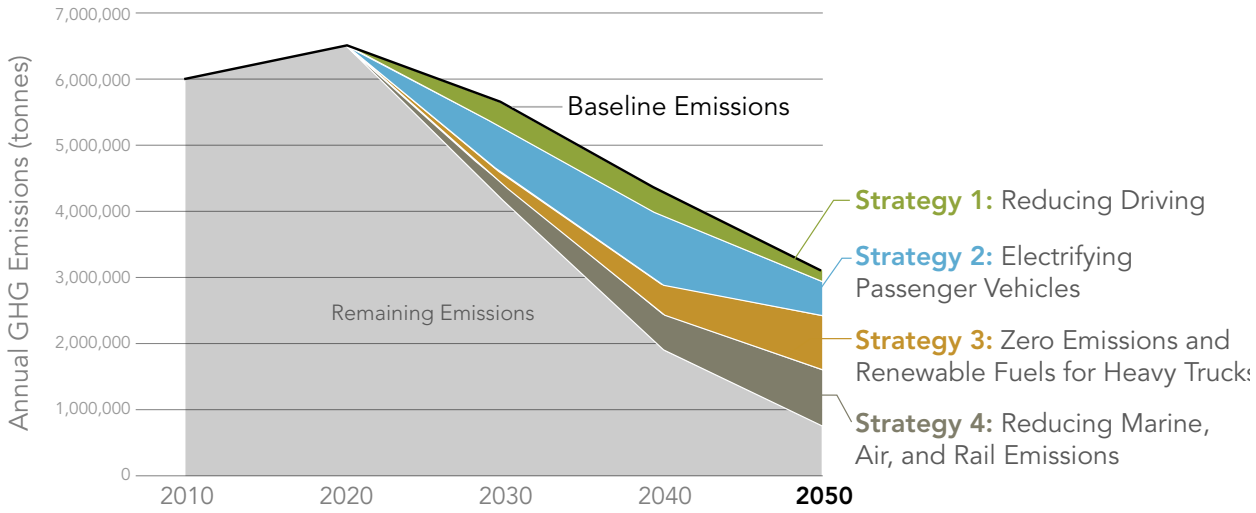
Industry – delivery of goods and provision of services impact the amount and types of transportation that take place in the region. Non-road vehicles and equipment may be impacted by policies applied to on-road transportation.

Linkage to Metro Vancouver's *Clean Air Plan*

Strategies 1-4 (and all the associated actions) appear in both the *Transportation Roadmap* and the *Clean Air Plan*. These two plans are working together to achieve a carbon neutral region. Linking these strategies and actions in both plans ensures a clear action plan for Metro Vancouver and its partners.

SKY TRAIN, SURREY

POTENTIAL IMPACTS OF THE STRATEGIES AND ACTIONS DESCRIBED IN THE ROADMAP



STRATEGY 1: Reduce Driving through Active Transportation and Public Transit

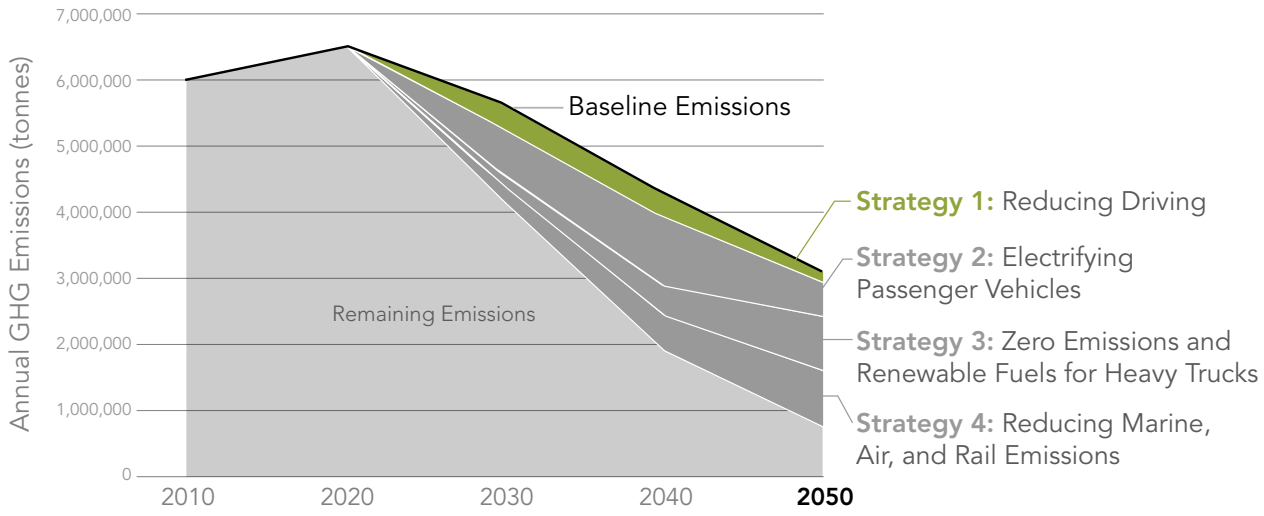
Transportation emissions at the community scale are driven by where people live, work, study and play. The Metro Vancouver *Regional Growth Strategy* and the *Regional Transportation Strategy* both outline policies to help create communities that are complete, compact, and transit oriented. When people live closer to where they work, study and play, more trips can be made by walking, rolling and cycling and on public transit. Emerging technologies and services such as electric mobility devices and and car sharing can also support a wider range of transportation options.

Reducing the amount of driving in the region contributes to many different goals, such as improving air quality and health impacts and managing traffic congestion as regional population grows. Active transportation in particular has important co-benefits such as improved health. However, helping residents and businesses to drive less is a long-term transition, and significant funding is needed to expand public transit and active transportation options.

STRATEGY 1	Potential Impacts of Strategy	Key Partners
	Reduce annual greenhouse gases by up to **280,000** tonnes by 2030 Reduce annual greenhouse gases by up to **170,000** tonnes by 2050	• Member jurisdictions • TransLink • BC Government • Government of Canada

RAPID BUS, MAPLE RIDGE

POTENTIAL IMPACT OF STRATEGY 1 ON GHG EMISSIONS



1.1 Enhance and Improve Regional Transit.

BIG Move

Advocate to TransLink to increase public transit in the region, significantly shifting trips from passenger vehicles to transit. TransLink should increase transit frequency in key areas, transition to using clean, renewable energy, and implement other related air quality and climate actions outlined in the *Regional Transportation Strategy*. Regional emission reductions should be prioritized in transit expansion and service decisions, while ensuring that all residents have access to transportation options in a connected region.

1.2 Use Pricing to Reduce Driving and Emissions.

BIG Move

Work with the BC Government, TransLink, member jurisdictions and other regional partners to develop and implement a policy that puts a price on driving in the region, to help reduce emissions. The program could include mobility pricing, transportation pricing, usage-based insurance, fuel taxes, etc. Any program should prioritize fairness and equity and be supported by transit expansion (Action 1.1). Any program should align with any low or zero emission zones in the region (see Actions 2.2 and 3.1).

1.3 Expand Active Transportation Networks.

BIG Move

Advocate to member jurisdictions to expand regional and local active transportation networks so it's the most convenient choice for most shorter trips. The networks should be well-connected, comfortable for most, and integrated with public transit. Network expansion should prioritize under-served areas to ensure all residents have access to active transportation options in a connected region. Network elements should include walking and cycling paths, regional greenways, separated bike lanes, and end-of-trip facilities suitable for all bike and mobility types, including charging for electric mobility devices such as electric bikes, electric scooters, etc.

1.4 More Stable Infrastructure Funding for Regional Active Transportation Networks.

Advocate to BC Government and Government of Canada to expand stable funding for comprehensive regional and local active transportation networks. The networks should be well-connected, comfortable for most, and integrated with public transit.

1.5 More Stable Funding for Regional Transit.

Advocate to BC Government and Government of Canada to expand stable funding for the regional transit system to cover both operations and capital investments, including investments to transition to zero emission technologies.

1.6 Regional Parking Strategy to Reduce Driving.

Develop a Regional Parking Strategy to prioritize active transportation and other low emission transportation options, coordinating with member jurisdictions and TransLink. The strategy could include replacing building parking minimums with maximums, establishing parking minimums for bicycles, implementing dynamic parking pricing and reducing free parking spaces. The strategy could also support uptake of electric and car-share vehicles by establishing electric vehicle charging requirements for parkades, and enhancing preferential parking rates and spaces for electric and car-share vehicles.

1.7 Support Residents and Businesses in Active Transportation.

Advocate to the BC Government and Government of Canada to provide provide funding (e.g. incentives, tax credits) to residents and businesses to support active transportation, including for buying, renting or sharing all bike and mobility types. Funding availability should prioritize groups who generally cannot access these transportation options, such as low-income residents and households.

1.8 Communicate the Benefits of Walking, Cycling and Public Transit.

Support outreach campaigns led by TransLink, member jurisdictions and health authorities that show the benefits of walking, cycling (including electric bikes) and public transit, including the associated improvements to regional air quality and greenhouse gas emissions.

1.9 Implement Trip Reduction Programs.

Advocate to BC Government to require large employers and major trip generators (e.g., shopping malls) to implement trip reduction programs. Such programs could require large employers and other major trip generators to measure staff or customer driving habits and take action to reduce driving. These programs should consider availability of lower emission alternatives and opportunities for remote and flexible work options.

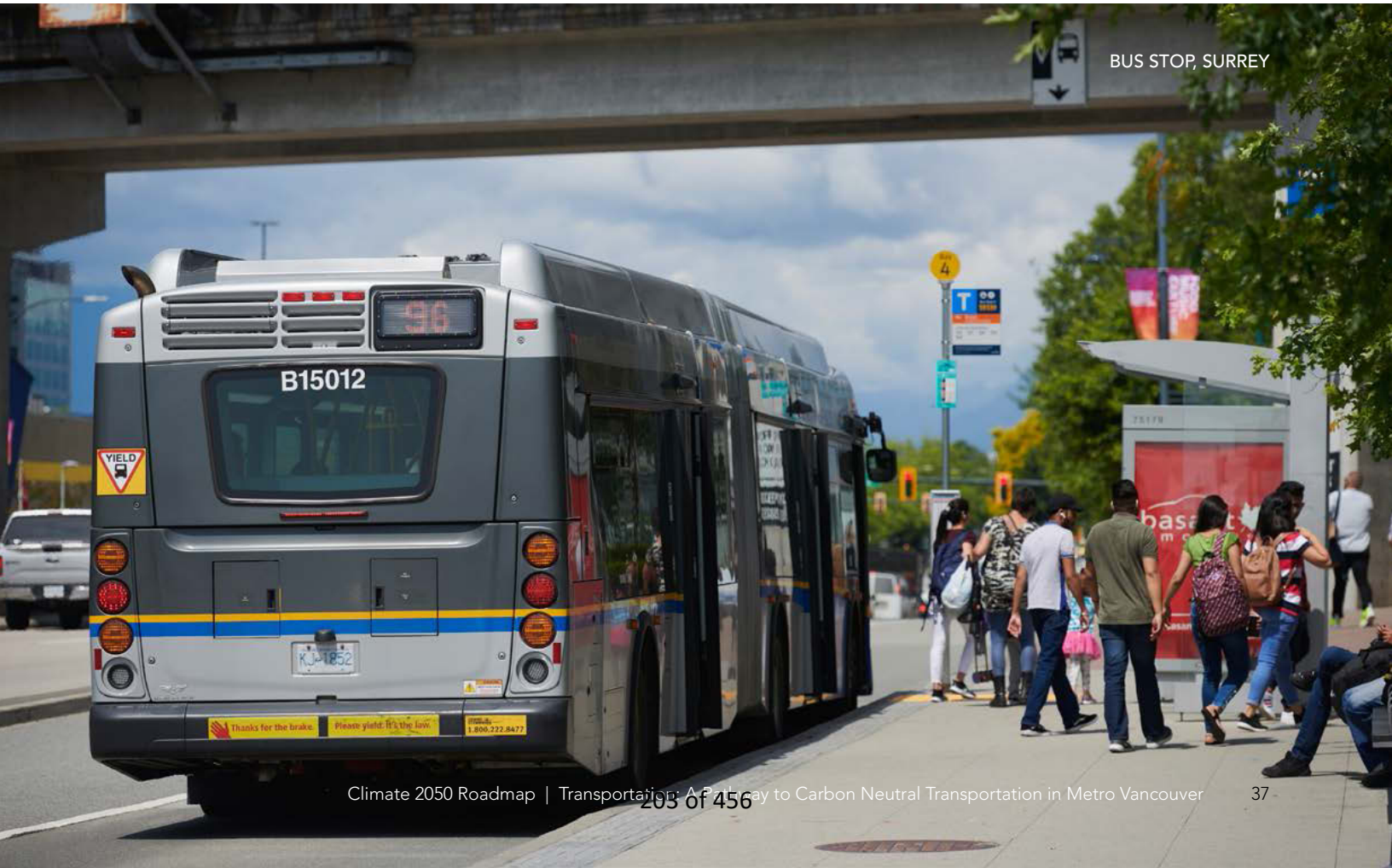
1.10 Regional Bike- and Car-Sharing Strategy

Develop a regional strategy to support the increased use of sharing services for cars, bikes, and electric mobility devices, including e-bikes, coordinating with member jurisdictions, TransLink and other regional partners. These services have been shown to reduce total driving distances among users.

1.11 Support Low Emissions Commuting by Staff.

Corporate LEADERSHIP

Develop and implement a Metro Vancouver corporate commuting strategy to reduce driving emissions. The strategy would encourage more commuting by active transportation, public transit and car-pooling. The strategy could also review parking policies, explore distributed and remote work options where operationally feasible, and recommend additional electric vehicle chargers at work sites.



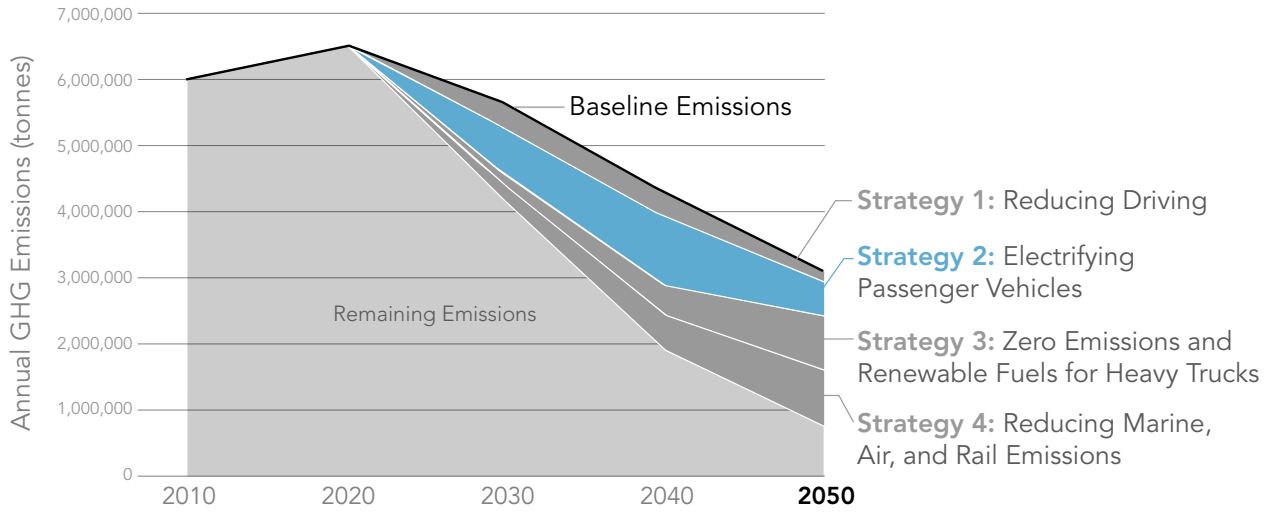
BUS STOP, SURREY

STRATEGY 2: Accelerate the Transition of the Passenger Vehicle Fleet to Electric Vehicles

The 1.5 million passenger vehicles registered in the region are our largest source of greenhouse gases, contributing almost a third of all regional emissions. Electrifying passenger vehicles is a critical way to significantly reduce these emissions, though work is needed to ensure that electric vehicles and charging infrastructure are reasonably accessible to everyone, including lower income households. The *BC Zero-Emission Vehicles Act* provides a pathway to 100% zero emission vehicle sales by 2040, but this timeline should be accelerated to get more electric vehicles on the road faster.

STRATEGY 2	Potential Impacts of Strategy	Key Partners
	Reduce annual greenhouse gases by up to **710,000** tonnes by 2030 Reduce annual greenhouse gases by up to **520,000** tonnes by 2050	• Member jurisdictions • BC Government • BC Hydro

POTENTIAL IMPACT OF STRATEGY 2 ON GHG EMISSIONS



2.1 Accelerate Sales Targets for New Electric Passenger Vehicles.

BIG Move

Advocate to the BC Government to accelerate the sales targets in the *BC Zero-Emission Vehicles Act* to reach 100% zero emission vehicle sales by 2030 (instead of current 2040 target). The BC Government should also modify the Act to prioritize 100% electric vehicles. Advocate to Government of Canada to establish sales targets for zero emission passenger vehicles, reaching 100% by 2030 (instead of the current 2035 target).

2.2 Develop Regional Emission Requirements for Passenger Vehicles.

BIG Move

Develop regulatory emission requirements for existing passenger vehicles, to be implemented by the BC Government or Metro Vancouver. Requirements could include low or zero emission zones, or a vehicle emission levy with rebates for replacing older vehicles. Any regulatory program must consider equity and be coordinated with member jurisdictions. Any program could also support actions focused on reducing total driving distances, including Action 1.2 on pricing driving.

2.3 Make Electric Vehicles More Affordable.

BIG Move

Advocate to BC Government, Government of Canada and other regional partners to continue providing funding (e.g., incentives, loans and tax credits) for the purchase of new and used electric vehicles. Funding should be available for personal and business purchases and should prioritize groups who generally cannot afford these vehicles without funding programs, such as low and middle income households.

2.4 Regional Electric Vehicle Charging Strategy.

Develop a long-term regional strategy for electric vehicle charging infrastructure, coordinating with member jurisdictions, energy utilities, TransLink, industry, and other regional partners. A strategy would identify where additional publicly accessible electric vehicle chargers are needed to ensure equitable access, as well as provide guidance on user fees, design and siting, and consider integration of other electric mobility devices such as e-bikes. The strategy should align with similar actions for medium and heavy duty trucks (Action 3.7).

2.5 Make New Passenger Vehicles Cleaner.

Advocate to the Government of Canada to adopt more stringent fuel economy and emission standards for new passenger vehicles, prioritizing greenhouse gas reductions.

2.6 Expand Electric Vehicle Charging in Buildings.

Work with member jurisdictions, BC Government, BC Hydro and Government of Canada to expand access to electric vehicle charging in buildings. This should include adoption of provincial "Right-to-Charge" legislation as well as code requirements that new or substantially renovated buildings are wired for electric vehicle chargers. Expanding access should also include increased support and funding (e.g., incentives, loans, tax credits) for electric vehicle charging in existing buildings. Funding should prioritize groups who generally would not have access to chargers, such as residents living in rental buildings, strata buildings, non-market housing or secondary suites.

CHARGING STATION, PORT MOODY

2.7 Electric Vehicle Outreach Programs.

Enhance existing and deliver new public outreach programs about the benefits of electric vehicles and how to install electric vehicle chargers at workplaces and multi-family buildings, working with member jurisdictions and other regional partners.

2.8 Electrification Targets for Ride-Hailing Services.

Advocate to BC Government to establish vehicle electrification targets for ride-hailing and taxi fleets.

Corporate LEADERSHIP

2.9 Transition the Corporate Fleet to Zero Emissions.

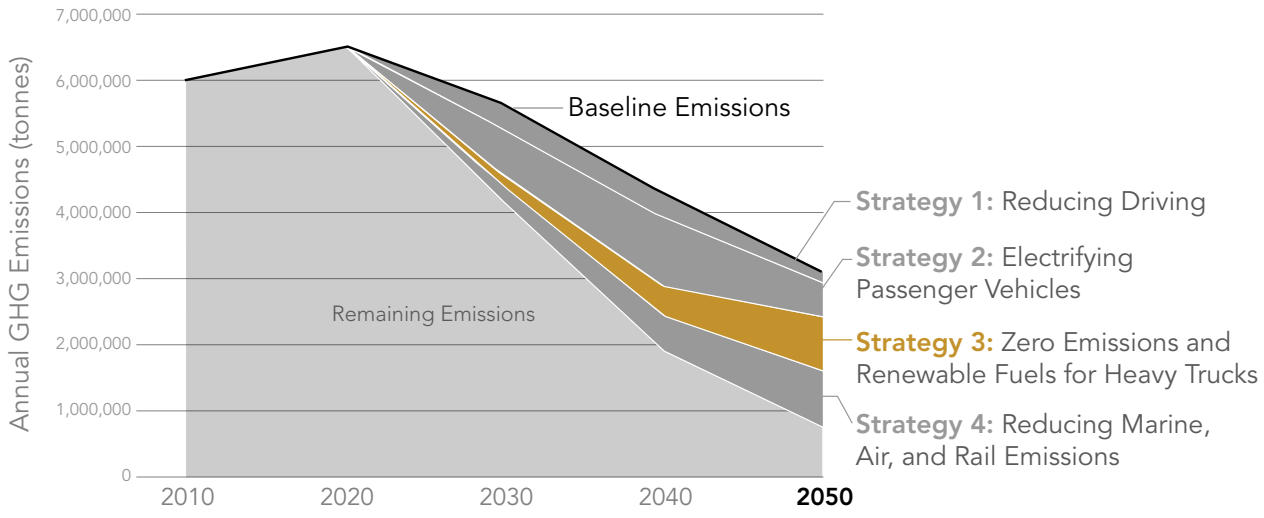
Transition Metro Vancouver's corporate on-road fleet to zero carbon emission between 2035 and 2040, and zero emission by 2050. The transition would include both passenger and medium and heavy duty vehicles.

STRATEGY 3: Reduce Heavy Truck Emissions and Support Early Adoption of Zero Emission Heavy Trucks

As our economy grows, goods movement in the region will continue to grow. Federal emission standards ensure new trucks use fuel more efficiently, and provincial clean fuel standards have reduced the carbon intensity of diesel, the primary fuel for medium and heavy duty trucks. Sales targets, incentives and a regional refueling strategy will accelerate the long term transition to zero emission medium and heavy duty trucks, reducing greenhouse gases and improving regional and local air quality while supporting a competitive local economy. Other medium and heavy duty vehicles used in the region, such as transit vehicles, must also shift towards zero emission technologies and low carbon fuels.

STRATEGY 3	Potential Impacts of Strategy	Key Partners
	Reduce annual greenhouse gases by up to **170,000** tonnes by 2030 Reduce annual greenhouse gases by up to **810,000** tonnes by 2050	• BC Government • TransLink • Trucking industry • Vancouver Fraser Port Authority • Member jurisdictions

POTENTIAL IMPACT OF STRATEGY 3 ON GHG EMISSIONS



3.1 Regulate Existing Medium and Heavy Trucks.

BIG Move

Develop regulatory requirements for existing medium and heavy duty trucks, implemented by the BC Government or Metro Vancouver. Regulatory approaches to reduce emissions could include an inspection and maintenance program that requires repairs on higher emitting trucks, registration requirements targeting older vehicles, and low or zero emission zones (aligned with Action 2.2). Requirements should be developed in coordination with member jurisdictions, Vancouver Fraser Port Authority, TransLink and other regional Requirements would align with TransLink's transition to clean, renewable energy in Action 1.1.

3.2 Require Zero Emission Sales Targets for New Medium and Heavy Trucks.

BIG Move

Advocate to the BC Government to set mandatory zero emission vehicle sales targets for new medium and heavy duty trucks. For medium duty trucks, the zero emission sales target should reach 100% by 2050. For heavy duty trucks, the zero emission sales target should reach 100% before 2060.

3.3 More Stringent Low Carbon Fuel Standards.

BIG Move

Advocate to the BC Government to further increase the stringency of the BC *Low Carbon Fuel Standard* to reduce the carbon intensity of transportation fuels, primarily through increasing use of renewable diesel and ethanol. Advocate to the Government of Canada to adopt a *Clean Fuel Standard,* to include more stringent carbon intensity targets for all transportation fuels (see Actions 4.1, 4.2, 4.5 and 4.6).

3.4 Long-term Emissions Strategy for Medium and Heavy Trucks.

Work with the BC Government and partners to develop a long-term province-wide emissions strategy for medium and heavy duty vehicles. The strategy should identify a phased timeline to implement a suite of policies and programs (including the other actions under Strategy 3) that would accelerate fleet turnover to cleaner vehicles while preparing for the longer term transition to zero emission vehicles. The strategy should target both greenhouse gas emissions and health harming air contaminants, while providing a level-playing field and minimizing stranded assets.

3.5 Make Low and Zero Emission Medium and Heavy Trucks More Affordable.

Advocate to BC Government, Government of Canada and other regional partners to enhance enhance funding (e.g. incentives, loans, tax credits, joint financing) for the purchase of low and zero emission medium and heavy duty trucks. Any funding program should consider whether funds should be targeted to groups less able to afford low and zero emission medium and heavy duty trucks.

3.6 Regulate Fuel Economy and Emissions for Medium and Heavy Trucks.

Advocate to the Government of Canada to adopt more stringent fuel economy and emission standards for medium and heavy duty trucks, prioritizing greenhouse gas reductions. Cleaner trucks will improve regional air quality in the short term and support the long term transition to zero emission vehicles.

3.7 Zero Carbon Refueling Strategy for Medium and Heavy Trucks.

Develop a long-term regional zero carbon refueling strategy for medium and heavy duty trucks, coordinating with member jurisdictions, energy utilities, Vancouver Fraser Port Authority, TransLink, fuels industry, and other regional partners. The strategy would identify where refueling stations are needed for different fuels including electricity, hydrogen, renewable diesel and others. The strategy could identify pilot

ROBERTS BANK, DELTA

projects and should also consider opportunities to leverage public investment in electric bus charging infrastructure for commercial vehicle use. This strategy should align with similar strategies for passenger vehicles (Action 2.4).

3.8 Funding for Zero Carbon Refueling Infrastructure for Medium and Heavy Trucks.

Advocate to the BC Government, Government of Canada and energy utilities to increase funding (e.g., incentives, loans, tax credits) for zero carbon refueling infrastructure for medium and heavy duty trucks. This infrastructure would support early adoption of low and zero emission medium and heavy trucks, prior to wider commercialization.

3.9 Large Fleets to Adopt "ZEV-First" Procurement.

Develop and support implementation of "ZEV-first" fleet procurement policies, coordinating with member jurisdictions and large fleet operators in the region, to transition fleets to zero emission vehicles by the late 2040s. The policies would be supported by regularly updated information on the availability of zero emissions medium and heavy duty trucks and zero emission passenger vehicles. The policies could also include guidance on right-sizing fleets, calculating total lifetime costs of zero emission vehicles, and potential regional coordination of purchases of zero emission vehicles for fleets (i.e. bulk buy).

3.10 Reduce Delivery Emissions.

Work with member jurisdictions, delivery industry, and other regional partners to implement programs to reduce delivery emissions. Programs should prioritize transitioning delivery fleets to zero emissions (aligned with Actions 3.7 to 3.9) and could also include off-peak deliveries, small urban consolidation centres ("microHubs"), and cargo bike deliveries. This should include exploring the emissions impact of growing online deliveries, along with any potential solutions.

3.11 Reduce Refuse Trucks Emissions.

Work with member jurisdictions and other regional partners to accelerate the transition to zero emission refuse trucks. Opportunities could include contracting, procurement, charging infrastructure, and regional coordination of purchases (i.e., bulk buy).

3.12 Support Innovation in Zero Emission Technology for Medium and Heavy Trucks.

Advocate to industry, academic institutions and other governments to accelerate innovation in low and zero emission technologies for medium and heavy duty trucks, including supporting pilot projects.

3.13 Use Business Licences to Support Emission Reductions.

Work with member jurisdictions to explore whether business licences can be used to accelerate adoption of low and zero emission medium and heavy duty trucks.

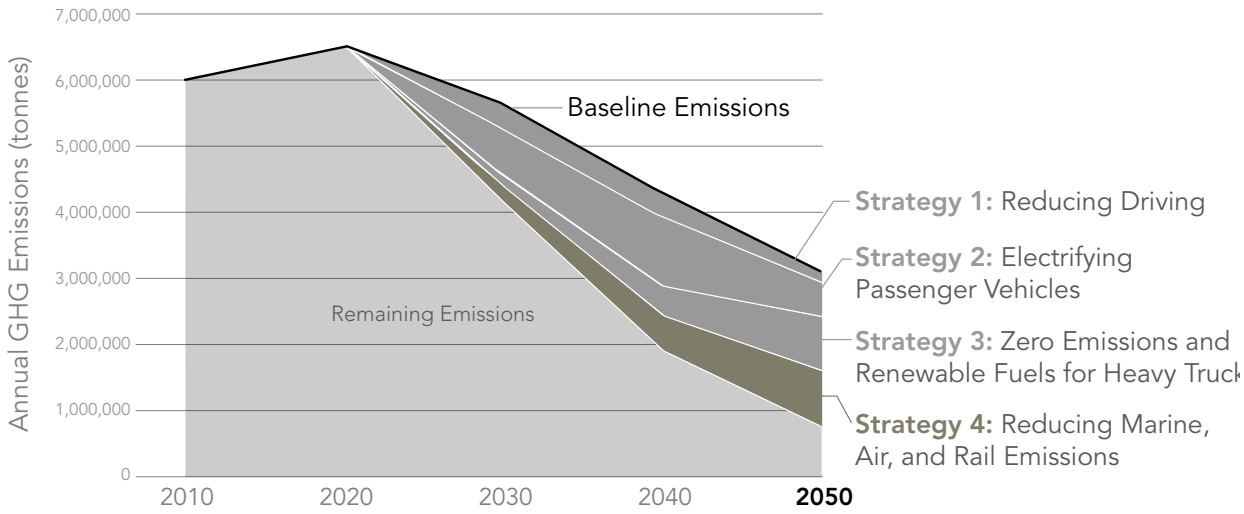
STRATEGY **4:** Reduce Marine, Rail, and Aviation Emissions

Marine, rail, and aviation are significant sources of greenhouse gas emissions globally. While they account for a relatively small amount of regional greenhouse gas emissions, regional rail lines, ports, and airports are important hubs in larger networks that must decarbonize to meet global climate targets. Achieving significant emission reductions in the marine and rail sectors depend on efforts by the Government of Canada and the BC Government to develop and implement strategies to advance cleaner fuels and engine technologies. The Government of Canada also needs to advocate to international organizations such as the International Maritime Organization to accelerate the implementation of more stringent emission standards. Locally, the Vancouver Fraser Port Authority is working to reduce greenhouse gas and health-harming air contaminant emissions associated with shipping in the region.

International standards have improved fuel economy from aircraft and the Vancouver International Airport Authority is electrifying airport operations. While electrification of small aircraft is progressing, achieving significant emission reductions for large aircraft is challenging. In the short term, increasing the availability of sustainable aviation fuel will reduce greenhouse gases from aviation. In the long term, the Government of Canada needs to develop a national strategy to transition to a carbon neutral aviation sector. This likely would include advocacy to international organizations such as the International Civil Aviation Organization.

STRATEGY 4	Potential Impacts of Strategy	Key Partners
	Reduce annual greenhouse gases by up to **250,000** tonnes by 2030 Reduce annual greenhouse gases by up to **860,000** tonnes by 2050	• Vancouver Fraser Port Authority • Government of Canada • BC Government • Airlines • Vancouver International Airport Authority • BC Ferries

POTENTIAL IMPACT OF STRATEGY 4 ON GHG EMISSIONS



4.1 Accelerate Emission Reductions from Marine Vessels.

BIG Move

Advocate to the Government of Canada and BC Government to develop and implement implement long-term strategies to accelerate emission reductions from ocean-going marine vessels, harbour vessels and passenger ferries in the region. Different strategies may be needed for domestic versus international vessels. In the short term, the strategy should prioritize cleaner engines, more renewable fuels and more shore power, particularly for vessels operating in areas that are most impacted by marine emissions. In the long term, the strategy should establish more stringent greenhouse gas emission targets, standards and regulations, to achieve a carbon neutral marine sector by 2050. The strategies should also consider efficiency improvements and the design and supportive funding for regional refueling infrastructure for zero carbon marine vessels.

4.2 Accelerate Emission Reductions from Rail Locomotives.

Advocate to the Government of Canada and BC Government to continue development and implementation of long-term strategies to accelerate emission reductions from rail locomotives in the region. Different strategies may be needed for local versus long-haul locomotives. In the short term, the strategies should prioritize cleaner locomotives, particularly those operating near neighbourhoods and active transportation corridors most impacted by rail emissions, as well as fugitive emissions from rail cars. In the long term, the strategies should establish more stringent greenhouse gas emission targets, standards and regulations for line-haul, switch, and local locomotives, to achieve a carbon neutral rail sector by 2050. The strategies should also consider efficiency improvements and the design and supportive funding for regional refueling infrastructure for zero carbon locomotives.

BURRARD INLET PORT LANDS

4.3 Support Emission Reduction Actions at Vancouver Fraser Port Authority.

Work with the Vancouver Fraser Port Authority to implement actions that reduce port-related greenhouse gas emissions and minimize air quality impacts on port-adjacent neighbourhoods. Areas of collaboration include phasing out older higher emitting equipment, increasing the availability of renewable fuels, developing infrastructure for zero emission equipment (e.g., shore power), and accelerating the adoption of zero emission solutions. Other opportunities include pilot or demonstration projects, and short-sea shipping.

4.4 Support Innovation in Low and Zero Emission Marine and Rail Technologies.

Advocate to BC Government and Government of Canada to help accelerate innovation in low and zero emission technologies for marine vessels, harbour tugs, passenger ferries and rail locomotives, including supporting pilot projects. Emerging engine technologies include hybrid, battery-electric and hydrogen fuel cells. This should include coordination with Vancouver Fraser Port Authority, BC Ferries, rail companies, governments and other regional partners.

4.5 Carbon Neutral Aviation Sector.

Advocate to Government of Canada to develop and implement a long-term strategy to accelerate greenhouse gas emission reductions from the aviation sector. The strategy should include more stringent fuel economy and emission standards for aircraft, to achieve a carbon neutral aviation sector by 2050. The strategy should also increase the availability of sustainable aviation fuel, and could include mandatory carbon offsets or carbon taxes for air travel.

4.6 Develop Local Sources of Sustainable Aviation Fuel.

Support airlines at Vancouver International Airport and other regional partners in increasing local availability of sustainable aviation fuel.

4.7 Technologies for Zero Emission Aircraft.

Advocate to Government of Canada and BC Government to support development of zero emission aircraft, including electrification of small aircraft.

4.8 Support Low Carbon Corporate Business Travel

Corporate LEADERSHIP

Update and adapt corporate business travel policies to reduce emissions, including air travel considerations, corporate carbon offsets, and remote attendance.

Resilient Transportation Strategies

STRATEGY 5: Protect Existing Transportation Networks from Future Climate Impacts

While reducing regional emissions will contribute to the global effort against climate change, some impacts from a changing climate are locked in and are likely to occur even with drastic emission reductions. Rising sea levels, increased frequency and severity of riverine flooding, and more frequent and intense heatwaves, wildfires, and droughts are already recognized as potential climate hazards that are likely to impact regional transportation networks within the next 100 years. Many critical transportation networks and infrastructure will remain standing for decades, but have not been designed to withstand impacts from changing climate hazards. Identifying current and future climate impacts and protecting existing transportation infrastructure from the hazards posed by these impacts is essential in order to maintain a resilient transportation system that is adapted to a changing climate.

5.1 Support Regional Emergency Management Planning.

BIG Move

Work with member jurisdictions, TransLink, neighbouring regions, the Vancouver Fraser Port Authority, and through convening groups such as the Integrated Partnership for Regional Emergency Management (IPREM) to collaborate on data sharing and policy development, and consider critical regional infrastructure interdependencies that could result in cascading effects in the event of regional climate disruption.

5.2 Protect Road Networks.

Work with the BC government and member jurisdictions to ensure that critical road networks, including infrastructure such as tunnels and bridges, are protected from future climate impacts (such as flooding and sea level rise) through projects such as dikes and drainage systems that mitigate potential climate impacts in known risk areas.

5.3 Protect Key Transportation Hubs.

Advocate to the Vancouver Fraser Port Authority, Vancouver International Airport Authority, and Federal government to protect key transportation hubs in low-lying coastal areas from hazards such as sea level rise and riverine flooding.

5.4 Adapt Active Transportation and Transit Networks.

Work with member jurisdictions and TransLink to make sidewalks, bike paths, regional greenways, and transit networks comfortable and safe to use even when impacted by climate hazards such as flooding, hotter temperatures, degraded air quality due to wildfires, and heavy precipitation.

5.5 Prepare for Regional Disruption.

Advocate to TransLink, Vancouver Fraser Port Authority, BC Ferries, and local airports to develop and maintain climate change adaptation plans that establish "safe-to-fail protocols" in the event of severe climate shocks that cause regional and inter-regional disruption, as well as post-event intervention and review procedures.

STRATEGY 6: Develop Climate Resilient Transportation Networks

In addition to protecting critical transportation infrastructure and networks, steps must be taken to proactively build a more resilient transportation system. Defining and assessing future climate risk must look beyond past trends in order to successfully create a transportation network that is resilient to future climate conditions. Climate change adaptation needs to be considered during the location, construction, maintenance, and operation of transportation infrastructure to avoid creating vulnerabilities that make adaptation more difficult and expensive in the future. Long range transportation planning must include hazard, risk, and vulnerability assessments to ensure that all new infrastructure is located in areas without known, unmitigated hazard risks. Land use and development can be coordinated with transportation networks to create robust regional transit, walking, and cycling options that provide a multitude of ways to get to and from key destinations, enhancing low carbon resilience.

6.1 Minimize Risk Exposure for New Transportation Infrastructure.

BIG Move

Work with the BC government, member jurisdictions, and TransLink to ensure that new transportation infrastructure is located outside of areas with known, unmitigated hazards, such as flooding and sea level rise.

6.2 Create Flexible Transportation Networks.

BIG Move

Work with member municipalities and TransLink to develop flexible transportation systems through low-cost, low-emission travel options such as active transportation and transit options that minimize reliance on vulnerable transportation networks, and create multiple travel options in the event of a disruption.

6.3 Reduce Reliance on Transportation Networks.

Work with member jurisdictions to develop complete, compact communities that support transportation demand management measures, reduce the need for long trips, and limit expansion of road space.

6.4 Build Climate Resilient Transportation Infrastructure.

Advocate to the BC government and Federal governments to strengthen climate change resilience design requirements for new transportation infrastructure projects.

6.5 Identify Regional Climate Hazards, Risks, and Vulnerabilities Impacting Transportation Networks.

Work with the BC government, member jurisdictions, TransLink, Vancouver Fraser Port Authority, BC Ferries, and local airports to collect data for baseline, trend, and monitoring purposes, and integrate forward-looking hazard, risk and vulnerability analysis into long-range transportation planning.

6.6 Integrate Resilient Infrastructure in to Transportation Networks.

Work with member jurisdictions, TransLink and the BC Government to consider possible synergies between and co-location of transportation networks with infrastructure designed to address resilience priorities such as storm water management, flooding, and seismic risk.

BIKING IN VANCOUVER

Setting the Path Ahead

The "Setting the Path Ahead" section will eventually be found on Metro Vancouver's *Climate 2050* webpages under "Transportation", and will serve as a companion to the *Transportation Roadmap*. This will allow Metro Vancouver to track progress towards targets, and add and adjust strategies and actions in response to performance measurement.

Transportation is one of the best opportunities for significant early reductions of greenhouse gases in the region, particularly for personal transportation. The region is well positioned to continue with intentional land use planning that supports walking, rolling, cycling, transit, and other shared mobility modes. Electric vehicles are readily available and ready to be deployed on a large scale. It's critical that the actions identified in this *Roadmap* to support faster uptake of electric vehicles are implemented without delay to set this transition in motion as soon as possible. Taking early action to reduce emissions can also help improve air quality, support health and well-being through exercise, and enhance low carbon resilience sooner rather than later. Taking action to improve the resilience of regional transportation networks should also begin right away to adapt to changing climate conditions.

As personal transportation transitions to zero emissions, medium and heavy trucks, marine vessels, aviation, and rail will become the largest sources of transportation greenhouse gas emissions in the region. Action that supports rapid development and scale-up of zero emission and low carbon options for these sectors is needed to ensure that the transportation sector as a whole can transition to carbon neutrality by 2050.

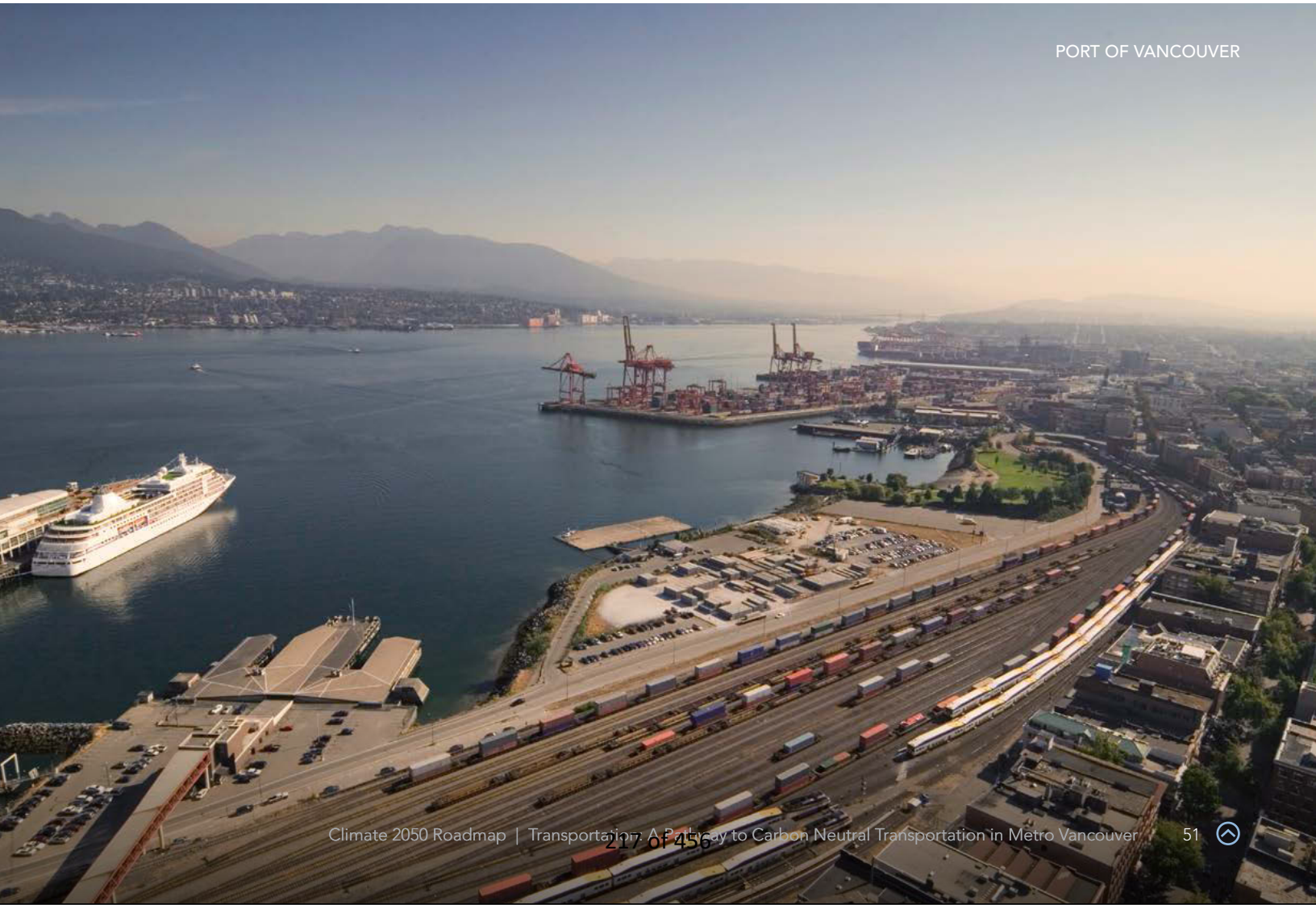
The timeline below includes all of the actions included in this *Roadmap*. Although there is much work to be done, there are some critical actions that, if started over the next two years, will make a major difference to accelerating the region's drive to zero emission and resilient transportation.

CLIMATE 2050 TRANSPORTATION ROADMAP ACTION TIMELINE

STRATEGY	2021-2023	2024-2029	2030-BEYOND
STRATEGY 1 Reduce Driving through Active Transportation and Public Transit	Enhance and Improve Regional Transit		
	Use Pricing to Reduce Driving and Emissions		
	Expand Active Transportation Networks		
	More Stable Infrastructure Funding for Regional Active Transportation Networks		
	More Stable Funding for Regional Transit		
	Regional Parking Strategy to Reduce Driving		
	Support Residents and Businesses in Active Transportation		
	Communicate the Benefits of Walking, Cycling and Public Transit		
		Implement Trip Reduction Programs	
		Regional Bike- and Car-Sharing Strategy	
	Support Low Emissions Commuting by Staff		
STRATEGY 2 Accelerate Transition of Passenger Vehicle Fleet to Electric Vehicles	Accelerate Sales Targets for New Electric Passenger Vehicles		
	Develop Regional Emission Requirements for Passenger Vehicles		
	Make Electric Vehicles More Affordable		
	Regional Electric Vehicle Charging Strategy		
		Make New Passenger Vehicles Cleaner	
	Expand Electric Vehicle Charging in Buildings		
	Electric Vehicle Outreach Programs		
		Electrification Targets for Ride-Hailing Services	
	Transition the Corporate Fleet to Zero Emissions		
STRATEGY 3 Reduce Heavy Truck Emissions and Support Early Adoption of Zero Emission Heavy Trucks	Regulate Existing Medium and Heavy Trucks		
	Require Zero Emissions Sales Targets for New Medium and Heavy Trucks		
		More Stringent Low Carbon Fuel Standards	
	Long-term Emissions Strategy for Medium and Heavy Trucks		
	Make Low and Zero Emission Medium and Heavy Trucks More Affordable		
	Regulate Fuel Economy and Emissions for Medium and Heavy Trucks		
		Zero Carbon Refueling Strategy for Medium and Heavy Trucks	
		Funding for Zero Carbon Refueling Infrastructure for Medium and Heavy Trucks	
	Large Fleets to Adopt "ZEV-First" Procurement		
	Reduce Delivery Emissions		
	Reduce Refuse Trucks Emissions		
	Support Innovation in Zero Emission Technology for Medium and Heavy Trucks		
		Use Businesses Licenses to Support Emission Reductions	
STRATEGY 4 Reduce Marine, Rail, and Aviation Emissions	Accelerate Emission Reductions from Marine Vessels		
	Accelerate Emission Reductions from Rail Locomotives		
	Support Emissions Reduction Actions at Vancouver Fraser Port Authority		
	Support Innovation in Low and Zero Emissions Marine and Rail Technologies		
	Carbon Neutral Aviation Sector		
	Develop Local Sources of Sustainable Aviation Fuel		
	Technologies for Zero Emission Aircraft		
	Support Low Carbon Corporate Business Travel		

CLIMATE 2050 TRANSPORTATION ROADMAP ACTION TIMELINE CONTINUED

STRATEGY	2021-2023	2024-2029	2030-BEYOND
STRATEGY 5 Protect Existing Transportation Networks from Future Climate Impacts	Support Regional Emergency Management Planning		
	Protect Road Networks		
	Protect Key Transportation Hubs		
	Adapt Active Transportation and Transit Networks		
		Prepare for Regional Disruption	
STRATEGY 6 Develop Climate Resilient Transportation Networks	Minimize Risk Exposure for New Transportation Infrastructure		
	Create Flexible Transportation Networks		
	Reduce Reliance on Transportation Networks		
	Build Climate Resilient Transportation Infrastructure		
	Identify Regional Climate Hazards, Risks, and Vulnerabilities Impacting Transportation Networks		
	Integrate Resilient Infrastructure in to Transportation Networks		



PORT OF VANCOUVER

Measuring our Progress

The table below lists examples of some of the performance indicators that could be used to help Metro Vancouver measure regional progress towards meeting the targets set out for this purpose. The performance indicators used will depend, to some extent, on the availability of this information from other organizations. Because the *Transportation Roadmap* is calling for actions from many different partners and stakeholders, data sharing will be foundational to understanding the pace of progress towards our common goals, and will help governments to continue to shape equitable and cost-effective pathways to a carbon neutral future. While much of the data needed to measure progress in on-road transportation is already collected, there are significant data gaps for rail, marine, and air transportation. Additional work is underway to understand what key performance indicators and data effectively measure progress towards regional resilience (noted in the table below as "TBD").

ROADMAP ELEMENT	KEY PERFORMANCE INDICATOR	DATA SOURCE	DATA IS CURRENTLY COLLECTED
Reduce Driving through Active Transportation and Public Transit	Mode share by trip (number of trips, % of total trips)	TransLink Statistics Canada Municipalities	Yes
	Kilometers travelled by mode type: walking, cycling, transit, single occupant vehicle, multiple occupant vehicle (Person kilometers travelled, PKM)	TransLink Municipalities	Yes
	Kilometers of bike lanes, paths, and greenways	Metro Vancouver Municipalities	Yes
	Proportion of household and employment growth concentrated in urban centres and frequent transit development areas (FTDAs) (% of households, % of jobs in urban centres and FTDAs)	Metro Vancouver	Yes
	Kilometers of road and road space area	Metro Vancouver Municipalities BC Government	Yes

ROADMAP ELEMENT	KEY PERFORMANCE INDICATOR	DATA SOURCE	DATA IS CURRENTLY COLLECTED
Accelerate Transition of the Passenger Vehicle Fleet to Electric Vehicles	Proportion of new vehicles sales that are electric, hybrid, hydrogen (number of new vehicle sales, % of total sales)	BC Government ICBC Market research firms Vehicle manufacturers	Yes
	Regional vehicle registration by engine type: internal combustion, electric, hybrid, hydrogen (number of new vehicle registrations, % of total registrations)	ICBC	Yes
	Kilometers travelled by vehicle model year, vehicle size, engine type (vehicle kilometers travelled, VKT)	ICBC TransLink Metro Vancouver	Partial
	Fuel use by type: fossil diesel, fossil gas, biofuels, electricity, hydrogen (Gigajoules, GJ)	Metro Vancouver BC Hydro BC Government	Partial
	Regional vehicle fleet make up by engine type: internal combustion, electric, hybrid, hydrogen (number of vehicles, % of total regional vehicle stock)	ICBC Metro Vancouver TransLink	Yes
	Number of electric vehicle chargers	Municipalities BC Government Charging service providers	Yes
Reduce Heavy Truck Emissions and Support Early Adoption of Zero Emission Heavy Trucks	New vehicle sales by engine type: internal combustion, electric, hybrid, hydrogen, compressed natural gas (number of new vehicle sales, % of total sales)	Vehicle manufacturers ICBC Market research firms Industry associations	Yes
	Regional vehicle registration by engine type (number of new vehicle registrations, % of total registrations)	ICBC	Yes
	Kilometers travelled by vehicle model year, vehicle class, engine type (VKT)	TransLink Metro Vancouver ICBC	Partial
	Fuel use by type: fossil diesel, fossil gas, compressed natural gas, renewable natural gas, biofuels, electricity, hydrogen (Gigajoules, GJ)	Metro Vancouver TransLink BC Hydro BC Government Market research firms Industry associations	Partial

ROADMAP ELEMENT	KEY PERFORMANCE INDICATOR	DATA SOURCE	DATA IS CURRENTLY COLLECTED
Reduce Marine, Rail, and Aviation Emissions	Marine vessels with access to shore power by vessel type: cruise, container, tanker, ferry, other (number of shore power terminals, % of marine vessels with access to shore power)	Vancouver Fraser Port Authority BC Ferries and other ferry operators	Yes
	Kilometers travelled by marine vessels using zero or low emission fuels (kilometers, % of total kilometers travelled)	Vancouver Fraser Port Authority International Maritime Organization Metro Vancouver Transport Canada BC Ferries BC Government	No
	Marine vessel fuel use by type: fossil fuels, liquefied natural gas, renewable natural gas, biofuels, electricity, hydrogen (GJ)	Vancouver Fraser Port Authority International Maritime Organization Transport Canada BC Ferries Metro Vancouver BC Hydro	No
	Kilometers travelled by rail locomotives using zero or low emission fuels (kilometers, % of total kilometers travelled)	Canadian National Rail Canadian Pacific Rail TransLink Other rail companies Metro Vancouver Transport Canada	No
	Locomotive and switch operations fuel use by type: fossil fuels, biofuels, electricity, hydrogen (GJ)	Canadian National Rail Canadian Pacific Rail TransLink Other rail companies Metro Vancouver Vancouver Fraser Port Authority Transport Canada	No
	Kilometers travelled by aircraft using zero or low emission fuels (kilometers, % of total kilometers travelled)	Transport Canada Regional airports Airlines	No
	Aircraft fuel use by type: fossil fuels, biofuels, electricity, hydrogen(GJ)	Transport Canada Regional airports Airlines	No
Protect Existing Transportation Networks from Future Climate Impacts	TBD	TBD	TBC
Develop Climate Resilient Transportation Networks	TBD	TBD	TBC

Glossary

Active transportation includes self-powered modes of transportation such as walking, biking, skateboarding, in-line skating/rollerblading, jogging and running, wheel chairing, snowshoeing and cross-country skiing.

Air contaminants means any substance that is emitted into the air and that (a) injures or is capable of injuring the health or safety of a person; (b) injures or is capable of injuring property or any life form; (c) interferes or is capable of interfering with visibility; (d) interferes or is capable of interfering with the normal conduct of business; (e) causes or is capable of causing material physical discomfort to a person; or (f) damages or is capable of damaging the environment.

Biofuels are renewable transportation fuels that have a low carbon footprint and are produced from organic matter derived from biomass such as plants.

Carbon dioxide (CO_2) is the primary driver of climate change, and is produced primarily by burning fossil fuels.

Carbon neutral region means that the region generates no net greenhouse gas emissions. This is achieved through the deepest greenhouse gas emission reductions possible across all economic sectors, with any remaining emissions balanced out by the carbon dioxide that the plants, trees, and soil of the region remove from the atmosphere, or potentially through technological means.

Carbon sequestration is the removal of carbon dioxide from the air and the long-term storage of carbon to mitigate climate change.

Clean, renewable energy is low or zero emission energy that is replenished over days or years. In Metro Vancouver, clean, renewable energy is primarily electricity from renewable sources such as hydro.

Climate change adaptation means anticipating, planning for and responding to the adverse effects of climate change and taking appropriate action to prevent or minimize 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.

Equity is the promotion of fairness, justice and the removal of structural barriers that may cause or aggravate disparities experienced by different groups of people.

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

Health-harming 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. Health-harming air contaminants include fine and coarse particulate matter, diesel particulate matter, ground-level ozone, nitrogen dioxide, sulphur dioxide, volatile organic compounds and ammonia.

Large fleet operators are organizations that purchase, operate, and maintain a significant amount of vehicles for public sector or commercial use.

Low carbon fuels produce direct greenhouse gas emissions, but have no net greenhouse gas emissions when the fuel lifecycle is taken in to account.

Low emission technologies produce some greenhouse gas emissions or air contaminants, but significantly less than conventional fossil fuel counterparts. This may include high efficiency vehicles or plug in hybrid technologies.

Marine vessels include ocean-going marine vessels (e.g., container, bulk, tanker, fishing, cruise and other specialty vessels), harbour vessels, and passenger ferries.

Medium and heavy duty trucks are mostly freight vehicles such as long-haul trucks and cube vans used for commercial purposes, but also includes buses and refuse trucks.

Mobility pricing refers to fees for transportation services. Some types of mobility pricing (e.g., decongestion charging, low emission zones) are used to manage demand for roads and reduce emissions.

Passenger vehicles include motorcycles, cars, SUVs, minivans and light trucks. Buses are included as part of medium and heavy duty trucks.

"Right-to-charge" legislation provides residents of multi-unit residential buildings with the right to install and use a charging station for their electric vehicle.

Right-sizing fleets means aligning the type and number of fleet vehicles to the true needs of the fleet. Right-sizing fleets reduces costs and emissions.

"Safe-to-fail" protocols anticipate possible system failures so that they can be contained and minimized.

Vulnerability is the degree to which ecosystems, economies, infrastructure and communities are susceptible to, or unable to cope with, the adverse effects of climate change. Vulnerability varies based on exposure, sensitivity and adaptive capacity. Geographic location, socio-economic conditions, and other factors can impact susceptibility to harm and adaptive capacity.

Zero emission means no greenhouse gases or other air contaminants are generated at the point of use, and also eliminates emissions of health-harming air contaminants (e.g., fine particulate matter and nitrogen oxides).

Zero emission vehicles (ZEVs) release no air contaminants from their tailpipes. Electric vehicles are the most common type of zero emission vehicle; others include hydrogen fuel cell vehicles.

ZEV-first is a procurement policy where priority is given to purchasing zero emission vehicles, if they are available.

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

Additional Feedback Considered in Updating the *Climate 2050 Transportation Roadmap*

Note: *Feedback considered for the greenhouse gas reduction related actions found in the Climate 2050 Transportation Roadmap are referenced in the Clean Air Plan feedback. A copy of the feedback can be found in the MVRD September 24th Board Agenda Package: Clean Air Plan (Section E3.1, Attachment 2)*

***Climate 2050 Transportation Roadmap* Section/Topic**	**Feedback**	**Metro Vancouver Feedback Response**
The Challenge		
Goals	The Roadmap includes goals for 2030, but the rest of the Roadmap consistently emphasizes the 2050 targets and 30-year time horizon.	Call out box added to clarify the relationship between the *Clean Air Plan*, as Metro Vancouver's 10-year air quality and greenhouse gas management plan, and the *Transportation Roadmap* as the overarching regional transportation climate strategy.
Climate Change Impacts on Transportation	In addition to experiencing the impacts of climate change, transportation infrastructure itself can exacerbate climate impacts.	Call out box added to note this interrelationship and connect to other relevant Roadmaps.
The Journey to Carbon Neutral, Resilient Transportation		
Linkages to Other *Climate 2050* Roadmaps	Clarity needed on the relationship between the *Clean Air Plan* and *Climate 2050 Roadmaps*.	Call out box added to clarify the overlap in actions between the *Clean Air Plan* and Roadmap.
Resilient Transportation Strategies		
Strategy 5: Protect Existing Transportation Networks from Future Climate Impacts		
Strategy 5 "Protect Existing Transportation Networks from Future Climate Impacts"	This strategy may be interpreted to mean that all existing transportation should be protected.	Language clarified to convey that critical infrastructure and networks should be protected.
Strategy 5 "Protect Existing Transportation Networks from Future Climate Impacts"	Some infrastructure or assets may become stranded; retreat should be considered as a possible response.	Metro Vancouver will be considering these issues in other Roadmaps (e.g. Land Use and Growth Management, Infrastructure).
Strategy 5, Action 5.1 "Support Regional Emergency Management Planning"	The Vancouver Fraser Port Authority is involved in regional emergency management planning.	Vancouver Fraser Port Authority identified as a partner for this action.
Strategy 5, Action 5.2 "Protect Road Networks"	Water crossings via bridges and tunnels are key risk areas and should be considered as part of this action.	Tunnel and bridges explicitly noted in this action.
Strategy 5, Action 5.4 "Adapt Active Transportation and Transit Networks"	Networks may also be impacted by flooding.	Flooding identified as a hazard in this action.

Strategy 5, Action 5.4 “Adapt Active Transportation and Transit Networks”	Equitable access to modes such as walking, cycling, and transit is essential.	Equity will be central to the development of policies and programs during implementation.
Strategy 5, Action 5.5 “Prepare for Regional Disruption”	Highway corridors in and out of the region are limited and several pass through one area.	Inter-regional disruption specifically identified in this action.
Strategy 6: Develop Climate Resilient Transportation Networks		
Strategy 6 “Develop Climate Resilient Transportation Networks”	The two strategies of protecting existing infrastructure and networks and creating new, resilient transportation networks may be interpreted as incompatible.	Additional wording added to clarify that the Roadmap proposes both strategies are needed to address climate resilience.
Strategy 6 “Develop Climate Resilient Transportation Networks”	As electric vehicles become more widely used, electric infrastructure used for charging vehicles will become an important part of transportation infrastructure; hazards impacting electrical infrastructure should be considered as part of the transportation system.	Climate resilience considerations for the electricity grid will be considered in the Energy Roadmap, including increased used of electricity as a transportation fuel.
Strategy 6 “Develop Climate Resilient Transportation Networks”	Developing complete, compact communities is foundational for low carbon resilience as it minimizes reliance on transportation networks to access work, services, and other amenities.	New action (Reduce Reliance on Transportation Networks) added to reflect this feedback.
Strategy 6 “Develop Climate Resilient Transportation Networks”	Other types of infrastructure related to climate resilience may be effectively integrated with transportation infrastructure, e.g. storm water management. Seismic resilience may also have synergies with climate resilience.	New action (Integrate Resilient Infrastructure in to Transportation Networks) added to reflect this feedback.
Strategy 6, Action 6.2 “Create Flexible Transportation Networks”	Both alternate routes and modes should be considered to maximize flexibility.	Wording adjusted to specify that both routes and modes should be considered in this action.
Strategy 6, Action 6.2 “Create Flexible Transportation Networks”	Building redundancy in to transportation systems can avoid significant costs in the event of disruptions to the transportation network;	Consideration of costs will be central to the development of policies and programs during implementation.

	quantifying these avoided costs can highlight the value of this approach.	
Setting the Path Ahead		
Measuring our Progress	Metrics are needed to track progress and establish more specific targets. Need leading (are we getting where we need to be?) and lagging (how have we been doing?) key performance indicators.	The targets and key performance indicators will be used to measure progress as the Roadmap is implemented.
Measuring our Progress	As electric vehicle use increases, understanding the amount of chargers in use will be important.	"Number of electric vehicle chargers" added as a potential key performance indicator.
Measuring our Progress	In addition to tracking kilometers of bike lanes, monitoring road space is an important metric to understand transportation infrastructure.	"Kilometers of road and road space area" added as a potential key performance indicator.
General Roadmap Feedback		
General Feedback	There are no actions regarding First Nations / Indigenous needs.	The Roadmap proposes policies that may include many partners, including First Nations governments, communities and businesses.
General Feedback	Comments queried the extent of the engagement, including specifically if Metro Vancouver has considered First Nations in the Roadmap, and how outreach will include a broader audience as we move into implementation.	The engagement to develop the Roadmap focused on audiences most likely to contribute to the technical discussions, be impacted by the actions, and play a key role in implementation. The project team shared progress and received feedback from some First Nations on transportation and other climate related topics. As Metro Vancouver moves in to implementation, outreach will broaden to seek a supportive constituency on the rationale and opportunities to reduce emissions and be prepared for climate impacts.
General Feedback	Consideration of embodied emissions and use of low carbon materials is needed to understand the true footprint of various transportation options and technologies.	Metro Vancouver is exploring an approach to assessing embodied emissions that takes in to account upstream emissions and emissions embedded in materials.

To: Climate Action Committee

From: Carla Stewart, Senior Planner, Regional Planning and Housing Department
Jason Emmert, Program Manager, Climate Policy, Parks and Environment Department

Date: October 13, 2021 Meeting Date: November 5, 2021

Subject: **Draft *Climate 2050 Agriculture Roadmap***

RECOMMENDATION

That the MVRD Board authorize staff to proceed with engagement on the draft *Climate 2050 Agriculture Roadmap*, as presented in the report dated October 13, 2021, titled "Draft *Climate 2050 Agriculture Roadmap*".

EXECUTIVE SUMMARY

This report presents the draft *Climate 2050 Agriculture Roadmap*, the next in a series of ten *Climate 2050* roadmaps that will guide our region's policies and collective actions to transition to a carbon neutral, resilient region by 2050. The draft *Climate 2050 Agriculture Roadmap* lays out strategies and actions that will accelerate the transition to a net-zero agriculture sector by 2050 and that support agriculture becoming resilient to the ever-changing effects of climate change that have a direct impact on the health and longevity of farming in this region. Action items in the *Agriculture Roadmap*, include protecting agricultural land and expanding the use of ecosystem services and regenerative agriculture within farming, to support creating an overall adaptive and resilient food system.

Like the other *Climate 2050 roadmaps*, the *Agriculture Roadmap* is intended to be dynamic, and over time, more work will be necessary to identify and undertake additional research and actions to reach our 2030 and 2050 climate targets. To assess resilience of the agriculture industry, further work and research is needed to establish measurable outcomes to quantify and qualify the impact of resiliency and adaptation actions in the *Climate 2050 Agriculture Roadmap*. The draft will inform on-going engagement with the agriculture sector, Metro Vancouver's Agricultural Advisory Committee and with member jurisdictions, with the intent of bringing an updated *Climate 2050 Agriculture Roadmap* for endorsement by the MVRD Board in 2022.

PURPOSE

To seek MVRD Board authorization to proceed with engagement on the draft *Climate 2050 Agriculture Roadmap*.

BACKGROUND

In September 2018, the MVRD Board adopted the *Climate 2050 Strategic Framework* and directed staff to initiate the development process of the *Climate 2050 Roadmaps*. The Board subsequently authorized staff to begin an integrated engagement process for *Climate 2050* and the *Clean Air Plan*, using a series of issue area discussion papers related to the roadmaps. The Climate Action Committee received a report on the *Climate 2050* Discussion Paper on Agriculture at its May 2020 meeting.

This report presents the draft *Climate 2050 Agriculture Roadmap* (attached), and provides information on how it will be the subject of engagement activities planned with the agriculture community, the public, stakeholders and other governments, including First Nations, on greenhouse gas (GHG) emission reductions from, and climate resiliency for, regional agriculture.

CLIMATE 2050 STRATEGIC FRAMEWORK

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. *Climate 2050* is being implemented through ten issue area Roadmaps, which will describe long-term goals, targets, strategies and actions to reduce regional greenhouse gases 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*, as well as forthcoming updates to the Regional Growth Strategy (*Metro 2050*).

DRAFT CLIMATE 2050 AGRICULTURE ROADMAP

The *Climate 2050 Agriculture Roadmap* presents a robust plan for this region to have a carbon neutral and resilient agricultural industry by 2050. In laying out the pathway, the *Agricultural Roadmap* identifies the following issues:

- **challenges** to reaching net-zero emissions and a resilient agricultural sector, including targets for GHG emission reductions and goals and measurable outcomes that illustrate effective adaptation by 2050;
- **key sources** of GHG emissions and the expected impacts to farming operations as a direct result of a changing climate;
- **barriers and opportunities** to reduce emissions and increase resiliency that shape the strategies and actions in the Roadmap; and
- **benefits** of net zero agricultural operations and the communal benefits achieved from farms that support and use ecosystem services near or on their property.

The draft *Climate 2050 Agriculture Roadmap* lays out 26 actions for reducing emissions and increasing resiliency, organized under the following four strategic areas:

1. Protect Agricultural Land
2. Support Farmers and Climate Action Leaders
3. Support Long-Term Farm Health and Resiliency
4. Leverage Economic Opportunities, Innovation and Leadership

The *Climate 2050 Agriculture Roadmap* proposes an implementation timeline to encourage swift early action on key GHG issues and on obtaining additional data and research to further understand the path to resiliency. Given the timelines and ambitious targets and goals, staff have continued to work with all levels of government and other partners, including the agriculture industry, to take action while planning and developing the *Climate 2050 Agriculture Roadmap*.

The goals, strategies and actions in the draft *Climate 2050 Agriculture Roadmap* incorporate public and stakeholder feedback, previously summarized in a report on engagement for the *Clean Air Plan* and the *Climate 2050 Agriculture Discussion Paper* received by the Climate Action Committee on November 13, 2020. Additional GHG reduction actions not accounted for in the *Clean Air Plan* but

included in the *Climate 2050 Agriculture Roadmap* involve examining the use of soil to sequester and store carbon. Additional research and data collection is required for this action item to thoroughly understand how it may contribute to a carbon neutral agriculture industry by 2050.

Potential Impact on Greenhouse Gas Emissions
Initial modelling of carbon neutral scenarios, including key actions for agriculture, were presented to the Committee in November 2020. The overall 2030 agriculture target was initially set at a 35% GHG reduction below the 2010 regional total but reaching this target is dependent on additional policy creation and new technologies being developed. Additional review and modelling will be required to fully determine what GHG emission reductions are possible for the agricultural sector as a whole.

Each of the *Climate 2050* roadmaps, including the *Climate 2050 Agriculture Roadmap*, is intended to serve as a "living, breathing" document that charts the path to achieving the region's climate action goals and targets. It is expected that the strategic areas and actions will be updated dynamically, responding to changes in policy, technology, science, opportunities and innovations, and performance measures and indicators. In coming years, staff will continue to work with the agricultural sector, residents, businesses and governments to amplify these actions and add new ones to accelerate the transition to resilient, carbon neutral agriculture.

Relationship between the *Climate 2050 Agriculture Roadmap*, *Clean Air Plan* and *Metro 2050*
Approved on September 24, 2021 by the MVRD Board, the *Clean Air Plan* is Metro Vancouver's fourth air quality and greenhouse gas management plan, building on the 2011 *Integrated Air Quality and Greenhouse Gas Management Plan*. The *Clean Air Plan* supports *Metro 2050*'s vision of a carbon neutral region by identifying the initial actions needed to meet the region's 2030 greenhouse gas target - a 45% reduction in greenhouse gas emissions from 2010 levels by 2030. The 2030 greenhouse gas reduction target in the *Climate 2050 Agriculture Roadmap* initiated from the *Clean Air Plan*.

In addition to incorporating actions from the *Clean Air Plan*, there are important connections between the *Climate 2050 Agriculture Roadmap* and *Metro 2050*, which is currently in the comment and review phase. Metro Vancouver, in partnership with its member jurisdictions, will manage regional land use and agricultural land protection through *Metro 2050*. The *Climate 2050 Agriculture Roadmap* will outline the actions necessary to achieve regional carbon neutrality and *Metro 2050* will shape the future of how we move and live. Together, these strategies will ensure that agricultural land protection, regional growth, food security and climate strategies are mutually supportive.

ENGAGEMENT PROCESS
Metro Vancouver is committed to engaging with the agricultural community, the public, stakeholders and other governments, including First Nations, that could be impacted by the *Climate 2050 Agriculture Roadmap,* and will incorporate feedback into the final document. The engagement will be conducted in accordance with the Board Policy on Public Engagement and will build on the work completed to date to develop the draft *Agriculture Roadmap*. Most of the GHG reduction actions in the *Climate 2050 Agriculture Roadmap* originated from the *Clean Air Plan* and were brought forward through the *Clean Air Plan* engagement and adoption processes.

Engagement for the roadmaps has been designed to reach a broad audience to convey the importance of zero emissions, low carbon and resilient agriculture. Engagement for the *Climate 2050 Agriculture Roadmap* will also require connecting to the local agricultural community including farmers and agricultural producers through the Metro Vancouver Agricultural Advisory Committee; the Ministry of Agriculture, Food and Fisheries; the Agricultural Land Commission; agri-tech focused businesses; and educational institutions and non-government organizations involved in agricultural-focused research. Feedback sought from these specific sectors and organizations might include: support or concerns about implementation or impacts, and ideas for innovation and collaboration. Due to public health regulations, engagement is expected to be conducted through virtual means and staff are planning creative and engaging materials to encourage feedback. This feedback will be reported to the Committee, highlighting how it informed a finalized *Climate 2050 Agriculture Roadmap*, which will be presented to the Committee and Board for consideration in 2022.

ALTERNATIVES

1) That the MVRD Board authorize staff to proceed with engagement on the draft *Climate 2050 Agriculture Roadmap*, as presented in the report dated October 13, 2021, titled "Draft *Climate 2050 Agriculture Roadmap*".

2) That the MVRD Board receive for information, the report dated October 13, 2021, titled "Draft *Climate 2050 Agriculture Roadmap*" and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

Under Alternative 1, the overall resources required to develop and engage on *Climate 2050 Roadmaps* have been approved in program budgets for 2021, including staff time and consulting expenditures. Funding for enhanced engagement on *Climate 2050* from the Sustainability Innovation Fund has been approved by the MVRD Board and will be used to support engagement activities on the development and implementation of the *Climate 2050 Roadmaps*. Continued alignment of engagement activities and deliverables for the *Climate 2050 Roadmaps*, with the implementation of the *Clean Air Plan* and development of other management plans, is intended to make the best use of resources available, as well as minimize time commitments for interested parties providing feedback.

CONCLUSION

Metro Vancouver's draft *Climate 2050 Agriculture Roadmap* lays out strategies and actions to transition regional agriculture to be resilient and adaptive to climate change and to reach carbon neutrality by 2050. If authorized by the Board, Metro Vancouver intends to seek feedback on the draft roadmap from the farming community, the public, stakeholders and other governments.

Staff recommend Alternative 1: for the Board to authorize staff to proceed with public engagement on the draft *Climate 2050 Agriculture Roadmap*. Engagement is intended to provide sufficient opportunity to interested parties to learn about the draft strategies and actions in the *Agriculture Roadmap* and provide feedback. Feedback from engagement will inform the development of a final *Agriculture Roadmap* for Committee and Board consideration, planned for 2022.

Attachment

Climate 2050 Agriculture Roadmap, draft dated October 13, 2021

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AGRICULTURE ROADMAP

Metro Vancouver acknowledges that the region's residents live, work and learn on the shared territories of many Indigenous peoples, including 10 local First Nations: Katzie, Kwantlen, Kwikwetlem, Matsqui, Musqueam, Qayqayt, Semiahmoo, Squamish, Tsawwassen, and Tsleil-Waututh.

Metro Vancouver respects the diverse and distinct histories, languages, and cultures of First Nations, Métis, and Inuit, which collectively enrich our lives and the region.

FRONT COVER: FARMING IN METRO VANCOUVER

4515 Central Boulevard, Burnaby, BC, V5H 0C6
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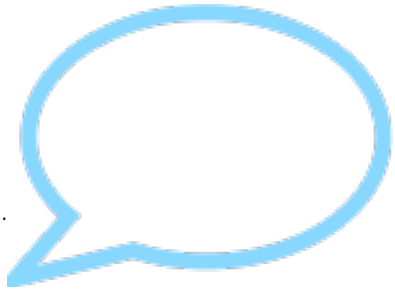
October 13, 2021

Your Input is Valued.



We heard you loud and clear.

This Roadmap was drafted in Summer/Fall 2021 based on feedback received from the farming community as well as a broad range of individuals, organizations and stakeholder groups between Spring 2020 and Spring 2021. Engagement was centred around the Metro Vancouver *Agriculture Discussion Paper* to support *Climate 2050*, introduced for public and stakeholder comment in Spring 2020.

Public feedback is valued and project teams will continue to seek input on this draft Roadmap through the Fall/Winter 2021. We will create online feedback opportunities, and will continue to ensure feedback is reflected as we move forward with implementing these actions. Documents, feedback forms, and direct email links to the project team are all posted to the Metro Vancouver website, metrovancouver.org, search "Climate 2050 Agriculture Roadmap".

COVID-19 has had an impact on our traditional engagement methods. Metro Vancouver assesses work plans on a case by case basis to determine if the COVID-19 pandemic response requires an adjustment to any work plans, including engagement components. For climate change programs and initiatives, this means continuing with work plans that protect human health and the environment, but adjusting how we approach engagement. Goals and targets in Metro Vancouver's climate-related plans are science-based and remain a priority. The interim target of a 45% reduction in greenhouse gas emissions below 2010 levels by 2030 has a time horizon of less than ten years. Pursuing a carbon neutral region by 2050 requires taking bold action now. Across the globe, the pandemic response has had an unexpected benefit of significant environmental improvements in terms of greenhouse gas emissions. This provides a glimpse of what is possible and what we can achieve with coordinated efforts and common goals in a time of crisis.

Metro Vancouver

Metro Vancouver is a federation of 21 municipalities, one Electoral Area and one Treaty First Nation that collaboratively plan for and deliver 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.

Mission

Metro Vancouver's mission is framed around three broad roles.

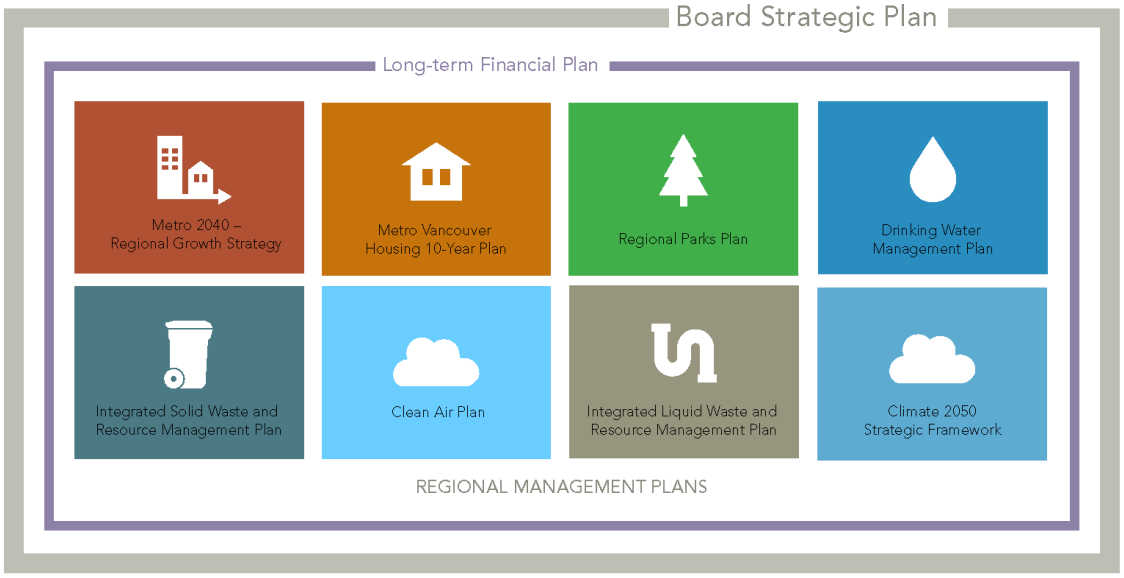
1. **Serve as a Regional Federation**
Serve as the main political forum for discussion of significant community issues at the regional level, and facilitate the collaboration of members in delivering the services best provided at the regional level.

2. **Deliver Core Services**
Provide regional utility services related to drinking water, liquid waste and solid waste to members. Provide regional services, including parks and affordable housing, directly to residents and act as the local government for Electoral Area A.

3. **Plan for the Region**
Carry out planning and regulatory responsibilities related to the three utility services as well as air quality, regional planning, regional parks, Electoral Area A, affordable housing, labour relations, regional economic prosperity, and regional emergency management.

Building a Resilient Region

Building the resilience of the region is at the heart of Metro Vancouver's work. Each of Metro Vancouver's regional plans and strategies adopts a vision, guiding principles, goals, strategies, actions and key performance measures that will support a more resilient, low carbon and equitable future. Metro Vancouver's interconnected plans and strategies are guided by the Board Strategic Plan, which provides strategic direction for each of Metro Vancouver's legislated areas of responsibility and the Long-Term Financial Plan which projects total expenditures for capital projects and operations that sustain important regional services and infrastructure. Together these documents outline Metro Vancouver's policy commitments and specific contributions to achieving a resilient region.



Metro Vancouver's Roles and Responsibilities for Climate Action

The three broad roles outlined in Metro Vancouver's mission, each demonstrate responsibilities related to climate change**.** More specifically, under the *Environmental Management Act*, Metro Vancouver has the delegated authority to provide the service of air pollution control and air quality management and may, by bylaw, prohibit, regulate and otherwise control and prevent the discharge of air contaminants, including greenhouse gas emissions. Through the regional growth strategy, Metro Vancouver, with its members, plans for compact, complete communities that are foundational to enabling a carbon neutral, resilient region. As part of delivering its core services, Metro Vancouver also generates and uses clean, renewable energy from its facilities and is working to ensure core regional services and infrastructure are prepared for and resilient to climate change.

In its role as a regional forum, Metro Vancouver builds and facilitates collaborative processes which engage the public and build partnerships to address significant regional issues like climate change. As part of this role, Metro Vancouver coordinates with and advocates on behalf of its member jurisdictions to other governments and regional partners on greenhouse gas management and climate change adaptation initiatives. We will be looking to many other regional partners to lead the implementation of key actions in the *Climate 2050 Roadmaps,* highlighting the importance of ongoing collaboration with other governments and partners.

The Roadmap at a Glance

Humans rely on agriculture to provide healthy, delicious food. Agriculture relies on healthy ecosystems, balanced soils and predictable growing conditions to produce crops for our enjoyment and consumption. Increasingly however, agricultural producers have been facing difficult challenges in managing their operations due to the effects of climate change and have been identified as also needing to adjust their business practices to reduce their contribution to that changing climate.

Like many industries, agriculture will be affected by higher temperatures, shifting precipitation patterns, severe weather events and sea level rise. In response to these complicated and challenging climate change impacts, this Roadmap focuses on supporting new technologies, using renewable energy sources, supporting and conserving ecosystem services and healthy soils relied upon by farms, and using adaptation as a method to support a resilient agricultural community that will survive, thrive and help to reduce the effects of climate change.

The *Climate 2050 Agricultural Roadmap* is about taking the necessary steps to ensure the agricultural sector is supported in the journey to resiliency and ensuring the long-term production of the food humans rely on. This Roadmap lays out four key strategies and 26 actions that will reduce the region's greenhouse gas emissions and create a strong, adaptive agricultural community in Metro Vancouver by 2050.

The Agricultural Roadmap lays out 26 actions for reducing emissions and increasing resiliency, organized under the following 4 strategic areas:

Strategy 1: Protect Agricultural Land
Strategy 2: Support Farmers as Climate Action Leaders
Strategy 3: Support Long-Term Farm Health and Resiliency
Strategy 4: Leverage Economic Opportunities, Innovation and Leadership

To achieve a carbon neutral agricultural community in this region, we are going to have to support farmers - financially and through information sharing - to transition their operations to using new sustainable technologies (e.g., solar power) and to incorporating regenerative agriculture and nature-based solutions into their daily operations. Farmers should not be left to manage this transition on their own, and the food available to this region, both today and well into the future, relies on making these adjustments as a collective whole, with each stakeholder playing a vital and unique part:

- → For Farmers – it means using climate smart, ecological and regenerative agriculture and investing in new available technologies to take advantage of digital systems and processes;
- → For Industry – it means funding new research and embracing digital innovations or information sharing to create new low-carbon options (e.g., electric farm equipment);
- → For Consumers – it means increasing their awareness (e.g., the connection between agriculture and our resilience to climate change), adjusting their personal choices (e.g., eating more local food and reducing food waste), and becoming stronger advocates (e.g., supporting structural and regulatory change that protects agricultural land and the longevity of farming in the region); and
- → For Government – it means establishing policies, creating programs and providing financial assistance to bring all these elements together to support the changes needed in the agricultural sector in order for it to become fully adaptive and resilient to the climate challenges ahead.

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Visioning Net-Zero Carbon, Resilient Agriculture in 2050

In 2050….agriculture is a key contributor to a low-carbon future having embraced clean and renewable energy sources, switched to regenerative farming practices, and transitioned farm land for both carbon capture and local food production.

Agriculture continues to significantly contribute to the Metro Vancouver regional economy, provides fresh, healthy food for local use and export markets, and operates in a sustainable and resilient capacity. Agricultural land is protected for future farming needs, and it helps to manage floods, captures carbon and provides habitat for pollinators and other wildlife while also benefitting from these ecosystem services.

Agricultural production practices have evolved and continue to adapt to the vulnerabilities of climate change. Farmers are able to pivot operations to manage changes in temperature and rainfall and are able to adjust farming practices and adapt to extreme weather events by using technological innovations and by taking advantage of new or expanded capacity and financial support systems. The agricultural community has seen noticeable improvement and maintenance of soil health and overall has increased and expanded its agricultural viability ensuring a long-term succession of farming and sustainable local food production for future generations.

PLACEHOLDER FOR IMAGE

Climate 2050 Agriculture Roadmap

A pathway to net-zero carbon, resilient Agriculture in Metro Vancouver

The Challenge

Agriculture in the Metro Vancouver Region contributes to the regional economy and provides fresh, healthy food for residents, visitors, businesses and export markets. In addition, agricultural land provides an aesthetic landscape, and other public benefits called ecosystem services, including wildlife habitat, carbon sequestration, water infiltration and flood management. At the same time, agricultural activities cause greenhouse gas and common air contaminant emissions. These come from livestock production, farm equipment, excess fertilizer applications, burning of organic residues, and the heating of greenhouses with natural gas and other fuels.

Compared to the biggest contributors of greenhouse gas emissions in the region, agriculture contributes approximately 4% to the total mostly from three main sources: 1. carbon dioxide produced from fuel combustion to heat greenhouses and to run farm equipment; 2. methane from livestock and manure storage; and 3. nitrous oxide from fertilizer and manure soil treatments. While the agricultural community is not a large contributor overall, all sectors will need to lower their emissions contributions in order for Metro Vancouver to hit carbon neutrality by 2050.

Agricultural activity is also vulnerable to the impacts of climate change. Farmers are dealing with changes in temperature and rainfall, and extreme weather events, all of which affect local food production. To increase our resilience, we need to support farming practices that improve soil health, strengthen agricultural viability and sustain local food production for future generations.

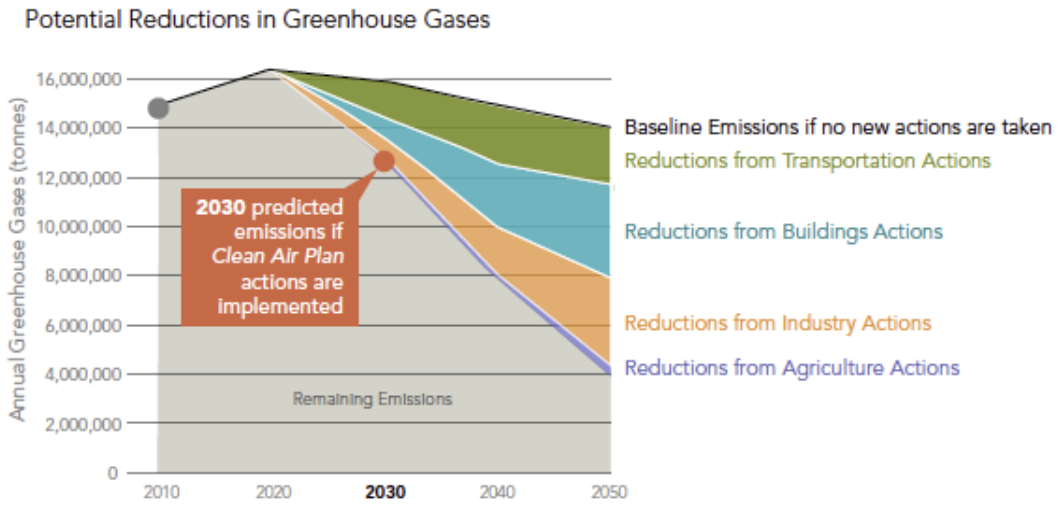
We are creating a roadmap to help us reach a low-carbon, resilient future while also improving air quality. By 2050, we can make agriculture carbon neutral and power it with clean, renewable energy. Farmers can use regenerative farm practices to capture carbon and build the soil for long-term productivity. And we can protect and invest in agricultural land to enable food production and provide secure tenure to farmers, and sustain the agricultural community over the long term.

Call Out Box: What is a Carbon Neutral Region?
A carbon neutral region generates no net greenhouse gas emissions. This is achieved through the deepest greenhouse gas emission reductions possible across all economic sectors, and any remaining emissions are balanced out by the carbon dioxide that the plants, trees, and soil in the region remove from the atmosphere, or potentially through technological means.

A carbon neutral region is the best option for future generations to maintain a good quality of life, beyond 2050. We have to make some difficult decisions and investments today or pass them onto our children and grandchildren at higher costs and consequences. Metro Vancouver and many of its member municipalities have committed to ambitious targets and bold leadership to respond to the climate crisis. This plan responds to the global challenge to come together, think big, and act now.

Goals

GOALS	TARGETS AND MEASURABLE OUTCOMES
GOAL: The agricultural sector is carbon neutral and maximizes carbon sequestration.	**TARGET**: 35% reduction in greenhouse gas emissions, relative to 2010 levels.
GOAL: All agricultural operations minimize greenhouse gas emissions using best available management practices and technologies, and are powered by clean, renewable energy.	
GOALS: The Agriculture community consistently applies its knowledge of the benefits of ecosystem services to support the resiliency of local farming operations.	**MEASURABLE OUTCOMES:** To Be Determined: measurable climate-resilient outcomes are currently unknown for the agricultural community. Additional review and consultation will be required to determine what outcomes are attainable and available to measure on how well the region's agricultural producers are adapting to climate change impacts.
GOAL: Metro Vancouver complete food system is adaptable and resilient.	
GOAL: Long-term investment in the Agriculture community is coordinated and successful.	

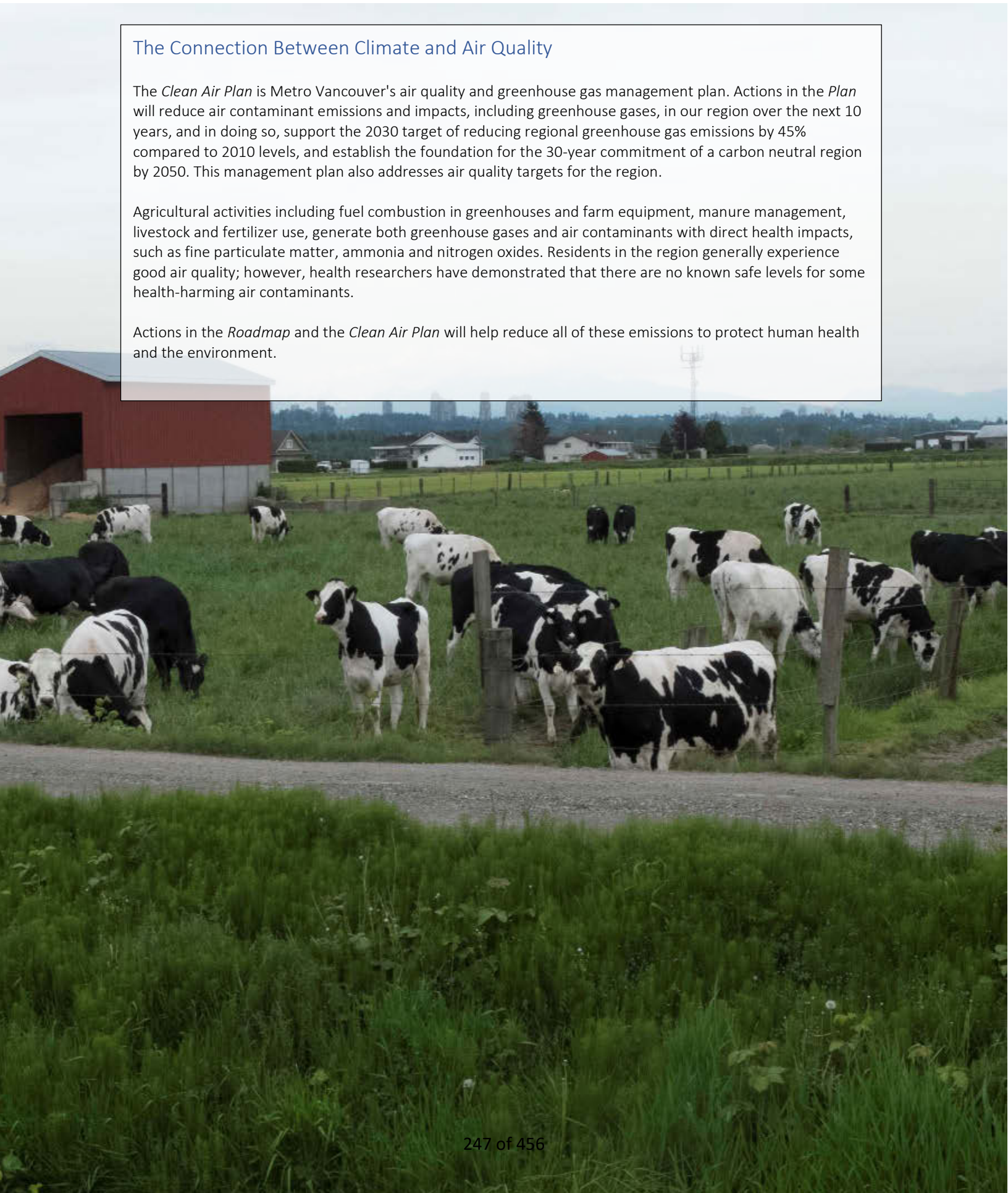


The Connection Between Climate and Air Quality

The *Clean Air Plan* is Metro Vancouver's air quality and greenhouse gas management plan. Actions in the *Plan* will reduce air contaminant emissions and impacts, including greenhouse gases, in our region over the next 10 years, and in doing so, support the 2030 target of reducing regional greenhouse gas emissions by 45% compared to 2010 levels, and establish the foundation for the 30-year commitment of a carbon neutral region by 2050. This management plan also addresses air quality targets for the region.

Agricultural activities including fuel combustion in greenhouses and farm equipment, manure management, livestock and fertilizer use, generate both greenhouse gases and air contaminants with direct health impacts, such as fine particulate matter, ammonia and nitrogen oxides. Residents in the region generally experience good air quality; however, health researchers have demonstrated that there are no known safe levels for some health-harming air contaminants.

Actions in the *Roadmap* and the *Clean Air Plan* will help reduce all of these emissions to protect human health and the environment.

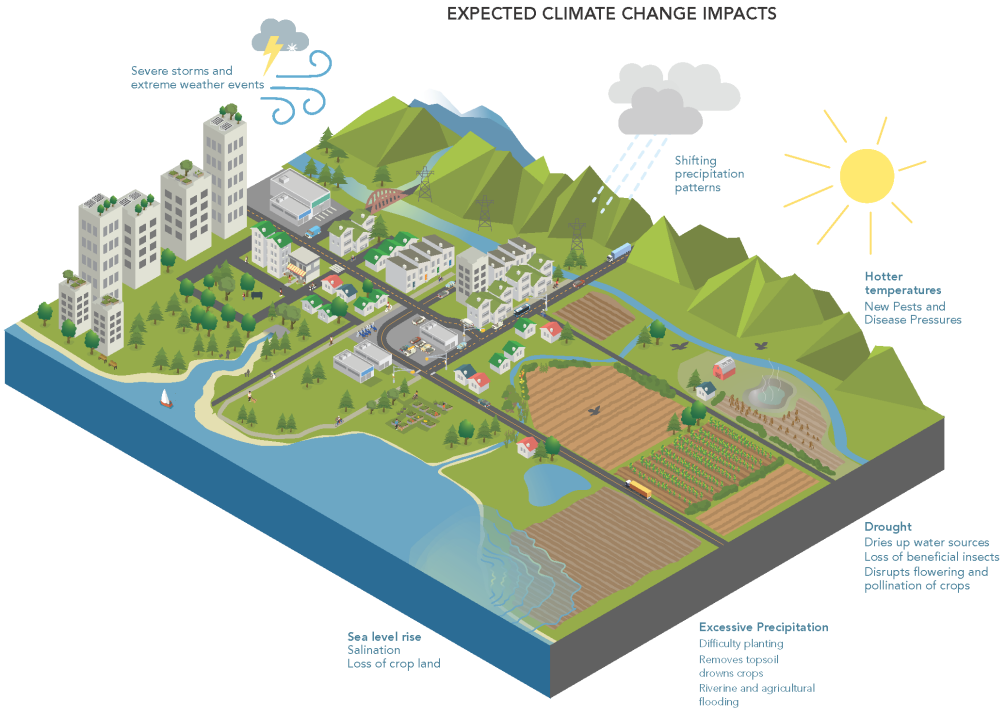


Climate Impacts on Agriculture

The agricultural sector is one of the most vulnerable sectors to the impacts of climate change. Farmers will continue to deal with changes in temperature and rainfall, shifting pests and diseases, and extreme weather events that significantly affect local food production. These impacts are not unique to the region, and have been and will continue to affect those agricultural areas in other parts of the world that supply food to this region. Climate change will lead to an overall increase in temperature, which may benefit agriculture by expanding the growing season, enabling a wider variety of crops that can be produced locally; however, there is also uncertainty and significant climate risks to agriculture such as the increased frequency and severity of extreme weather events - droughts, heat waves, heavy rainfall and flooding.

Extreme conditions will have immediate impacts on food production in the Metro Vancouver area as well as other parts of North America and internationally that supply food in this region.

Adverse impacts on agricultural crops are expected from higher temperatures, increased frequency and/or severity of droughts and storm, severe precipitation events, and salinization of soil and groundwater due to sea-level rise. The potential impacts to agriculture will increase costs of crop and livestock production and reduce economic viability.



PLACEHOLDER GRAPHIC

Based on climate projections to the 2050s, we can expect the following changes and impacts:

Climate Changes

Higher Temperatures overall, with higher daytime and nighttime temperatures, and more hot summer days. This will lead to increased frequency and severity of heatwaves, wildfires and droughts.

Shifting Precipitation Patterns, including more rainfall in every season except the summer, and less precipitation falling as snow.

Severe Storms and Extreme Weather Events, including high winds and heavy rainfall.

Sea Level Rise, with 0.5 m expected by 2050, which will impact coastal communities in our region. While sea level rise is an important aspect of climate change with significant regional impacts, it is not directly addressed in this report because it is being addressed through other Metro Vancouver initiatives.

Impacts Felt

Adjustments in temperature disrupt expected seasonal temperature changes affecting fisheries, livestock and crop mortality and the increase in the prevalence of new parasites and diseases. A longer growing season does lead to earlier harvests, a greater range of crop suitability and a decrease in heating costs for greenhouses in cooler months; however, warmer temperatures lead to an increase in demand for water for irrigation during the growing season and exacerbates pest and disease problems that are controlled by cooler temperatures.

Variations in temperature increase the variability in growing conditions which can impact crop quality, pollination and the life-cycle of pests and disease. These changes create challenges in aligning production with processing schedules. Hotter summers and heat waves also decrease productivity and crop quality and increase crop losses. Heat stress may require more heat-tolerant plants which may not currently be in use and may increase stress on limited water resources placing additional demands for irrigation. Energy use increases for the cooling and ventilation of greenhouses, crop storage and livestock.

Changes in precipitation increases the demand for supplementary irrigation that could put pressure on local water supplies and on adjacent ecosystems and riparian areas. Unreliable rainfall during the growing season increases irrigation requirements that didn't previously exist and waterlogged soils lead to delayed planting, soil compaction and nutrient leaching. Crop damage, crop loss, livestock relocation and soil erosion are all additional challenges agricultural producers are faced with due to the experienced changes in precipitation experienced within this region.

Riverine and field flooding from periods of extreme rainfall and increased runoff from adjacent urban development reduces ground permeability and causes long-term inundation of water into agricultural lands. This water intrusion reduces and limits land-use potential and causes root rot damage to year-round crop varieties.

More incidences of coastal flooding from higher tides and more severe storm surges causes immediate and long-term damage to agricultural land and operations including increased salinization of soils from brackish water, increased coastal erosion, loss of livestock and crops, reduced fish passage and a decrease in water quality used for irrigation and ecosystems. Coastal flooding also places additional pressures on ensuring flood prevention mechanisms, such as dykes, spillways and pumps, are all adequately maintained.

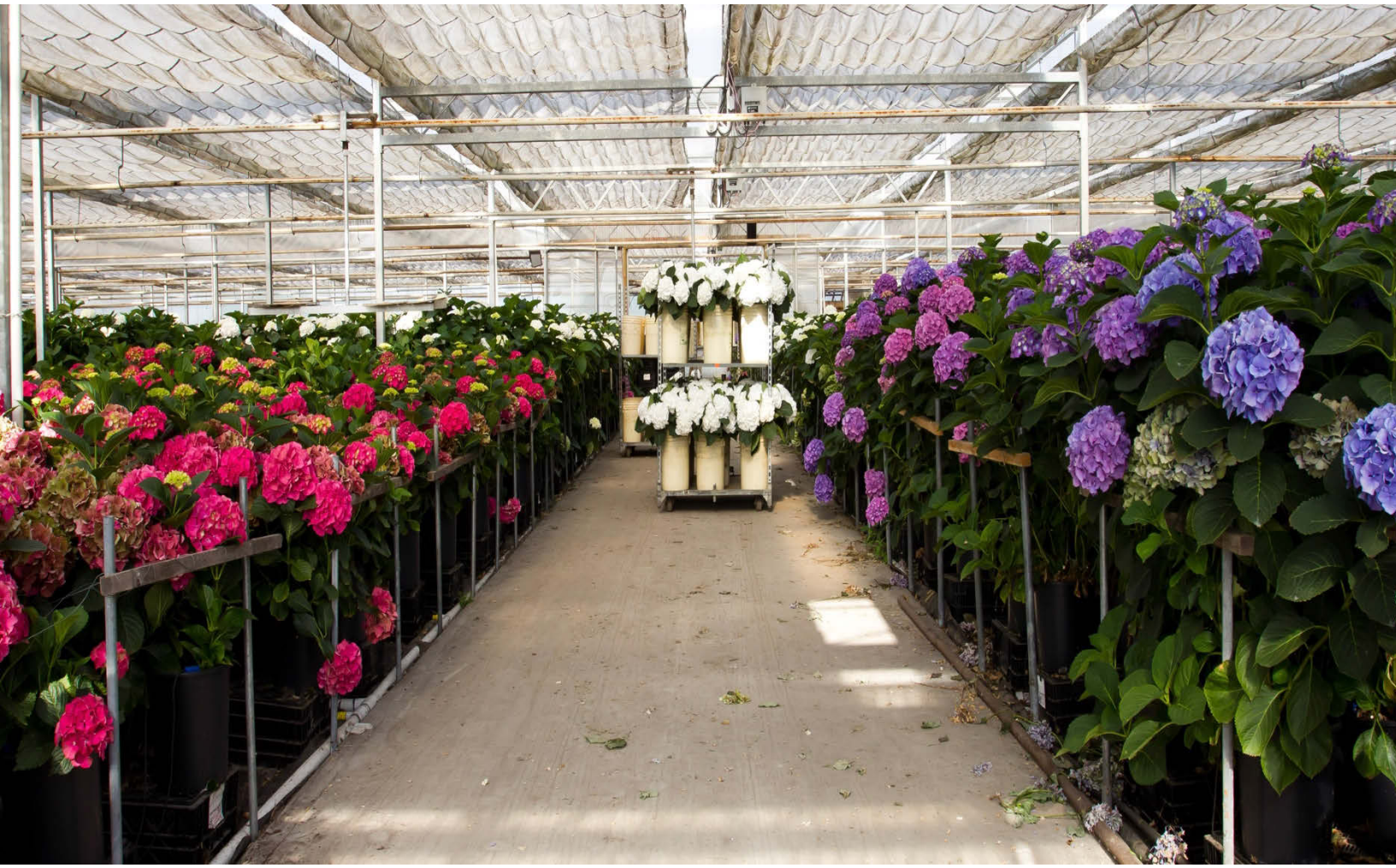
Food loss from climate change impacts affects the availability and pricing of local food producers, as well as international food markets, to produce enough food for human consumption. Local food systems impacted by climate change also experience disruptions to regional infrastructure, supply and delivery lines, a skilled agricultural labour force, and trade markets. This may lead to food price increases, food shortages of some agricultural products, distribution disruptions and an overall increase in food insecurity for an area.

Emissions from Agriculture in Metro Vancouver

Metro Vancouver's 2015 regional emissions inventory estimates that agricultural activities generate 4% of total greenhouse gas emissions in the region. The major sources of agriculture-related greenhouse gas emissions in this region are: carbon dioxide from fuel combustion in greenhouses and farm equipment; methane from livestock and manure storage; and nitrous oxide from fertilized and manured soils.

Agriculture emits 10% of the total greenhouse gases in Canada, with similar estimates for agriculture globally. This figure only measures emissions from agriculture production (including for food and non-food products) and does not reflect the full spectrum agricultural system emissions caused by upstream fertilizer and farm equipment manufacturing nor downstream from food transportation, refrigeration, processing and food waste disposal.

Opportunities to reduce greenhouse gas emissions from agriculture in Metro Vancouver include using cleaner, more renewable fuels, reducing energy demands and improving the energy efficiency of greenhouses, improving fertilizer and manure management, and altering livestock diets. Agriculture can also contribute to carbon sequestration by maintaining existing natural vegetation and woodlots, planting trees and hedgerows, and using regenerative farm practices that add carbon to soil. Protecting agricultural land for farming also prevents land conversion and development that generally emit more greenhouse gases.



Net-Zero Emissions, Resilient Agriculture

Reaching net-zero emissions and resilience in the agriculture sector involves considering and balancing, wherever possible, necessary elements of climate change action:

- Reducing Greenhouse Gas Emissions that accelerate climate change.
- Increasing resilience and the agriculture sector's ability to prepare, respond and recover from the effects of climate change that cannot be avoided.

A "net-zero emissions and resilient" agricultural sector is one that emits almost no greenhouse gas emissions and is able to withstand the negative effects of a changing climate, ensuring farm yield and business livelihoods are maintained. Looking to 2050, the *Roadmap* seeks to support the continued transition of agriculture toward a net-zero emissions future where renwable energy systems, innovative farm practices, and grazing and crop techniques support a sustainable and thriving future. By aiming for all of these desired outcomes simultaneously, we can identify ways to reduce emissions and vulnerability to climate change impacts at the same time.

In order for meaningful change to take place within the agriculture community, it is helpful to examine how it is connected to the three pillars of sustainability: economic, environmental and socio-cultural. These three pillars can also be used to structure and support necessary solutions and actions for change.

1. ECONOMIC - agricultural operations are businesses that need to make profits in order to survive and continue to function; these businesses can be difficult to adjust and may rely on expensive innovations and new technologies that still need to be developed in other sectors. For example, farmers cannot stop using diesel tractors until alternative fuel source (e.g., electric) tractors have been developed and commercialized. When appropriate funding, incentives and technologies are offered to the agricultural sector, farmers can begin to implement these new innovations while still maintaining a profitable business.

What is the difference between "Zero Carbon", "Zero Emissions", "Net-Zero" and "Carbon Neutral" and what is "Carbon Sequestration"?

"Zero Carbon" also known as Zero Carbon Emissions, is reached when no greenhouse gas emissions exist at the point of use. A zero carbon fuel source either produces no greenhouse gas emissions, or the greenhouse gas emissions that are produced are offset by renewable energy (either generated onsite or purchased).

"Zero Emissions" are reached when no greenhouse gases or other air contaminants are generated at the point of use. Zero emissions include zero carbon and the elimination of or non-existence of health-harming air contaminants (e.g., fine particulate matter and nitrogen oxides).

"Net-Zero" is reached when there is a balance between the whole amount of greenhouse gases that are released into the atmosphere and the amount that is taken out.

"Carbon Neutral" is reached when a company achieves a balance between the carbon dioxide it releases into the atmosphere and the amount it takes out.

"Carbon Sequestration" is a process of capturing and storing atmospheric carbon dioxide. In the agricultural context, carbon sequestration includes carbon storage in soils in conjunction with sound land management practices, and is one component in creating a resilient agricultural sector.

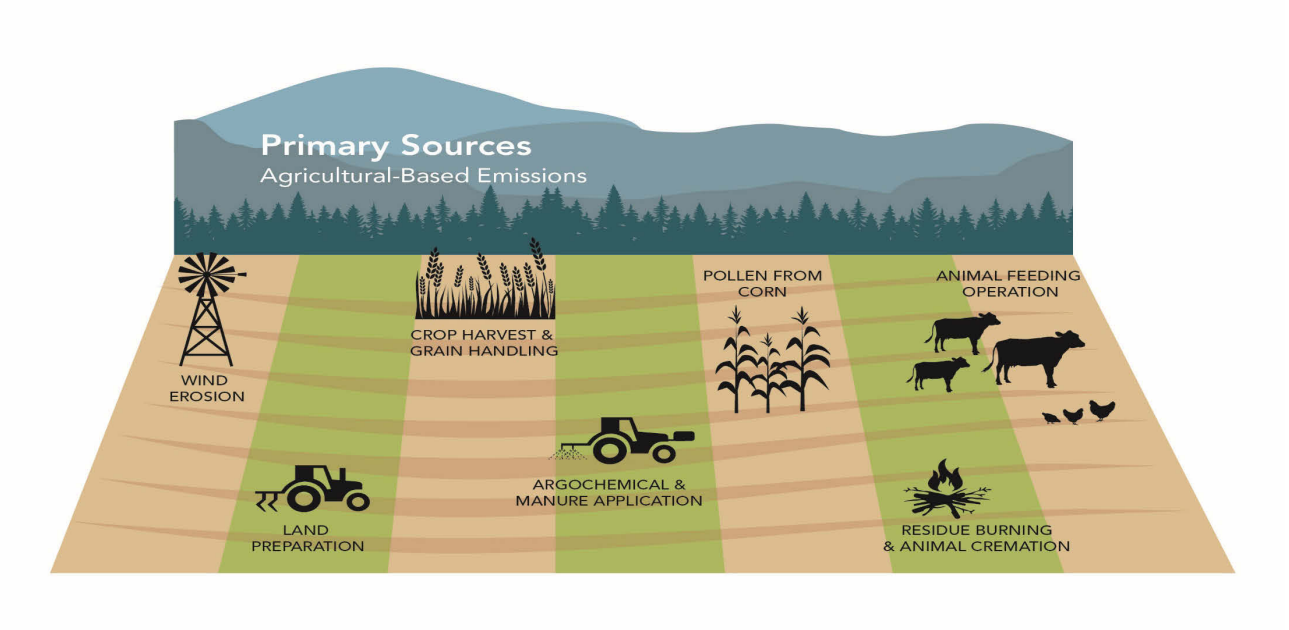
2. ENVIRONMENTAL - farming relies on and is affected by the environment. Affecting change, including using new fertilizer types and application methods, incorporating new irrigation systems and adjusting soil quality to increase carbon sequestration are all adjustments to farming practices that may take multiple growing seasons to determine if they were successful or not. Using nature-based solutions to solve problems is likely the best case scenario; however, outcomes are hard to determine in the short term.

3. SOCIO-CULTURAL - many farms are family-run businesses with generational ties to farming practices and many farms operate within a region where most residents have limited experience with the challenges and realities of running a farm. While these can both be challenging to overcome as farming is faced with the necessity to adjust its practices, generational knowledge and the desire for residents to have a closer connection to their food can also be used as positives for change.

Lowering Emissions Through Renewable Energy and New Technology

Agricultural operations emit air contaminants that can impact human health and the environment. These contaminants are sourced from a variety of farming practices including: the use of poultry and cattle manure; by-products from heating greenhouses; feed types provided to livestock; fertilizer application; and pesticide application.

Each of these contributors to air contaminants can be mitigated and addressed using a combination of renewable energy sources, new technologies, new management practices, and new input application methods.



1. Renewable Energy Sources

Renewable energy sources such as biogas and wind and solar have been around for decades and, when applied as alternative energy sources, their use helps to significantly reduce greenhouse gas emissions. Trucks, tractors and other non-road equipment, as well as greenhouses and agricultural buildings, all represent opportunities for the agricultural sector to transition to the use of clean, renewable energy sources. Most agricultural vehicles and equipment are extremely expensive (each range from $15,000 - $700,000 when purchased new) and are built to be durable and used for decades. Farmers need help to turn these vehicles over and take them out of production and they need technologies to advance making the option to purchase, for example an electric tractor with the same operating costs and life span as the current diesel version, actually possible.

2. New Technologies

New technologies across all industries are being invented, tested and applied to mainstream uses on a regular basis. Within the agricultural sector, new energy sources such as renewable natural gas (RNG) hydrogen energy, and re-using captured carbon dioxide are all options that have potential to transform farming operations into carbon neutral producers. Greenhouses have the most to gain from these new technologies; however, more research is required to fully understand how fuel is used and released and how different technologies and fuel types can be applied to existing buildings and production systems. These new technologies can be used in conjunction with improving the energy efficiency of greenhouses (for example, making them more air tight and improving thermal performance) to increase the overall sustainability of the agriculture sector. Businesses involved in the Agritech Grant Program in British Columbia are providing insight into how farming can evolve.

3. New Management Practices

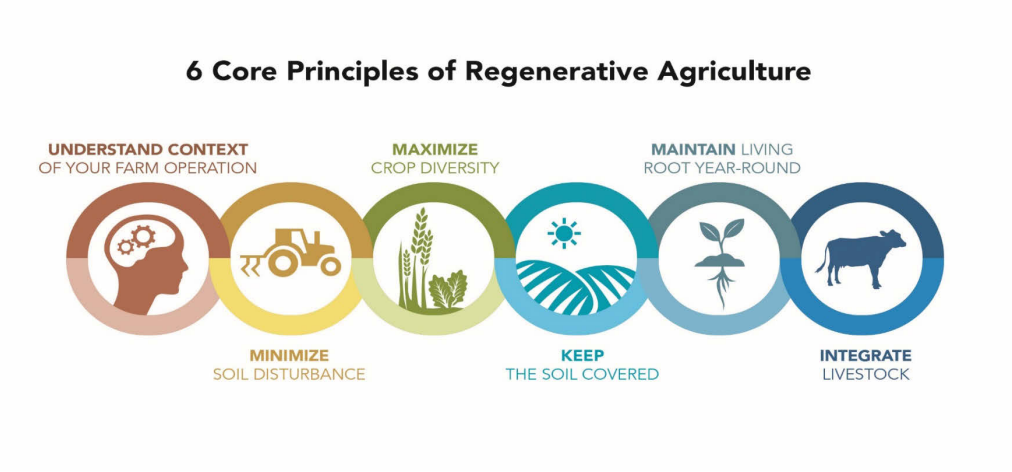
Adjusting production management practices at the farm level is an area where the agricultural community has more individual control. Enhancing grazing practices and optimizing grass and forage quality has shown to reduce methane emissions from cattle and retaining, expanding and adding freshwater wetlands and riparian zones directly onto farms can increase a farm's resiliency, and using regenerative agricultural practices within production fields can increase the ability for soils to store carbon, thereby releasing less carbon emissions into the atmosphere. Additional data collection in this area is vital to understanding the degree to which the agricultural community can, contribute to a reduction in greenhouse gas emissions in the region, and determine how these management practices can contribute to the long-term resiliency of agricultural producers.

4. New Input Application Methods

In farming, field crops use nutrients, or inputs, (e.g., potassium, phosphorous and nitrogen) to grow. These nutrients are replaced back into the soil for each growing cycle through the use of mineral fertilizers. As these fertilizers are applied to crops, ammonia and greenhouse gas emissions, such as nitrous oxide, are released into the atmosphere. A convenient and standardized approach to fertilizer use involves an even application across entire fields regardless of plant need. Research has been conducted that shows that slow-release fertilizers and precision applications (for example, using field mapping to determine which specific parts of the crop need the fertilizer) can reduce emissions produced from using this input.

Understanding and Benefitting from Ecosystem Services

The agriculture sector within Metro Vancouver, British Columbia, Canada and across the globe is at a turning point of needing to adapt to the increasingly extreme effects of climate change. Every season, floods, rainfall events, heat waves, and droughts last longer or are more severe. Crop losses are more extensive, pest management is more difficult, and production costs are more expensive. Through all of this, farmers are relied upon to continue to produce the same quality and higher quantities of food even while it becomes harder and more challenging to do so. In order to continue to fill this economic and social need, farms must become as healthy and resilient as possible. This is achieved by understanding and benefitting from the ecosystem services provided by nature and working with those systems to ensure the long-term viability of agricultural producers.



1. Support Regenerative Agriculture

The agricultural sector is affected by and relies upon the natural environment. As the negative effects of climate change continue to increase and take their toll on farming operations, the natural environment increasingly is being identified as something farmers can turn to, not only to help them adjust to the changing conditions, but to also work to actually counteract climate change. Regenerative agriculture focuses on building high-quality soil, increasing biodiversity, and retaining rainwater with a focus on working in sync with nature. Land management practices such as agroecology and agroforestry are increasingly being applied by farmers globally and show promising signs of success.

2. Support and Expand Ecosystem Services

Regenerative agriculture and maximizing ecosystem services on farmland will help farmers manage against the uncertainty of the timing, extent and frequency of extreme weather conditions. Programs such as Farmland Advantage, work directly with farmers, helping to not only conserve critical riparian streams and habitats but making farms more resilient to climate concerns. Farmland Advantage targets high risk and high opportunity (e.g., where support by a farmer already exists) areas throughout British Columbia and focuses on providing assessments and working collaboratively with farmers. Identifying the best ways to enhance ecosystem services on farmland largely depends on understanding the regional specialization and differences in landscapes, for example, rain, wind and sun microclimates, ocean and riverine environments, species at risk locations, soil composition, etc. One way to identify these differences is to conduct natural asset mapping, an evaluative process that compiles an inventory of a community's existing natural assets (e.g., aquifers, forests and wetlands), within Metro Vancouver's agricultural areas, to determine how these areas can currently work to collectively create a resilient agricultural sector.

3. Payment and Programs for Ecosystem Services

In order for the agricultural sector to be resilient in the wake of a significantly changing climate, adaptation will need to take place at the farm level. This requires that individual farmers take their land out of production; and although this results in the farmer losing the ability to expand their business, these set-aside areas also provide benefits to the farmer in the form of ecosystem services that provide habitat for pollinators and well as natural

flood and erosion control. In order to make establishing set-asides financially viable for the farming community, they need appropriate compensation, directly or indirectly, for these set-asides. Delta Farmland and Wildlife Trust and Farmland Advantage provide programs that specifically support ecosystem services in farmland in Metro Vancouver but there are other indirect tools (e.g., land acquisition programs) that can be used to share the burden throughout the entire population of Metro Vancouver as all residents, businesses and visitors benefit from supporting measures that help farmers maintain a sustainable business and that help farms adapt and increase their resiliency.

Other programs and policies that have been used throughout British Columbia and Canada to support the expansion of ecosystem services in agricultural areas include: Land Acquisition Fund Property Levy (Capital Regional District); Natural Asset Reserve Fund (Edmonton); reverse auctions (Ducks Unlimited); Species at Risk Farm Incentive Program (Ontario); Land Stewardship and Habitat Restoration Program (Ontario); Natural Area Protection Tax Exemption Program (Vancouver Island); Riparian Tax Credit (Manitoba); Stewardship Portal (Ontario). Funding sources for the lower mainland would need to be examined and reviewed to determine the most appropriate and effective option for supporting ecosystem services within Metro Vancouver's agricultural areas.

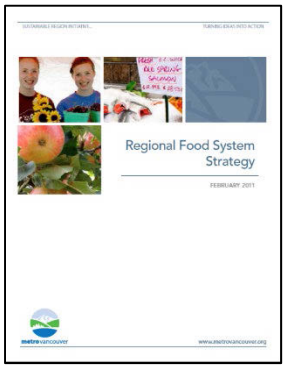
4. Focus on Soil Health

Good soil health is the backbone to a sustainable, resilient farm operation. Healthy soils help with water retention and infiltration, help reduce the effects of drought and the need to use fertilizers, help improve soil nutrients and can help roots grow deeper and sustain cover crops which helps sequester carbon and reduce carbon dioxide release into the atmosphere. Beneficial Management Practices (BMP) for maintaining soil health, as used in regenerative agriculture, include reducing or eliminating tillage, reducing and minimizing soil disturbance and keeping plants growing year-round through the use of cover crops during the off-season. Work and research is currently on-going in Metro Vancouver to determine the benefits of healthy soils, which is imperative to help farmers understand how they can adjust their business practices to get the inherent benefit of the soil they depend on so much.

Developing Adaptable and Resilient Food Systems

The Metro Vancouver region is one of the most important food producing areas in British Columbia. The system that supports food production in the Lower Mainland is comprised of a myriad of players engaged in farming, processing, transporting, distributing, celebrating and food waste recovery. These players function as individual units yet are simultaneously part of a larger natural, social, economic and political system that is incredibly complex, layered and multi-jurisdictional. Food systems that are sustainable and able to adapt to changing climate, economic and societal conditions must be energy efficient, protect ecosystems as part of their operations, build and bind a local community, and provide for sustained and attainable economic development opportunities.

In the context of this Roadmap, sustainable food systems are not just about providing local, healthy food, they are about ensuring the resiliency of the farm system in the context of significant major driving forces such as development pressures, climate change impacts, greenhouse gas emissions reductions, increasing transportation costs, pandemics and global health crises, and droughts, floods and an increased incidence of severe weather events to name a few. A transition to a sustainable, adaptable and resilient food system will require a multitude of interventions, decisions and changes in business and consumer practices both at the community and individual level.



1. Update Food System Strategy

A key step in examining the resiliency of Metro Vancouver's food system is to update the existing Regional Food System Strategy. This would allow for a separate process to answer tough questions about sustainability, adaptability and resiliency solely from the perspective of food. New experiences such as a global pandemic and exacerbated experiences such as extended heat waves and droughts can be examined cohesively with other issues such as vulnerabilities in the food chain, Indigenous access to traditional foods, inefficiencies in the transportation system, expansion of agricultural waste reduction; and Agritech and the role of technology and innovation.

2. Plan for Systemic Agricultural Changes

Large portions of the most productive agricultural land occupy low-lying, reclaimed coastal regions are susceptible to coastal flooding and are at risk from increased soil salinization and widespread farmland inundation and crop losses. A significant amount of work has already been done examining how communities are going to manage sea level rise and increased coastal flooding but there has not been a singular, regional examination of what that means specifically to the agricultural community, how it can be addressed and what systemic changes are needed in order to ensure the long-term viability of the region's farms. Focusing on cover crops, improving soil structure, switching to salt-tolerant crops are all elements that need to be examined in more detail and applied under a regional scale.

REGIONAL FOOD SYSTEM STRATEGY

In 2011, the Metro Vancouver Board endorsed the Regional Food System Strategy to create a collaborative approach to a sustainable, resilient and healthy food system. Since that time, the region has experienced a significant amount of urban growth, has seen increased and unprecedented pressure for agricultural lands to accommodate non-farm uses, has experienced increased food insecurity among vulnerable populations and among new demographic sectors as a result of a global pandemic, has experienced increasing changes to climate such as heat waves and droughts and has not addressed gaps in the previous Strategy including managing for hazards such as floods and earthquakes and engaging with the Indigenous community to help them expand access to traditional food sources.

In order for these issues to be explored from a purely food-centric perspective, they will be included in a review of Metro Vancouver's Regional Food System Strategy separate from this Roadmap. Of particular note, the following items should also be explored from a food system point of view:

i. examine the Milan Urban Food Policy Pact to determine what regional monitoring frameworks can be implemented to evaluate gaps in policy and resource mobilization and reveal overall food system improvements;
ii. examine the entire food system chain from a regional level to determine where emissions can be reduced and what efficiencies can be achieved;
iii. examine the Food and Agriculture Organization of the UN to determine what sustainability indicators can be applied regionally to Metro Vancouver;
iv. identify partnerships with industry, for example, Cleanfarms.ca, to determine ways to reduce packaging waste in the agriculture and food industries;
v. work with the Indigenous Advisory Council on Agriculture and Food, as well as other Indigenous partners, to identify opportunities to strengthen Indigenous food systems and increase Indigenous participation in the agriculture and food sectors;
vi. establish partnerships and programs to support and increase information sharing with farmers about the sustainability challenges faced by the agricultural sector;
vii. establish partnerships and programs to support and increase information sharing with the consumer about how food is produced, sustainability challenges faced by the food sector, and the benefits of supporting local farmers;
viii. examine how the local agriculture community can diversify including: new, more resilient crop species; appropriate locations for crops based on soil type and hazard vulnerabilities (e.g., coastal flooding); and new adaptive agricultural management and production models;
ix. gain a complete and comprehensive understanding of a farmer's realities regarding regulations, jurisdictional requirements, food safety needs, access to labour, profit margins, machine and equipment purchasing and maintenance costs and how that relates to the price of food to the local consumer; intended to bridge the gap between the realities of the farming community and expectations of the consumer;
x. establish inter-municipal learning opportunities for staff, administration and council to learn from each other and understand how municipal interests and activities intersect with food systems planning and decision-making;
xi. determine the content for a toolkit to be used by new or young farmers interested in starting a farm operation within Metro Vancouver, including step-by-step instructions to follow, Beneficial Management Practices to follow, and financial sources to seek;
xii. address the tension that exists between food safety (health protection) and food security (health promotion) activities.

Enable Long-Term Investment in Agriculture

Agricultural producers understand and largely support the need to adapt and adjust their processes to remain viable as an sector; however, they have experienced gaps in the knowledge, financial support, policy structure or understanding of what these adjustments should be, how to go about making them happen on their farms, and how they can be applied to their business practices.

1. Support Champions and Provide Strong Leadership

In order for the agricultural sector to make the necessary adjustment to manage for climate change and keep their farming operations running and viable, long-term investment in agriculture and farming operations is necessary at all levels and through multiple streams: financial, support services, leadership, innovation, education, policy and regulation. While climate adaptation requires changes to individual behaviour as well as business practices, these changes are often unsuccessful without the necessary champions and leaders (e.g., BC Climate and Agricultural Initiative).

2. Ensure Policy, Regulatory and Financial Support

In order for the agricultural sector to remain viable and to continue to adapt to changing climate conditions, all levels of government in Canada will need to ensure there are adequate policies and regulations established to support innovation and create opportunities for businesses to be flexible to adjust to changing international, national, local and sector needs. Regulators will also need to show leadership in understanding and supporting that conventional farming models will likely not be applicable in the future and that alternative models with new and multiple objectives should be pursued. Tax reform, incentive programs, learning opportunities, research funding, and an overall recognition and understanding of the importance of supporting the agricultural sector as it adjusts and adapts to the new climate realities will go a long way. Coupled with the policy and regulatory support needed by the agricultural sector is the financial support farmers need to make this transition. Financial support doesn't just have to show up through complicated adjustments to tax structures or finding ways to reduce the impact of the high cost of land in the Metro Vancouver region, it can also take place through offering programs that provide specialized agricultural advisement to primary producers, supporting extension services that help understand supply chain, packaging, food safety, human resources, and marketing and distribution commitments.

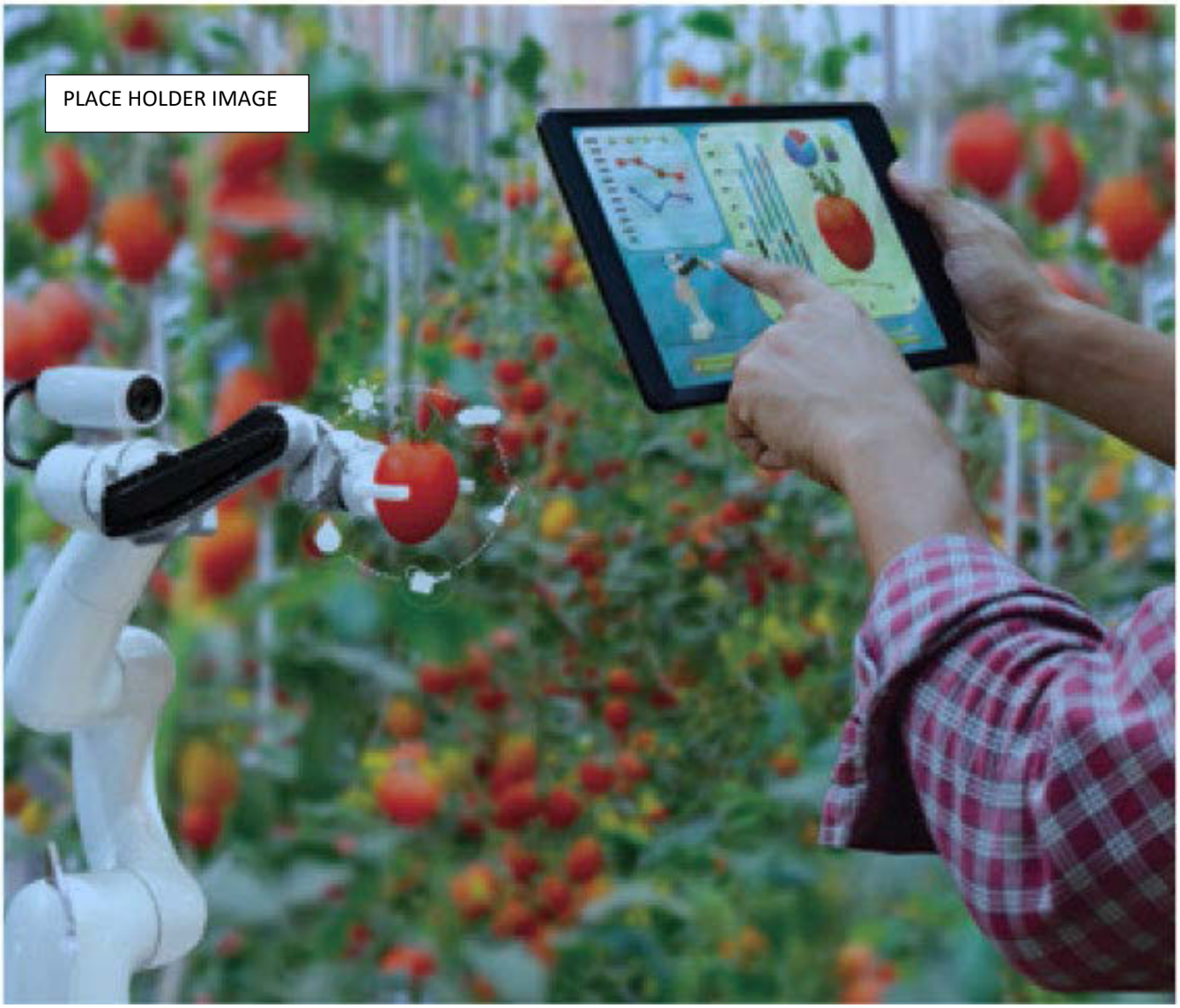
3. Create Opportunities to Increase Self-Sufficiencies

Many farmers rely on others to provide them information on how they can adjust their operational practices to become more resilient. Production improvements are often suggested to farmers, for example, to incorporate new growing practices, add new building technologies, or participate in educational opportunities that may require expensive testing to implement (e.g., soil for carbon sequestration), may not be readily available (e.g., solar powered equipment) or that may be offered during the most productive part of a farmer's day. Part of the leadership gap that exists in the agricultural sector is the lack of resources that could help farmers increase their existing self-sufficiencies by relying less on outside sources to determine if a new farming method is successful or not. Programs such as COMET (US Department of Agriculture) allow farmers to use an online evaluation tool to determine a generalized estimate of the greenhouse gas impacts of a conservation or adaptive principle implemented by the farming operation. Tools like these provide more knowledge and information to the farmer to make better decisions and allow for more adaptive and innovations on their own farms. Online programs like AgPal (Government of Canada) allow farmers and agri-businesses to find relevant resources and information (for example, funding and grants, licensing and regulations, business practices, science, environment and sustainability) in an easy to access platform that they can use at a time that is suitable to them. Expanding and supporting these types of

resources go a long way in increasing a farmer's ability to be self-sufficient and able to adjust and pivot to outside changes and pressures.

4. Integrate the Use of Technological Solutions

While the agricultural sector is making great strides in using regenerative agricultural practices and ecosystem services to create sustainable farming operations, technology is also playing a vital part in helping farmers adjust to climate change and increase their overall operational resiliency. Supporting technology to optimize fertilizer application, generate renewable energy from agricultural residues, and assist with pest, water and soil management are great examples of how farming is benefiting from high-tech innovations. Continuing to innovation and technology, as well as Provincial programs such as Agritech (supports agriculture and food and seafood processing) will help the agriculture sector in Metro Vancouver, and throughout the province, remain competitive, diverse, resilient and adaptive.



Barriers and Opportunities

Most barriers are also chances for opportunities....

International Pressures

Barrier	Opportunity
Farm businesses are expected to accommodate all climate-related policy and regulatory changes while working with global commodity prices and also competing with cheaper imports.	Climate change is experienced locally but it is being experienced globally and throughout the world people are experimenting and researching solutions that may be applicable in a local setting; solutions can be shared.

Sea-level Rise and Extreme Weather Events

Barrier	Opportunity
Salt water intrusion is an on-going issue and drainage problems and flooding pose great risks; the extreme land shortage in the Lower Mainland doesn't provide opportunities to 'move' farmland to somewhere else.	Pushing the sector and all levels of government to collaboratively develop solutions by developing salt-resistant crops and by supporting crop diversification within the region thereby establishing a more resilient agricultural sector.
Lack of knowledge and understanding by the consumer on how extreme weather events, for example an on-going heat wave, affect their own food security. Crop damages due to extended droughts and high temperatures not only affect crop production, they affect a farmer's livelihood, decrease the amount of food available for consumption and increase food costs.	Communication with surrounding urban communities is an opportunity to connect them with their local food and strengthen the urban population's understanding of agriculture and how their personal decisions and choices toward managing climate change can be connected to the cost of the food they consume.
Ongoing insufficient access to water for irrigation for agricultural purposes.	Determine how using practices such as regenerative agriculture can directly impact the amount of water needed by the agricultural sector to reduce the effects of climate change; test and implement alternative water storage and recycling methods and strategies to overall increase the resiliency of the farming community within Metro Vancouver.

Local Decision Making

Barrier	Opportunity
Financial costs from the effects of climate change hinder the agricultural sector's ability to produce food.	Adjust policies, regulations, and financial structures to shift toward supporting the agricultural sector in becoming more resilient and finding ways to best adapt to the climate challenges ahead.
Urban development impacts and the effects of climate change have not been factored into managing and protecting local agricultural land and managing and dealing with water shortages.	Local governments can apply local solutions to ensuring the resiliency of the agricultural resiliency; not all of their decisions are reliant on other levels of government to approve.
The agricultural community is marginalized and produce food for consumers who do not understand the challenges and risks that go into local farming.	Communication with surrounding urban communities is an opportunity to connect them with their local food and strengthen the urban population's understanding of agriculture and how their personal decisions and choices toward managing climate change can be connected to the cost of the food they consume.
Lack of access to irrigation for agricultural purposes including: water licences that are over prescribed;	Determine how using practices such as regenerative agriculture can directly impact the amount of water

water taken without a licence; marginal ground water quality; and difficulty accessing ground water sources.	needed by the agricultural sector to reduce the effects of climate change; test and implement alternative water storage and recycling methods and strategies to overall increase the resiliency of the farming community within Metro Vancouver.
Standing in the way of farmers to fully integrate adaptability and sustainability into their farm operations includes no capacity to do so and the processes, applications and permitting being too onerous, costly and time consuming.	Support and expand programs such as Farmland Advantage that directly provide support services to assess a farmer's land, determine remediation needs (if any), follow-up with additional inspections and provide payment for ecosystem services.
There are more non-farm landowners in ALR than farmers in Metro Vancouver making it difficult to comprehensively use agricultural land to manage for climate change; high absentee landlords in the ALR make it difficult to access underused agricultural land; agricultural land is held idle by non-farm land owners while at the same time there are operators who cannot find land to use for farming purposes.	Adjust policies, regulations and financial structures to make non-farm uses that do not support agricultural operations harder to support for the long-term and that make it less financially viable to use agricultural land for uses other than agriculture.
Metro Vancouver farmland is very desirable for estate and non-farm use development and activities that generate higher financial gains compared to food production and agricultural uses, makes it difficult to comprehensively use agricultural land to manage for climate change.	Adjust policies, regulations and financial structures to make non-farm uses that do not support agricultural operations harder to support for the long-term and that make it less financially viable to use agricultural land for uses other than agriculture.
Ongoing tension and pressure from industrial sector to expand into and convert agricultural land to ease regional industrial land shortages.	Adjust policies to re-affirm using Agricultural land for agricultural purposes; specifically examine how agriculture and ag-industrial uses can co-benefit and co-exist within a region that experiences pressures for both use types.

Ongoing Research and Support

Barrier	Opportunity
Switching to high-value crops may be challenged by exposure to pests, soil salinization etc.	The integrated pest management approach inherent in regenerative agriculture provides an opportunity to address increased pest exposure; research and technology can determine ways to adapt crops and farmland to better manage sea water inundation and the increased salinization of soil as a result.

Journey to Net-Zero Emissions, Resilient Agriculture

Agriculture contributes to the regional economy and provides fresh, healthy food for local consumption and export. Protecting agricultural land supports regional food security and provides ecosystem services, which are public benefits that include flood management, carbon sequestration and wildlife habitat. Agricultural activities also generate emissions of greenhouse gases and other air contaminants.

Linkage to Other Issue Areas

There are several linkages between agriculture and other issue areas and Metro Vancouver is exploring which linkages must be considered when developing policies and actions. This *Roadmap* primarily addresses agriculture within our region and impacts and actions related to climate change or air contaminants. Some of the related issue areas for agriculture are:

Land Use and Growth Management – Containing urban growth protects agricultural land for farming. Agriculture is vulnerable to impacts from adjacent land uses and new housing developments and transportation infrastructure.

Human Health and Well-Being – Fresh local and imported food, especially fruits and vegetables, support healthy communities; food choices affect health as well as emissions and agriculture viability.

Transportation – Transporting imported and exported foods and food distribution within the region, are sources of emissions.

Waste – Food loss and food waste increase air contaminant emissions, including greenhouse gases.

Industry and Energy - Production of renewable natural gas from agricultural organic residues has the potential to supply energy to the agriculture sector as well as other industries thereby reducing greenhouse gas emissions from manure and from industrial energy use.

Nature and Ecosystems – Protecting, restoring and connecting natural areas, and enhancing ecosystem services on agricultural land support a climate resilient agriculture sector. The significant connection the *Nature and Ecosystems Roadmap* has to the agricultural sector is explored in more detail below.

As these other Roadmaps are developed, they will be made available on the Metro Vancouver website.

CLIMATE 2050 NATURE AND ECOSYSTEMS - ROADMAP CONNECTION TO AGRICULTURE

While there are several linkages between the *Agriculture Roadmap* and the other issue areas of *Climate 2050*, more than any of the others, the *Nature and Ecosystems Roadmap* is the most inter-connected and related to the *Agriculture Roadmap*.

The *Nature and Ecosystems Roadmap* and *Agricultural Roadmap* largely connect through the co-benefits each provides the other:

→ NATURAL SPACES provide agricultural lands pollinator habitat, flood and erosion control and natural pest management; and
→ AGRICULTURAL LANDS provide the opportunity for wildlife and bird habitat, natural asset management, connections and linkages to Metro Vancouver's Green Infrastructure Network, regional park space and habitat for sensitive ecosystems and species at risk.

Source: Metro Vancouver Regional Planning 2018

Strategies and Actions

ROLES AND RESPONSIBILITIES

Under authority delegated by the BC Government in the *Environmental Management Act*, Metro Vancouver is responsible for managing and regulating air quality and greenhouse gases in the region, including air contaminants from agricultural sources. Metro Vancouver is also responsible for developing, implementing and stewarding *Metro Vancouver 2040: Shaping our Future* (*Metro 2040*), the regional growth strategy, and for preparing an update to that strategy, *Metro 2050* (draft). Both *Metro 2040 and Metro 2050* contain Metro Vancouver's greenhouse gas reduction targets and include strategies to protect agricultural land and promote agricultural viability through policies such as the Urban Containment Boundary.

While Metro Vancouver plays a pivotal role in advancing climate strategies and actions for the agricultural community in response to climate change issues, air quality management and climate action require close coordination among all governments, as well as private businesses, utilities, institutions and residents. The government and agency organizations that fill key roles in reducing agricultural emissions and helping increase resiliency of Metro Vancouver's agricultural community are outlined below:

ENTITY	ROLE
BC Ministry of Agriculture, Food and Fisheries (AFF)	Supports the production, marketing, processing and merchandising of agricultural products, provides guidance for agricultural operations and secures agricultural production through the mandate of the Agricultural Land Commission.
Agricultural Land Commission (ALC)	Preserves agricultural land, encourages farming in British Columbia and encourages local governments to enable and accommodate farm use of agricultural land.
BC Ministry of Environment and Climate Change Strategy (MOECCS)	Responsible for the protection, management and conservation of BC's water, land and air and living resources and leads climate action through various policies, legislation, regulation and programs.
Government of Canada	Establishes standards for agricultural operations and agricultural equipment as well as supports agricultural research.
Member Jurisdictions	Have authority over local land use decisions and support agriculture through zoning, environmental policies and engaging with residents. Some member jurisdictions can manage agriculture through Farm Bylaws approved by the BC Ministry of Agriculture.
Energy Utilities	Provide rebates, infrastructure and energy for agricultural operations as well as access to market for energy sources such as renewable natural gas (RNG) (e.g., BC Hydro, FortisBC)
Farm Industry Review Board	An independent administrative tribunal that is responsible for hearing complaints from person aggrieved by odour, noise, dust or other disturbances arising from agriculture and may also study and report on farm practices.
Industry Associations	Support agricultural producers with the latest information on technologies, policies and regulations.
Academic Institutions	Conduct research and provide education and training as well as advocate and inform others about ways to transition to a low-carbon and resilient future.
Non-Profits	
Other Organizations	
Local Residents	Make food choices that can support agriculture by buying local food.

STRATEGY 1: Protect Agricultural Land

Above all else, farming cannot take place, food cannot be produced, and ecosystem services cannot be gained if farmland does not exist. Agricultural land in Metro Vancouver is increasingly threatened from non-farm land uses. Currently, there are more non-farm landowners in the Agricultural Land Reserve (ALR) than there are farm owners which is a significant barrier to not only turning unused or non-productive land into operating farms and to ensuring the ALR is cohesively used to protect farming operations from climate change, but it is also a substantial barrier that prevents new or young farmers from gaining access to land to farm, whether it be through leasing or purchasing. This imbalance in land ownership and use of the ALR represents lost economic development opportunity for the region and places strains on the local food system when the demand for local food is constrained by the availability of land for farming. The agricultural sector stimulates links with restaurants, retail, food manufacturing and tourism making its protection a regional priority.

1.1 Continue to Protect Agricultural Land From the Impacts of Land Development

Advocate to member jurisdictions to use the powers provided to them through the *Local Government Act* and *Agricultural Land Commission Act* and Regulations to: 1. adopt policies, regulations and Development Permit Guidelines requiring agricultural impact assessments for development taking place adjacent to the ALR; and 2. limit the extend of urban development and commercial uses that seek to extend utility services into the ALR.

1.2 Provide Secure Tenure for Farmers.

METRO 2040

Work with member jurisdictions to protect the supply of agricultural land and promote agricultural viability with emphasis on food production by actively monitoring the status of agricultural land, including the amount of actively farmed land and other indicators to be able to promote agricultural viability and food production. Metro Vancouver will continue to work with its Agricultural Advisory Committee to protect the region's agricultural land base and will continue to work with the Agricultural Land Commission to protect and optimize the use of agricultural land in order to preserve farmland capability well into the future.

1.3 Enable Long-term Investment in Agricultural Lands.

Metro Vancouver will update its Regional Food System Strategy to determine appropriate, effective and measurable actions that will enable investment in agricultural lands for the long-term, including how to support local food production that will contribute to food security and regional resilience.

1.4 Encourage Adjustment of Agricultural Practices to Ensure Long-Term Local Food Sources.

BIG MOVE

Work with the BC Government, Government of Canada, industry and other regional partners to determine the changing conditions for farming in the region and what farming practices can be adjusted to ensure food production can successfully continue here well into the future. This should include examining irrigation infrastructure and water use, adjustments to farming techniques to account for climate change and incorporating regenerative agriculture and nature-based solutions into farming daily practices.

1.5 Increase Entry and Reduce Barriers to Local Farming.

Advocate to the BC Government for changes to the tax structure for agricultural properties to reduce incentives for non-farm use development in the ALR. Work with member jurisdictions to support existing land matching initiatives or to create their own programs (e.g., municipal-owned agricultural land trust provided for long-term leasing for incubator farms) that would help eliminate the barriers to local farming experienced by young or new farmers.

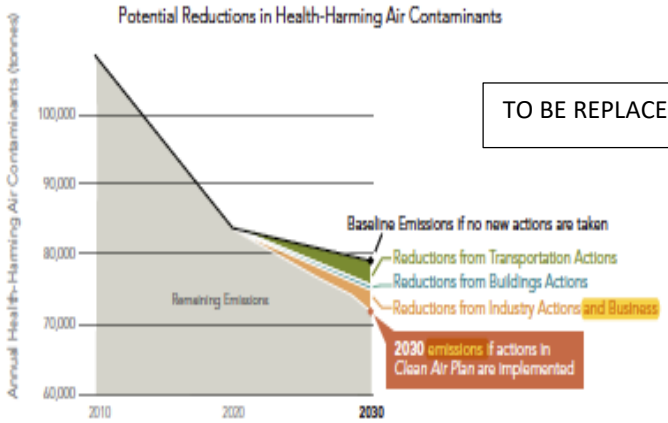
1.6 Protect Agricultural Land for Ecosystem Services

BIG MOVE

Metro Vancouver will examine the use of ecosystem services as a benefit to the regional agricultural sector including what programs are most beneficial to farmers financially and what methods are most effective in securing land for ecosystem services and for ensuring the long-term health and resiliency of farming operations.

STRATEGY 2: Support Farmers as Climate Action Leaders

Agricultural activities generate 4% of regional greenhouse gas emissions, primarily from heaters and boilers in greenhouses, agricultural equipment, and livestock. Improving energy efficiency and switching to clean, renewable energy for greenhouses and agricultural equipment and using enhanced Beneficial Management Practices (BMP) will help achieve 2030 agriculture emission targets for greenhouses gases. Increasing the production of renewable natural gas through anaerobic digestion of agricultural and other waste will help to displace natural gas from fossil fuels in sectors where zero emission solutions are more challenging.



The agricultural sector has demonstrated its leadership in continually looking at ways to adjust production methods to reduce costs and increase efficiencies and has demonstrated its willingness to continue to innovate and make adjustments in order to remain competitive and viable and be a positive, contributing factor to a healthy future. Supporting farmers and the agricultural sector in continuing this tradition of leadership is an essential step in leading to a net-zero greenhouse gas emissions future.

Potential Impacts of Strategy 2	Key Partners
Reduce annual greenhouse gases by up to 100,000 tonnes Reduce annual health-harming air contaminants by up to 50 tonnes	Government of Canada BC Government Agriculture Community Member Jurisdictions

2.1 Reduce Emissions from Greenhouses

BIG MOVE

Work with the BC Government, BC Agricultural Council, BC Greenhouse Growers Association and member jurisdictions to explore opportunities to reduce emissions from greenhouses. Opportunities could include improving energy performance and transitioning to using cleaner, renewable energy, while considering the need for supplemental carbon dioxide in greenhouses to support plant growth. This can be supported by preparing passive design standards specific to greenhouse operations and providing an on-line decision support tool for how to best upgrade greenhouses. Metro Vancouver will update the regional emissions inventory with data specific to greenhouses to increase the understanding of their level of greenhouse gas emissions and will work with industry to determine how much carbon dioxide is used for their processes.

2.2 Improve Soil Health to Help Address Carbon Emissions

BIG MOVE

Work with the BC Government, member jurisdictions, industry and other regional partners to expand the knowledge and understanding the role of soil health in ensuring long-term agricultural viability and resilience against climate change and as a local source able to reduce carbon emissions within the Lower Mainland.

Examine ways to financially support expansion of data collection in soil carbon measuring and establish actionable programs specific to soil carbon storage and sequestration.

2.3 Outreach Program on Reducing Agricultural Emissions

Develop and implement an awareness and outreach program on reducing agricultural emissions. The program would be developed with the agriculture community, member jurisdictions and BC Government, and would supplement existing agricultural outreach and support programs. The program would include examining all sources of agricultural emissions to determine how agricultural practices could be adjusted (for example, adjusting cattle feed to reduce methane, using field mapping to apply fertilizer more efficiently, and using crops and soil on farms to capture and sequester carbon) to not only reduce agricultural emissions, but include farmers in an effort to reverse the effects of climate change in the region.

2.4 Enhance Funding for Environmental Farm Plans

Advocate to the Government of Canada and BC Government to enhance the funding for developing and implementing Environmental Farm Plans. This program helps agricultural operations reduce emissions of nitrous oxide, methane and other air contaminants. This should include continued development and promotional Beneficial Management Practices (BMP), as well as providing reliable incentives and technical guidance to farms to support adoption of low emission practices and technologies.

2.5 Incentives for Farmers to Transition to Lower Emission Equipment

Advocate to the BC Government and Government of Canada to enhance or develop funding supports for cleaner agricultural equipment (e.g., incentives, tax credits, loans, etc.). This would help accelerate the transition to lower emission equipment (e.g., a harvester with better emission controls) or encourage the installation of improved emission controls on existing equipment (e.g., diesel particulate filters). Higher incentives should be available if old equipment is scrapped and for zero emission equipment to increase their adoption.

2.6 Pilot Study with Zero Emission Agricultural Equipment

Work with the BC Government, industry, and the agriculture community to develop a pilot study for zero emission agriculture equipment such as an electric tractor. The study could identify the long-term pathways for wider adoption of zero emission agricultural equipment, including charging and related infrastructure, and could focus on emerging alternative fuels such as hydrogen.

2.7 Streamline Emission Requirements for Anaerobic Digestion Facilities

Develop an emission regulation for anaerobic digestion of manure, other agricultural waste and commercial food waste. The updated regulation would maintain equivalent protections for regional air quality and human health as the existing permit process, and would provide a simpler path to regulatory compliance.

2.8 Expand Anaerobic Digestion of Agricultural Waste

Advocate to the BC Government, Government of Canada, energy utilities and member jurisdictions to expand development of anaerobic digestion facilities to process manure, other agricultural waste and commercial food waste. This could include financial incentives (and tax credits) and removal of barriers in existing regulations. Any expansion should avoid the loss of agricultural land in the Metro Vancouver region.

2.9 Encourage Local Agriculture

Metro Vancouver will update the Regional Food System Strategy and will continue to advocate to member jurisdictions and other regional partners to address regional food security issue, to encourage more local food production, and to prioritize agricultural practices that reduce emissions or help maintain or sequester carbon.

STRATEGY 3: Support Long-Term Farm Health and Resiliency

Farmers and agricultural operations have adapted and evolved over time accommodating changes in economics, consumers, weather, technology, transportation, and markets. Resiliency and adaptation are not new concepts and have been requirements for the long-term success of the agricultural sector in general for centuries. While facing adversity is not a new concept, the degree to which farmers need to adapt to continue to succeed in the face of a rapidly changing climate is.

Farmers and their businesses will not be able to continue to withstand the effects of climate change, feed present and future populations or provide ecosystem services to adjacent urban areas without adjusting their practices to ensure the health of their farm is a top priority. These adjustments will need to incorporate and connect to the ecosystem, natural biological applications and regenerative techniques more than ever before. This involves first understanding a farm's specific vulnerabilities and then second, pursuing actions so that they can directly benefit from the ecosystem services (e.g., soil nutrient and organic matter, habitat for wildlife, food for pollinators, carbon sequestration and flood management) provided by their agricultural land.

3.1 Expand the Use of Regenerative Agriculture

BIG MOVE

Work with the BC Government to normalize regenerative agricultural practices for farming operations within the lower mainland by offering additional extension services, financial support and information sharing opportunities. Metro Vancouver will examine the feasibility of establishing a regional network for farmers (for example, Texas' Soil for Water Network) that provides access to peer-to-peer knowledge sharing from research, pilot projects and operational adjustments to increase the support for local farmers to increase their resiliency to climate change.

3.2 Support and Expand Ecosystem Services

BIG MOVE

Work with the BC Government, member jurisdictions, the farming community and other regional partners such as Farmland Advantage to determine how much agricultural land is available and appropriate to be used for ecosystem services, how individual farms can benefit from the restoration and protection of these lands (including riparian areas) on their farms, and how farmers and land owners can be compensated for keeping these lands set aside for ecosystem services. Metro Vancouver will provide regionally-appropriate guidance on the valuation methodologies, tools and decision-making frameworks needed to identify, preserve, restore, and, where necessary, expand natural ecosystems on agricultural land and will examine the benefits of connecting these areas within a regional Green Infrastructure Network, as a way to increase agriculture's role in contributing to a resilient region, both on and off the farm.

3.3 Support Innovations in Agricultural Operations

BIG MOVE

Work with the BC Government, Federal Government, industry and regional partners to expand digital and high-tech agricultural systems to improve production operations that will increase the resiliency and longevity of agricultural operations, including GPS-guided machinery, sensor and data-driven analytics, quantification platforms and technology hubs, precision farming, drone monitoring and data collection, and using cognitive systems to help address labour shortages.

3.4 Ensure Long-term, Reliable Access to Water

BIG MOVE

Work with the BC Government to provide viable and tangible solutions to ensuring water resources needed by the farming community are provided in a sustainable, consistent and reliable manner including: exploring innovative sources and new technologies for water re-use (e.g., municipal waste water, sea water, brackish water, meat and dairy processing wastewater, and agricultural drainage water) and water conservation (e.g., applying mulches to field crops); and developing a new reservoir or storage systems that takes advantage of rainfall collection when it is abundant to be used during periods of low or no rainfall during the growing season. Metro Vancouver will update the agricultural water demand model to incorporate current climate conditions, crop irrigation systems and soil information data to contribute to the discussion of water availability for the agricultural community and will develop a toolkit on how a circular water economy can be supported within the Metro Vancouver farming community.

STRATEGY 4: Leverage Economic Opportunities, Innovation and Leadership

Agriculture requires long-term investment, financial support and leadership from all levels of government (federal, provincial, regional and local), from private industry (transportation, finance, support services, logistics, retail, and research), and from society (consumers, education, non-profits, places of worship). Farming is the corner stone to the agricultural sector providing healthy food to every individual and as every human being needs to eat, every human being should be invested in ensuring the longevity and resilience of farming.

4.1 Prioritize Agriculture Via Strategic Action

BIG MOVE

Metro Vancouver will illustrate leadership in the importance of prioritizing agriculture within the region by committing to provincial, federal or international programs that establish bench-line policies, measurable targets and achievable actions. Metro Vancouver will also encourage member jurisdiction engagement and participation in the programs aimed at the municipal level, for example, the Mexico City Pact and Milan Food Policy Pact, as they can help communities commit to addressing the effects of climate change on agriculture and provide reporting frameworks by which to monitor the effectiveness of policies and the progress of actions.

4.2 Continue Long-term Financial Investment in the Agricultural Sector

Work with the Federal and BC Governments to support the agricultural sector through direct and indirect financial investment that: provide incentive programs to help farmers adjust their operations to become more sustainable; expand funding sources for long-term, consistent and reliable funding to agricultural producers to pay for agricultural land to be used for ecosystem services and advance the resiliency of farming operations in the lower mainland; and designate resources for testing practices and technology to help farmers effectively use soil as a means to store carbon for a greater societal benefit.

4.3 Increase Access to Information for Local Farmers and Agricultural Producers

BIG MOVE

Work with member jurisdictions and the BC Government to provide information to the farming community in formats that are compatible with the specific needs of farmers, including providing on-field workshops, supporting Farmer-to-Farmer information sharing, and providing existing and new educational materials, guidelines, regulations and toolkits in different languages and as audio books to expand outreach and ease of accessing information.

4.4 Reduce Confusion with Provincial Legislative Overlaps

Prepare a joint and coordinated toolkit that brings together all legislation applicable to agriculture and farming from the Ministry of Agricultural, Food and Fisheries, Agricultural Land Commission, Ministry of Environment and Ministry of Municipal Affairs to collectively address legislation that can be contradictory (e.g., riparian protection within the Agricultural Land Reserve) to make it transparent, clear and concise about the expectation from farmers for managing these areas on their farms.

4.5 Support Long-term Local Food Production

Metro Vancouver will update the Regional Food System Strategy to ensure food-specific challenges, gaps and opportunities are identified for the region to specifically include climate change issues and will include examining impacts and considerations specific to food production vulnerability and longevity within the region.

4.6 Bridge the Gap Between the Agriculture Community and the Consumer

Metro Vancouver will develop engaging and approachable educational campaigns aimed toward the public about agriculture and how it is affected by climate change, what costs and processes go into producing food (e.g., the farm to food cost spectrum), what actions farmers are taking to adapt to significant regional climate issues and how consumers can be a positive contributor to agricultural resiliency through their actions and decision making. These campaigns will specifically work to bridge the gap between the public and the realities of what climate change is, helping to increase understanding and awareness of it broadly and as it relates specifically to food costs and availability.

4.7 Help Farmers Build Capacity to Adapt to Climate Change

BIG MOVE

Work with the BC Government, member jurisdictions, industry and other regional partners to increase the agricultural community's capacity to integrate climate change considerations into their ongoing business decisions and operations. This will include a wide spectrum of support mechanisms, including: encouraging and aiding farm-level preparation of emergency plans; working at the farm level to help producers implement water back-up plans or determine appropriate methods to recycle or store water; increasing producer access to programs, tools, practices, equipment and finances to help them self-monitor and manage soil (e.g., US Department of Agriculture on-line COMET carbon sequestration evaluation tool); and help prepare farm-level business continuation plans for prolonged extreme weather events and disruptions to water and energy supplies.

Setting the Path Ahead

The "Setting the Path Ahead" section will eventually be found on Metro Vancouver's Climate 2050 webpages under "Agriculture" and will serve as a companion to the Agriculture Roadmap. This will allow Metro Vancouver to track progress towards targets and add and adjust strategies and actions in response to performance measurements.

The timeline below includes all of the actions included in this Roadmap. There is much work to be done; however, there are some critical actions that, if started over the next two years, will make a major difference to accelerating the region's drive to zero emission and resilient agriculture.

CLIMATE 2050 AGRICULTURE ROADMAP ACTION TIMELINE

STRATEGY	2021-2024	2025-2029	2030-BEYOND
STRATEGY 1 Protect Agricultural Land	Continue to Protect Agricultural Land From the Impacts of Land Development Provide Secure Tenure for Farmers Enable Long-term Investment in Agricultural Lands Encourage Adjustment of Agricultural Practices to Ensure Long-Term Local Food Sources Increase Entry Into and Reduce Barriers to Local Farming Protect Agricultural Land for Ecosystem Services		
STRATEGY 2 Support farms as leaders in Climate Change mitigation.	Support Improving Soil Health to Help Reduce Carbon Emissions Enhance Funding for Environmental Farm Plans Provide Incentives for Farmers to Transition to Lower Emission Equipment Streamline Emission Requirements for Anaerobic Digestion Facilities Expand Anaerobic Digestion of Agricultural Waste Encourage Local Agriculture	Reduce Emissions from Greenhouse Gases Pilot Study with Zero Emission Agricultural Equipment and Heating Sources	
STRATEGY 3 Support Long-Term Farm Health and Resiliency	Expand the Use of Regenerative Agriculture Support and Expand Ecosystem Services Support Innovations in Agricultural Operations	Ensure Long-term, Reliable Access to Water	
STRATEGY 4 Enable Long-Term Investment in Agriculture	Prioritize the Agriculture Sector Via Strategic Action Increase Access to Information for Local Farmers and Agricultural Producers Support Long-term Local Food Production	Continue Long-term Financial Investment in the Agricultural Sector Reduce Confusion with Provincial Legislative Overlaps Bridge the Gap Between the Agriculture Community and the Consumer Help Farmers Build Capacity to Adapt to Climate Change	

Measuring Our Progress

The table below lists examples of some of the performance indicators that could be used to help Metro Vancouver measure regional progress towards meeting the targets set out for this purpose. The performance indicators used will depend on the availability of this information from other organizations. Because the Agriculture Roadmap is calling for actions from many different partners and stakeholders, and because, in some instances, it is suggesting using technology that either does not currently exist or that is not readily available at a consumer level, data availability may be limited until technologies advance and industry markets further advance toward full operational sustainability. Additionally, data sharing from partner organizations will be foundational to understanding the pace of progress toward s our common goals and will help governments to continue to shape equitable and cost-effective pathways to a zero emission and resilient future.

ROADMAP ELEMENT	KEY PERFORMANCE INDICATOR	DATA SOURCE	DATA IS CURRENTLY COLLECTED
Resilient Agriculture	% ALR used for long-term set aside ecosystem services	ALUI	no
Protected Agricultural Land	% ALR actively farmed	ALUI	yes
Regional GHG Impact	The agricultural sector is carbon neutral by 2050.	various	yes
Regional GHG Impact	% greenhouse gas emissions from greenhouses	various	yes
	The agricultural sector produces clean, renewable energy to meet all its production needs by 2050.	various	yes
	The agricultural sector provides clean, renewable energy to other energy users by 2050.	various	no

Feedback and Engagement Process

This Roadmap was generated with input from many organizations, including other levels of government, and residents across the region. The project team is continuously assessing that input, and many of the recommendations are reflected in the structure and content of this Roadmap.

This Roadmap reflects current policies and the best ideas, approaches and technologies available at time of writing. As with all climate planning, it must be viewed as an iterative, dynamic path forward. The goals remain clear, and new policies, ideas, approaches and technologies must be anticipated and reflected in the Roadmap.

The project team continues to be open to feedback, at any time, in this Agricultural Roadmap and any other aspect of the climate action initiatives led or coordinated through Metro Vancouver. Send any comments direct to the Project Team through Climate2050@metrovancouver.org or phone 604-432-6200.

Glossary

Adaptation means anticipating, planning for and responding to the adverse effects of climate change and taking appropriate action to prevent or minimize 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.

Adaptive capacity means the ability of ecosystems, economies, infrastructure and communities to adjust to climate change (including climate variability and extremes) by moderating potential damages, taking advantage of potential opportunities, or coping with consequences.

Agroecology applies ecological principles to agriculture ensuring a regenerative use of natural resources and ecosystem services while addressing the need for food sovereignty. While the practices can be wide-ranging, agroecology is characterized by diversifying farms and farming landscapes, replacing chemical inputs with organic materials and processes, optimizing biodiversity and stimulating interactions between different species.

Agroforestry is a collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used on the same land-management units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence.

Air contaminants are any substances emitted into the air that do 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.

Carbon dioxide (CO_2) is the primary driver of climate change, and is produced primarily by burning fossil fuels. In agriculture, carbon dioxide is primarily generated by fuel combustion by greenhouses and agricultural equipment. Carbon dioxide is also released from farm fields during soil cultivation as organic materials undergo biological decomposition. Plants, trees and soils can sequester carbon in stable organic matter.

Carbon neutral region is a region that has achieved the deepest greenhouse gas emissions reductions possible across all economic sectors, and removes or captures sufficient carbon dioxide to balance any remaining regional greenhouse gas emissions.

Carbon sequestration is the removal of carbon dioxide from the air and the long-term storage of carbon to mitigate climate change. Carbon enriched soils are healthier, have better resilience to extreme weather, better water permeability, microbial diversity, higher yields and reduced input requirements.

Carbon sinks are natural systems that absorb more carbon dioxide than they release. The main natural carbon sinks are plants, the ocean and soil.

Clean, renewable energy is low or zero emissions energy that is replenished over days or years.
In Metro Vancouver, clean, renewable energy is primarily electricity from renewable sources such as hydro or solar.

Climate change adaptation means anticipating, planning for and responding to the adverse effects of climate change and taking appropriate action to prevent or minimize 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.

Ecosystem services are the benefits people obtain from ecosystems. Ecosystem services provided by farmland include nutrient and organic matter recycling (from food waste), food for pollinators, wildlife habitat, flood control, and carbon sequestration.

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

Green Infrastructure "Natural and human made elements that provide ecological and hydrological functions and processes. Green infrastructure can include components such as natural heritage features and systems, parklands, stormwater management systems, street trees, urban forests, natural channels, permeable surfaces, and green roofs. - Green Infrastructure Ontario

Hazard refers to a dangerous phenomenon, substance, human activity, or condition. In this context, hazards are caused or made worse by climate change. Examples include rainstorms, extreme weather, wildfires, storm surges, and landslides.

Impacts refers to the consequences of realized risks on ecosystems, economies, infrastructure and communities. Impacts may be referred to as consequences or outcomes, and can be adverse or beneficial.

Methane (CH_4) is a short-lived greenhouse gas and is 25 times more effective than carbon dioxide at trapping heat in the atmosphere. Methane emissions from agriculture are produced by ruminant animals such as cattle and sheep through a bacterial process called enteric fermentation, as well as being released from manure storage sites, especially when wet because of the lack of oxygen during decay. Natural gas is mostly composed of methane.

Natural assets are the stock of natural resources and ecosystems (including geology, soil, air, water and all living things) that provide benefits to people. Examples include forests, wetlands, and streams. It is from these natural assets that humans derive a wide range of services, often called ecosystem services, which make human life possible.

Natural infrastructure can be considered an *active* form of nature likely focused on the most important of these benefits. Natural infrastructure comprises an *active management component* aimed at providing (or conserving) the key advantages—such as climate resilience, clean water and biodiversity. It differs from traditional "grey" infrastructure, such as pipes, tunnels and factories, which are completely constructed by humans. Natural infrastructure is a form of "green" infrastructure, a term that also includes systems with positive environmental outcomes, such as renewable energy or electric vehicles.

Nature-based solutions (**NBS**) refers to the sustainable management and use of nature for tackling socio-environmental challenges. The challenges include issues such as climate change, water security, water pollution, food security, human health, and disaster risk management.

A definition by the European Union states that these solutions are "inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. The Nature-based Solutions Initiative meanwhile defines them as "actions that work with and enhance nature so as to help people adapt to change and disasters". Such solutions bring more, and more diverse, nature and

natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions".[1] With NBS, healthy, resilient and diverse ecosystems (whether natural, managed or newly created) can provide solutions for the benefit of societies and overall biodiversity. Nature-based Solutions (NbS) are defined by IUCN as "actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits".

Promoting nature-based solutions to enhance ecosystem functions, expand green infrastructure and increase resilience.

Nitrous oxide (N_2O) is a long-lived greenhouse gas, and is 298 times more effective than carbon dioxide at trapping heat in the atmosphere. Nitrous oxide emissions from agriculture is primarily produced by microbes as they process nitrogen in soils from fertilizers, manures and other inputs.

Regenerative agriculture can rebuild soil organic matter, restore degraded land and improve the water cycle by utilizing natural nutrient cycles, restoring soils, raising carbon levels, protecting water, and enhancing biodiversity and ecosystem services. OR/AND: is a holistic land management practice that holds the potential of reversing climate change by rebuilding soil organic matter and restoring degraded soil biodiversity resulting in carbon drawdown and improvement of the water cycle (Regeneration International, 2017). This farming method that regenerates soil fertility, improves water retention, fosters biodiversity, and sequesters carbon.

Resilient/Resilience capacity to withstand and/or recover from hazards, risks and challenges associated with a changing climate. Also referred to as adaptive capacity which is the capacity of ecosystems, economies, infrastructure and communities to absorb the impacts of climate change while maintaining essential services and functions needed to support health and well-being. In some cases, resilience involves changing services and functions so they are more sustainable.

Sensitivity is the degree to which a community or system is affected (positively or negatively) by climate variability or change. The effect may be direct or indirect.

Vulnerability is the degree to which ecosystems, economies, infrastructure and communities are susceptible to, or unable to cope with, the adverse effects of climate change. Vulnerability varies based on exposure, sensitivity and adaptive capacity. Geographic location, socio-economic conditions, and other factors can impact

To: Climate Action Committee

From: Kathy Preston, Program Manager, Environmental Regulation and Enforcement
Parks and Environment Department

Date: October 19, 2021 Meeting Date: November 5, 2021

Subject: **Board Appointment of Enforcement Officers**

RECOMMENDATION

That the MVRD Board:

a) pursuant to the *Greater Vancouver Regional District Air Quality Management Bylaw 1082, 2008* and the *Environmental Management Act*:
   i. appoint Metro Vancouver employees Matt Brinkworth and Toby Gritten as officers; and
   ii. rescind the appointments of Rick Laird, Robert Kemp and Corey Pinder as officers; and

b) pursuant to section 28 of the *Offence Act*:
   i. appoint Metro Vancouver employees Matt Brinkworth and Toby Gritten for the purpose of serving summons under section 28 of the *Offence Act* for alleged violations under the *Greater Vancouver Regional District Air Quality Management Bylaw 1082, 2008*; and
   ii. rescind the appointments for the purpose of serving summons of Rick Laird, Robert Kemp and Corey Pinder.

EXECUTIVE SUMMARY

Recent changes in staff have resulted in a need to update staff appointments as MVRD Board-designated officers under the *Greater Vancouver Regional District Air Quality Management Bylaw 1082, 2008*, the *Environmental Management Act* and the *Offence Act*. Staff recommend that the MVRD Board appoint staff accordingly.

PURPOSE

To appoint two Metro Vancouver employees as Board-designated officers and to rescind the appointments of three former employees.

BACKGROUND

Employment status changes for Metro Vancouver environmental regulatory staff have resulted in a need to update staff appointments to ensure appropriate authority to advance air quality management goals. Section 31 of the *Environmental Management Act* and the *Greater Vancouver Regional District Air Quality Management Bylaw No. 1082, 2008* grant authority to Board-designated officers.

ROLE OF PERMITTING AND ENFORCEMENT OFFICERS

Metro Vancouver's Air Quality Regulatory Program supports the goals of the Clean Air Plan by promoting compliance with air quality management bylaws and regulating the discharge of air contaminants.

Officers may enter property, inspect works, and obtain records and other information to promote compliance with the *Environmental Management Act* and MVRD air quality management bylaws.

The *Offence Act* allows regional districts to appoint bylaw enforcement officers for the purpose of serving summons for bylaw violations. Officers, if appointed for that purpose, may serve a summons in respect of alleged offences under the *Greater Vancouver Regional District Air Quality Management Bylaw 1082, 2008*.

ALTERNATIVES

1. That the MVRD Board:
   a) pursuant to the *Greater Vancouver Regional District Air Quality Management Bylaw 1082, 2008* and the *Environmental Management Act*:
      i. appoint Metro Vancouver employees Matt Brinkworth and Toby Gritten as officers; and
      ii. rescind the appointments of Rick Laird, Robert Kemp and Corey Pinder as officers; and
   b) pursuant to section 28 of the *Offence Act*:
      i. appoint Metro Vancouver employees Matt Brinkworth and Toby Gritten for the purpose of serving summons under section 28 of the *Offence Act* for alleged violations under the *Greater Vancouver Regional District Air Quality Management Bylaw 1082, 2008*; and
      ii. rescind the appointments for the purpose of serving summons of Rick Laird, Robert Kemp and Corey Pinder.

2. That the MVRD Board receive for information the report dated October 19, 2021, titled "Board Appointment of Enforcement Officers" and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

There are no additional financial implications for expenditures as the MVRD appointees are already on staff.

CONCLUSION

Recent changes in staff have resulted in a need to update staff appointments as MVRD Board-designated officers under the *Greater Vancouver Regional District Air Quality Management Bylaw 1082, 2008*, the *Environmental Management Act* and the *Offence Act*. Staff recommend that the MVRD Board adopt Alternative 1.

47344635

To: Finance and Intergovernment Committee

From: Mark Seinen, Senior Planner, Regional Planning and Housing Services

Date: September 29, 2021 Meeting Date: November 10, 2021

Subject: **TransLink Application for Federal Gas Tax Funding for 2023 Depot Infrastructure, Fleet Replacement, and Fleet Design**

RECOMMENDATION

That the MVRD Board approve $358.48 million in funding from the Greater Vancouver Regional Fund for the following transit projects proposed by TransLink in its Application for Federal Gas Tax Funding as attached to the report dated September 29, 2021, titled "TransLink Application for Federal Gas Tax Funding for 2023 Depot Infrastructure, Fleet Replacement, and Fleet Design":

1. Marpole Transit Centre – Implementation
2. 2023 Conventional Bus – Replacement
3. 2023 HandyDART Vehicle Purchase – Replacement
4. 2023 Community Shuttle Purchase – Replacement
5. Next Generation SeaBus Design

EXECUTIVE SUMMARY

TransLink is requesting approval of five projects for Federal Gas Tax funding from the Greater Vancouver Regional Fund totaling $358.48 million. This is TransLink's largest Greater Vancouver Regional Fund (GVRF) funding request to date – about three times the typical request – and would draw 86 percent of available GVRF funds, leaving approximately $57.3 million in reserve. The majority of the $358.48 million would be used to design and construct a new electrified depot, Marpole Transit Centre, that would ultimately house up to 350 battery-electric buses. TransLink also proposes: three replacement projects, comprising 50 CNG buses, 46 HandyDart vehicles and 27 Community Shuttles; and funding for electric SeaBus design. The application is broadly consistent with the MVRD Board's policies on regional growth management, air quality, and climate protection, along with the Board's interest in economic prosperity.

PURPOSE

To present for MVRD Board consideration TransLink's application for funding from the GVRF under Metro Vancouver's Federal Gas Tax Fund Expenditures Policy (*GVRF Policy*) (Reference 1).

BACKGROUND

On September 24, 2021, Metro Vancouver received TransLink's application for GVRF funding (Attachment 1). With this application, TransLink is seeking approval of five projects for Federal Gas Tax Funding from the GVRF for depot infrastructure, transit fleet replacement, and transit fleet design. The MVRD Board has approval authority over requests for GVRF funding, including any scope changes. The Union of British Columbia Municipalities (UBCM) holds the federal gas tax funds and transfers the funds to TransLink upon formal notification by the MVRD Board of its approval of applications per the *GVRF Policy*.

Continuous investment in the expansion and modernization of the transit system is critical to achieving the MVRD Board's regional growth management, environmental, and economic objectives. Since adopting the *GVRF Policy* in May 2016, the MVRD Board has approved approximately $839 million in GVRF funds to TransLink for eligible regional transportation projects. At the end of 2020, there remained $415.8 million in unallocated GVRF funds available.

In June 2021, the Federal Gas Tax Fund was renamed to the Canada Community-Building Fund. This administrative change does not affect the terms of the *GVRF Policy*.

GREATER VANCOUVER REGIONAL FUND POLICY REQUIREMENTS

The *GVRF Policy* sets out the application process, information requirements, and evaluation criteria that are to be used to evaluate and respond to TransLink's request for GVRF funding. TransLink's proposed projects were evaluated under these guidelines, which include requirements for projects to quantify emissions reduction benefits and integrate with *Metro 2040*.

Project eligibility for GVRF funding is determined by the *Administrative Agreement on the Federal Gas Tax Fund in British Columbia* (Reference 2). Public transit is an eligible project category, including expenditures associated with procurement, planning, design, construction, or renovation of capital assets.

THE FUNDING REQUEST

TransLink is seeking approval of GVRF funding for five projects totaling $358.48 million. This is the largest gas tax funding request TransLink has made under the current gas tax agreement; it would require about 86 percent of available GVRF funds, leaving approximately $57.3 million unallocated.

Table 1 shows the amounts requested in previous years, which have ranged from about $120 million to $155 million.

Table 1 – Previous GVRF Funding Requests

FIC Meeting Date	GVRF Funding Request ($ millions)
September 23, 2016	127.18
April 28, 2017	121.28
October 27, 2017	121.15
October 26, 2018	142.10
October 16, 2019	149.10
January 20, 2021	154.13
October 13, 2021	**358.48**

The motivation for TransLink's large funding request is the Marpole Transit Centre, a significant infrastructure project that will provide ultimate capacity for up to 350 battery-electric buses. This is

a substantial investment in transit infrastructure that will, as documented in Table 2 and TransLink's application materials (Attachment 1), have long-term region wide greenhouse gas reduction benefits.

Proposed Projects

The project descriptions, including costs and GVRF funding requests, are set out in Table 2. One project is for design and construction of new Marpole Transit Centre to support the eventual deployment of up to 350 battery-electric buses. Three projects involve replacement of existing transit fleet (Projects 2, 3 and 4). The fifth project is for electric SeaBus design. The projects are identified in TransLink's *2018-2027 Investment Plan* and its *Low Carbon Fleet Strategy*.

Table 2 – Project Descriptions

Project	Scope	Units	($ millions)	
			Cost	GVRF Funding Request
1. Marpole Transit Centre	Facility design and construction	1	308.17	298.10
2. 2023 HandyDART Vehicle Purchase – Replacement	HandyDART vehicles	46	6.96	6.77
3. 2023 Community Shuttle Vehicle Purchase – Replacement	Community Shuttle vehicles	27	6.90	6.66
4. 2023 Conventional Bus – Replacement	CNG buses	50	46.05	44.44
5. Next Generation SeaBus Design	Vehicle design	1	2.65	2.51
Total			**370.73**	**358.48**

Project Locations

The projects are to be deployed in the following locations:

- Upgrades to Marpole Transit Centre in south Vancouver will improve transit services operating out of that depot and contribute to reduced greenhouse gases region-wide;
- CNG bus replacements will operate out the Port Coquitlam and Hamilton Transit Centres, which together serve multiple subregions;
- Replacement HandyDART and Community Shuttle vehicles will be deployed throughout the region; and
- The Next Generation SeaBus will serve the existing route between Vancouver and Lower Lonsdale in the City of North Vancouver.

Project Timelines

TransLink's applications for GVRF funding are typically made about two years in advance of initiation of the project or service. The current application includes projects with service initialization / project initiation in 2023.

METRO VANCOUVER ANALYSIS

A summary of analysis based on the prescribed evaluation criteria contained in the *Federal Gas Tax Fund – Greater Vancouver Regional Fund Application Guide* is presented below.

Screening Criteria - TransLink's application is complete and meets the screening criteria for eligibility, consistency with regional plans and alignment with TransLink's corporate policies. The projects represent a significant contribution towards the transit service expansion, state of good repair and electrification commitments set out in the *2018-2027 Investment Plan* and the *Low Carbon Fleet Strategy.*

Integrated Criteria - The projects score "good" or better on integrated criteria relating to Regional Growth Strategy, Transportation Performance, Regional Environmental Objectives and Economic Development.

Assessment of Evaluation Criteria - Table 3 assesses the five projects in TransLink's application as a whole. Individual projects might score higher or lower if they were assessed separately. For example, Project 1 will significantly reduce greenhouse gases by upgrading depot infrastructure to house the battery-electric bus fleet, while Projects 2 and 3 will have negligible emissions benefits since they are like-for-like replacements of existing gasoline-powered vehicles. Overall Regional Environmental Objectives criteria have been assessed as "good."

Table 3 – Assessment of Evaluation Criteria

Criterion	Description	MV Assessment
Screening Criteria		
Eligible Project Category	Local roads and bridges, including active transportation, OR public transit, as set out in the 2014 Administrative Agreement, Schedule B.	**Meets criterion -** All projects are public transit infrastructure (Eligible Project Category 7).
Eligible Expenses	As set out in the 2014 Administrative Agreement, Schedule C.	**Meets criterion -** All scope items, including design work, qualify as Eligible Expenditures.
Plan Consistency	Projects must be consistent with TransLink's Capital Plan, *10-Year Investment Plan, the Regional Growth Strategy, and the Regional Transportation Strategy.*	**Meets criterion -** The projects are identified in TransLink's 2018-2027 Investment Plan and Low Carbon Fleet Strategy and are consistent with long-range regional plans.
Corporate Policies	Projects must be consistent with applicable TransLink policies such as sustainability, environmental responsibility, emissions, and infrastructure.	**Meets criterion -** The projects are broadly consistent with TransLink policies such as reaching a carbon neutral transit fleet by 2050.
Integrated Criteria: Regional Growth Strategy		
Supports the Regional Growth Strategy	The degree to which the project assists in achieving the goals in the *Regional Growth Strategy* and directions set out in the *Metro Vancouver Board Strategic Plan.*	**Good -** The projects will support a compact urban form and benefit growing neighbourhoods and subregions.

Urban Centres and Frequent Transit Development Areas	Where applicable, the project is located in, or demonstrates tangible benefits to, the overall performance of Urban Centres and Frequent Transit Development Areas.	**Excellent -** The SeaBus project is a move toward improved connectivity between Lonsdale Regional City Centre and Vancouver Metro Core. The conventional bus, HandyDart and Community Shuttle replacement projects benefit the entire region, often serving as feeder routes into Urban Centres. The Marpole Transit Centre project will improve transit system capacity around the Canada Line, with greenhouse gas reduction benefits for the entire region.
Integrated Criteria: Transportation Performance		
Headline Targets	Demonstrates tangible beneficial effects on vehicle kilometres travelled and/or walk/ cycle/ transit/ multiple occupancy vehicle mode share.	**Good -** These projects support a state of good repair, which can translate into customer retention. However, none of the projects provide new system capacity that would meaningfully influence modal splits or VKT.
Other Transportation Outcomes	Demonstrates tangible beneficial effects on vehicle congestion, transit passenger congestion, transit ridership, transportation safety, and/or goods movement for the duration of the project.	**Good -** These projects improve passenger experience and increase service reliability, which support transit ridership and safety.
Project Type	Demonstrated value of the project type.	**Excellent -** Upgrading assets at the end of their service life is an essential investment in safety and system cost-effectiveness.
Integrated Criteria: Regional Environmental Objectives		
Supports the Climate 2050 Strategic Framework and Integrated Air Quality and Greenhouse Gas Management Plan	Contributes to the achievement of regional climate action and air quality goals, including directions set out in the *Metro Vancouver Board Strategic Plan*, the *Regional Growth* Strategy, *Climate 2050,* and the *Integrated Air Quality and Greenhouse Gas Management Plan.*	**Good -** The Marpole Transit Centre will advance regional air quality and emissions reduction objectives by providing depot capacity for a battery-electric bus fleet of up to 350 vehicles. The electric SeaBus design will eventually reduce CO2 emissions by an estimated 1,130 tonnes per year and reduce diesel fuel use by 430,000 litres per year. However, the HandyDart and Community Shuttle projects will be like-for-like replacements of existing gasoline-powered vehicles, and the performance of the CNG bus replacements will largely depend on whether renewable natural gas (RNG) is used.
Quantifiable Emissions Impacts	Achieves quantifiable beneficial impacts on greenhouse gas and common air contaminant emissions relative to baseline transit vehicles, and lowers the emissions profile of the transit fleet.	**Good -** Estimated emissions reductions are provided for the Marpole Transit Centre and future electric bus deployment and for the SeaBus replacement, demonstrating the impact of these proposed projects in quantitative terms. However, no emissions impact is estimated for the HandyDart and Community Shuttle projects, suggesting that

		there are no quantified emissions impact from these proposed replacements. While newer vehicle models in a like-for-like replacement may result in modest emissions reductions relative to older vehicles, this impact is not quantified. The emissions impact from the like-for-like CNG bus replacement will depend on the fuel type used.
Integrated Criteria: Economic Development		
Supports Regional Prosperity	Contributes to a regional transportation system that moves people and goods and aligns with regional prosperity.	**Good -** The projects modernize the transit system to encourage mode shift and enhance safety.

Summary of the Evaluation

The proposed projects meet all of the Screening Criteria, and score mixed results on the Integrated Criteria.

- *Regional Growth Strategy* - Since the projects are primarily replacement, rather than expansion, they make only minor contributions to the regional growth objectives of *Metro 2040.*
- *Transportation Performance* - While the projects support a state of good repair, service reliability and safety, they do not expand service, so there will be minimal benefits for congestion, ridership, goods movement, VKT or mode share.
- *Regional Environmental Objectives* - Two of the projects (the new Marpole Transit Centre and Next Generation SeaBus Design) will contribute to significant long-term greenhouse gas reductions. However, the two gasoline replacement projects will have no greenhouse gas benefits. The environmental performance of the CNG bus replacement project will depend on the extent to which renewable forms of natural gas (i.e. RNG rather than CNG) are used.

ALTERNATIVES

1. That the MVRD Board approve $358.48 million in funding from the Greater Vancouver Regional Fund for the following transit projects proposed by TransLink in its Application for Federal Gas Tax Funding as attached to the report dated September 29, 2021, titled "TransLink Application for Federal Gas Tax Funding for 2023 Depot Infrastructure, Fleet Replacement, and Fleet Design":
    1. Marpole Transit Centre – Implementation
    2. 2023 Conventional Bus – Replacement
    3. 2023 HandyDART Vehicle Purchase – Replacement
    4. 2023 Community Shuttle Purchase – Replacement
    5. Next Generation SeaBus Design

2. That the MVRD Board endorse in principle the report dated September 29, 2021, titled "TransLink Application for Federal Gas Tax Funding for 2023 Depot Infrastructure, Fleet Replacement, and Fleet Design" and refer it to the Mayors' Council on Regional Transportation for comment prior to final consideration by the MVRD Board.

FINANCIAL IMPLICATIONS

Each of TransLink's proposed projects includes a risk assessment that identifies potential risk factors and mitigation approaches. For the Marpole Transit Centre project, these risks include potential permitting delays and cost overruns. To address these risks, TransLink has committed to engaging closely with the relevant parties (City of Vancouver, Province of British Columbia, and BC Hydro) on site design and servicing, while building a contingency allowance into the project that is sufficient to absorb price fluctuations.

If the MVRD Board approves alternative one, the UBCM will be notified within seven business days of the Board's decision to approve $358.48 million in GVRF funding for all of the projects in TransLink's application. This alternative would exhaust about 86 percent of available GVRF funds, leaving approximately $57.3 million unallocated.

If the MVRD Board approves alternative two, the Metro Vancouver staff report and recommendations, along with the TransLink application, would be forwarded to the Mayors' council further consideration that would offer greater GHG reduction benefits to the region, or such other evaluation criteria as requested by the Board, to final consideration by the Board.

CONCLUSION

TransLink is requesting approval of five projects for Federal Gas Tax funding from the GVRF, totaling $358.48 million. TransLink proposes a significant new transit facility, Marpole Transit Centre; three replacement projects, comprising 50 CNG buses, 46 HandyDart vehicles and 27 Community Shuttles; and funding for electric SeaBus design. Staff recommend that the MVRD Board approve the requested gas tax funding, as the application is consistent with the prescribed evaluation criteria contained in the *Federal Gas Tax Fund – Greater Vancouver Regional Fund Application Guide*, and generally consistent with the MVRD Board's policies on regional growth management, air quality, and climate protection as well as the Board's interest in economic prosperity.

Attachment

1. TransLink, *Application for Federal Gas Tax Funding*, dated September 24, 2021 *(Doc# 48037724)*

References

1. Federal Gas Tax Fund Expenditures Policy (*GVRF Policy)*
2. Administrative Agreement on the Federal Gas Tax Fund in British Columbia

47413025

ATTACHMENT

To: Jerry Dobrovolny, Chief Administrative Officer, Metro Vancouver

From: Christine Dacre, Chief Financial Officer, TransLink
Geoff Cross, Vice President, Transportation Planning and Policy, TransLink

Date: September 24, 2021

Subject: 2022 Application for Federal Gas Tax Funding from the Greater Vancouver Regional Fund

PURPOSE

TransLink is requesting the Metro Vancouver Regional District (Metro Vancouver) approve $358.48 million in Federal Gas Tax Funds (FGTF) from Greater Vancouver Regional Fund (GVRF). The largest project funded in the 2022 application, the Marpole Transit Centre, will support the expansion of bus service levels within Metro Vancouver, in accordance with Mayors' Council Vision and the 10-year Investment Plan, and the electrification of the bus fleet. The Mayors' Council has directed TransLink to electrify its bus fleet; in support of the electrification of the fleet, Marpole Transit Centre will be built as 100% electric ready. This facility will be designed for the operation and maintenance of 350 40' Equivalent Battery Electric Buses and to service a diesel fleet at opening.

In addition, this application includes funding requests for replacement of 50 CNG Conventional Buses, 46 HandyDART vehicles, 27 community shuttles and a Next Generation SeaBus design project. These replacement vehicles are critical to ensuring the transit fleet remains in a state of good repair and the reliability of the transit system is maintained.

The funding requests for projects detailed in this application are consistent with the 2018 Investment Plan (2018 Plan), approved by the TransLink Board and Mayors' Council in June 2018. These projects have also received endorsement in September 2021 from the Board and Mayors council to be funded by the GVRF and to be included in the 2022 Investment plan currently under development. Furthermore, the Marpole Transit Centre project included in this application is essential to TransLink's Low Carbon Fleet Strategy (LCFS) and two significant Board approved sustainability targets: to reduce GHG emissions by 80 per cent by 2050, and to utilize 100 per cent renewable energy in all operations by 2050.

Both the 2018 Investment Plan (2018 Plan) and the Low Carbon Fleet Strategy were approved by the TransLink Board and endorsed by the Mayors' Council. The 2018 Plan and LCFS advance the goals identified in TransLink's Regional Transportation Strategy, Metro Vancouver's Regional Growth Strategy and Metro Vancouver's new Climate 2050 goals.

This application is the administrative process to access the funding outlined per the Administrative Agreement on Federal Gas Tax Fund in British Columbia approved in 2014.

This request will support the region's environmental policies, specifically:

- Metro Vancouver's *Integrated Air Quality and Greenhouse Gas Management Plan* (*IAQGGMP*) strategies:
    - Strategy 1.4 – Reduce air contaminant emissions from cars, trucks, and buses; and
    - Strategy 3.3 – Reduce the carbon footprint of the region's transportation system.
    - Ensuring infrastructure, ecosystems, and communities are resilient to the impacts of climate change.

- *Metro Vancouver 2040: Shaping Our Future* (*Metro 2040*) actions to encourage transportation infrastructure that reduce energy consumption and greenhouse gas emissions and improve air quality:
    - Action 3.3.6 – That TransLink pursue reductions of common air contaminants and greenhouse gas emissions from on-road transportation sources in support of regional air quality objectives and greenhouse gas reduction targets; and
    - Action 3.3.7 – That TransLink manage its transit fleet and operations with the goal of increasing fuel efficiency and reducing common air contaminants and greenhouse gas emissions over time, in support of the Regional Growth Strategy and Air Quality Management Plan.

- *Metro Vancouver's Climate 2050 goals* to ensure our infrastructure, ecosystems, and communities are resilient to the impacts of climate change, and pursue a carbon neutral region by 2050.

BACKGROUND

Since the GVRF program began in 2005, TransLink has received $1,457.7 million in funding to expand and modernise the transit network. Interest earned on funds received, which must be used for approved GVRF projects, totalled $57.7 million at December 31, 2020. Currently, there is $470.4 million in funds available to TransLink. Metro Vancouver Regional District and its member municipalities have specified that their portion of GVRF funding go to public transportation, with a small amount going to the Community Works Fund. A summary of the funds and usage is provided below:

Greater Vancouver Regional Fund
(as of December 31, 2020)
In millions

Approved GVRF Funds	1,457.721
Interest earned on funds received	57.723
Unapproved GVRF Funds[1]	415.781
Total Gas Tax Funds	**1,931.225**
Less	
Funds applied to completed projects	(542.311)
Funds applied to active and approved in principle projects[2]	(904.067)
Interest allocated to completed projects	(14.488)
Funds Available for use	**470.359**
Proposed project Funding[3]	**(358.477)**
Funds Remaining[4]	**111.883**

As required in this application process, Appendix A includes a summary of TransLink's strategic plan, the 2018 Investment Plan, including the projects funded or anticipated to be funded by the GVRF as well as other funding anticipated in the 2018 Plan. Additionally, Appendix B provides a short description of the categories listed in the 2018 Investment Plan (Appendix A). A revised GVRF utilization plan will be published in the 2022 Investment plan.

[1] On January 29, 2021, TransLink's 2021 application for $154M of GVRF funding was approved by the Metro Vancouver Board of Directors.
[2] See table 1a for Active projects and 1b for Approved in Principal projects that have previously received GVRF funding up to December 31, 2020.
[3] See table 2 for Projects requesting GVRF funding in this application.
[4] GVRF program is expected to receive a top-up of $140M in 2021 in addition to the regular allocation.

Active Projects

Table 1a below shows the status of active projects with GVRF funding. The total forecasted project cost for active projects is $888.017 million, with $808.103 million in GVRF funds approved for these projects. At December 31, 2020, project costs incurred totalled $698.068 million, with $596.385 million in GVRF funds spent.

Table 1a: Active Projects

Active Projects with GVRF Funding	# of Vehicles	Forecast Final Cost	Approved Funding	Costs to Date	Funds Spent	Unspent Funds
Hamilton Transit Centre	N/A	135.057	84.978	135.057	84.978	-
2nd SeaBus Replacement	1	21.183	19.697	20.124	19.285	0.412
SkyTrain Mark I Vehicle Refurbishment	N/A	26.121	24.360	26.121	14.501	9.859
2014 Conventional Bus	45	25.035	24.391	25.035	24.391	-
2014 HandyDART Vehicle	65	7.594	7.523	7.594	7.523	-
Surrey Transit Centre - CNG Facility Retrofit	N/A	15.797	4.000	15.797	4.000	-
Metrotown - Trolley Overhead Rectifier Replacement	N/A	4.379	4.725	4.379	4.233	0.492
Automated Train Control Equipment Replacement	N/A	4.834	4.500	4.834	4.500	-
2016 Conventional 40' Bus Replacement	85	18.973	19.090	18.573	18.046	1.044

2016 Community Shuttle Vehicle Replacement	20	3.112	3.560	3.112	3.075	0.485
2017 Conventional Bus Replacement	106	110.810	105.985	110.565	104.349	1.636
2017 HandyDART Vehicle Replacement	35	4.313	5.013	4.307	4.208	0.805
2018 Conventional Bus Replacement	92	65.531	61.925	65.046	61.925	-
2018 40' Conventional Bus Purchases - Expansion	94	91.550	85.584	91.550	85.584	-
2018 60' Conventional Bus Purchases - Expansion	11	15.590	17.316	15.590	15.404	1.912
Electric Battery Bus Purchases - Pilot	4	9.435	6.892	8.681	6.892	-
2018 HandyDART Vehicle Replacement	40	5.128	5.605	5.123	5.048	0.557
2018 HandyDART Vehicle Purchases - Expansion	13	1.802	2.193	1.802	1.778	0.415
2018 Community Shuttle Vehicle Replacement	20	3.722	3.830	3.722	3.620	0.210

2018 Community Shuttle Vehicle Purchases - Expansion	12	2.101	3.175	2.101	2.057	1.118
2019 Double Decker Bus Purchase – Replacement	27	35.226	30.000	33.181	30.000	-
2019 Conventional Bus Expansion - double decker	5	6.083	5.670	6.062	5.846	(0.176)
2019 Conventional Bus Expansion - 60' hybrid	47	68.759	68.130	68.529	66.085	2.045
2019 HandyDART Vehicle Purchase – Replacement	40	5.372	5.200	5.372	5.200	-
2019 HandyDART Vehicle Purchase – Expansion	10	1.419	1.350	1.419	1.350	-
2019 Community Shuttle Purchase – Replacement	49	10.891	10.800	10.891	9.537	1.263
2020 Conventional - Replacement	25	32.367	31.590	3.377	2.956	28.634
2020 Conventional - Expansion	61	100.836	97.784	0.126	0.016	97.768
2020 HandyDart - Replacement	42	6.300	6.130	-	-	6.130
2020 HandyDart - Expansion	10	1.600	1.559	-	-	1.559

2020 Community Shuttle - Expansion	9	2.100	2.391	-	-	-
2021 Conventional 60-ft and 40-ft Bus Purchase – Expansion	78	16.440	15.856	-	-	-
2021 HandyDART Vehicle Purchase – Replacement	42	6.498	6.380	-	-	-
2021 Community Shuttle Vehicle Purchase – Replacement	62	12.119	13.690	-	-	-
Mark 1 500-800 Refurbishment	N/A	9.943	17.230	-	-	17.230
Total	**1,150**	**888.017**	**808.103**	**698.068**	**596.385**	**173.400**

Approved in Principle Projects

Table 1b below shows the projects with GVRF funding which are approved in principle as at December 31, 2020 for a total of $95.964 million. GVRF funding for these projects was approved by the Board of Directors of Metro Vancouver Regional District on November 1, 2019[5].

Table 1b: Approved in Principle Projects

AIP Projects with GVRF Funding	# of Vehicles	Approved Funding
2021 Conventional 60-ft and 40-ft Bus Purchase – Expansion	78	91.964
2021 HandyDART Vehicle Purchase – Expansion	10	1.560
2021 Community Shuttle Vehicle Purchase – Expansion	9	2.440
Total	**97**	**95.964**

PROPOSED PROJECTS AND FUNDING

This application is requesting $358.480 million for five projects, as shown in Table 2. The projects are consistent with the 2018 Investment Plan and the 10-Year Vision. Detailed project descriptions are included in Appendix C.

Table 2: Summary of Projects, Total Costs, and Gas Tax Funding Request

Projects	Scope	($millions)	
		Total Project Budget	Requested Gas Tax Funding
Marpole Transit Centre - Implementation (Phase 4)	Facility Improvement	308.170	298.100
2023 Community Shuttle Replacements	27 Community shuttle buses	6.900	6.660
2023 Conventional Bus Replacement (50 40' CNG Buses)	50 CNG buses	46.050	44.440
2023 HandyDART Vehicle Replacement	46 HandyDART vehicles	6.960	6.770
Next Generation SeaBus Design	Design	2.650	2.510
Total	**124 vehicles**	**370.730**	**358.480**

[5] On January 29, 2021 an additional 8 projects were approved for GVRF funding totalling $154.13M.

Fleet Propulsion Selection

All vehicle projects are evaluated based on vehicle purchase cost, fuel and maintenance cost, life-cycle cost, emissions of GHG, NOx, Hydrocarbon and particulate matter (PM), and aspects of vehicle performance and customer and driver environment such as noise and ride quality. Route characteristics such as topography and average route speed (based on bus stop spacing and traffic conditions) can affect the performance of different technologies. Fuel infrastructure and depot space are considerations in fleet deployment. TransLink considers all these factors in identifying the most advantageous propulsion technology for different vehicle projects, consistent with financial and environmental goals and policies. Based upon the most current information and policy direction, diesel propulsion is no longer a preferred option for any of our operations compared to CNG, hybrid-electric or full zero emission battery-electric, except for highway routes except for highway routes and where alternative propulsion is not available. Diesel propulsion is still the preferred option for highway routes as CNG or diesel-hybrid would have higher capital cost but marginal emissions reduction due to higher operating speeds.

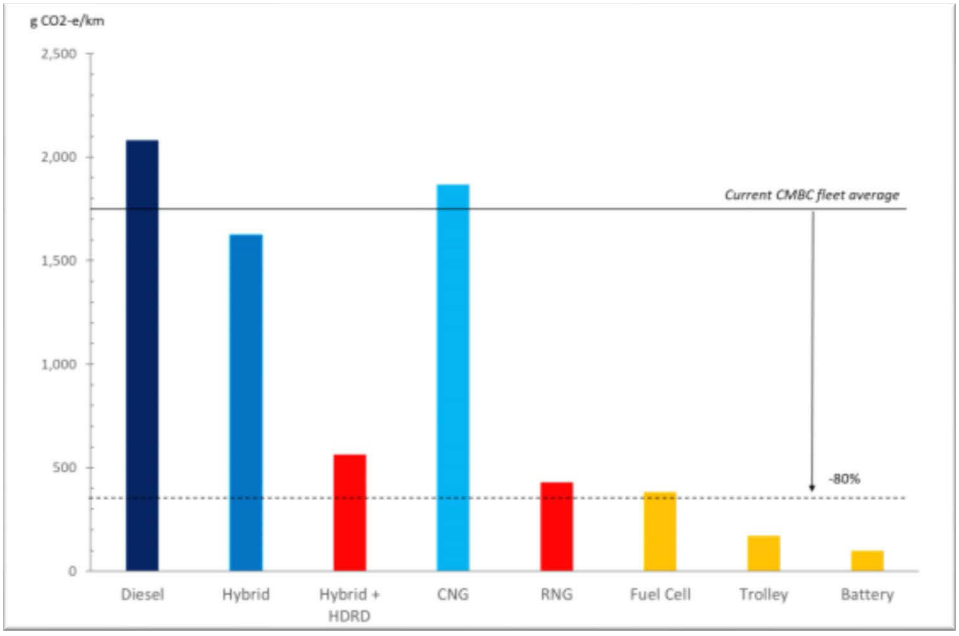
Fleet procurement projects are brought to an internal steering committee to ensure alignment with the Investment Plan and Regional Transportation Strategy, consider operational aspects to fleet deployment, prioritize projects, and submit business cases and project financials. Projects are then reviewed by TransLink's Senior Executive team to ensure that the business cases and financials are sound, and to evaluate the projects against TransLink's affordability criteria. The final list of recommended capital projects is submitted to the Board of Directors for approval within the Annual Capital Budget.

Selection of propulsion technology for vehicle replacement projects in this application also considers the following:

- Hybrid and battery-electric propulsion for HandyDART and Community Shuttle vehicles are not currently market ready or suitable for the service needs. TransLink's team consistently performs market scans for these options and will recommend these when deemed viable. These vehicles are built on the back of Van chassis and a battery electric option is not current available in the market. There are other buses that are smaller versions of a 40" standard bus available as battery electric but they are orders of magnitude more expensive (360% more expensive) and have a very small service window before requiring recharging.

- Replacing the diesel direct drive Burrard Beaver SeaBus with Next Generation battery-electric propulsion SeaBus vessel will result in zero tailpipe greenhouse gas and criteria air contaminant emissions. This project is estimated to reduce CO2 emissions from SeaBus operations by 1,130 tonnes CO2 / year while reducing diesel fuel used by 430,000 liters per year.

Figure 1: Emission profiles of various propulsion types



Project Summaries

Marpole Transit Centre – Implementation (Phase 4): This project will design, procure and install the charging infrastructure required to operate and maintain 350 40' on-route charged battery-electric buses and to service a diesel fleet at opening.

2023 Community Shuttle Purchase - Replacement: This project will procure twenty-seven (27) community shuttles to replace vehicles that have reached the end of useful life and to modernize the vehicle fleet.

2023 Conventional Bus Replacement: This project will procure fifty (50) 40' CNG buses to replace vehicles that have reached the end of useful life and to modernize the vehicle fleet.

2023 HandyDART Vehicle Purchase Replacement: This project procures forty-six (46) HandyDART vehicles to retire vehicles that have reached the end of useful life. These new vehicles will support maintaining transit system reliability for HandyDART trips.

Next Generation SeaBus Design: This project will cover the design phase that will ultimately allow us to replace the Burrard Beaver Seabus with a New Generation battery-electric Seabus vessel.

Deployment of Proposed Projects
Replacement vehicles will service areas as set out in Table 3 below.

Table 3: Deployment of Proposed Replacement Vehicle Projects

Project Type	# of Replacement Vehicles for 2022/23 (Current Application)	Service Areas for 2022/23 Vehicles
Community Shuttle Purchase – Replacement	27	Region-wide
Conventional CNG Bus Purchase - Replacement	50	NE Sector*
HandyDART Vehicle Purchase – Replacement	46	Region-wide

*CNG buses are limited to garages that have CNG fuelling capability: Hamilton, Poco and Surrey

BENEFITS

Improving Accessibility
The continued transition of stepless low-floor community shuttles across the system will improve accessibility with a front door deployable ramp and kneeling feature that is presently not available with existing high-floor shuttle vehicles. This will support *Goal 2 – Support a sustainable Economy* and *Goal 4 – Develop Complete Communities* of *Metro 2040*, by enabling people of all abilities to access transportation to get to and from work as well as access to range of services and amenities.

Emissions Reduction

Table 4: Emissions Reductions from Vehicles Relative to Baseline Diesel Projects

Projects	Propulsion	GHG Approx. Impact	NOx Approx. Impact	PM Approx. Impact
2023 Community Shuttle Vehicle Purchase – Replacement	Gasoline	No material change as gasoline to gasoline No viable zero emission vehicles on the market	No change as gasoline to gasoline	No change as gasoline to gasoline
2023 Conventional Bus – Replacement (40' CNG)	CNG	No change as CNG to CNG	No change as CNG to CNG	No change as CNG to CNG
2023 HandyDART Vehicle Purchase – Replacement[1]	Gasoline	Estimated to be approx. 20% lower due to new engines and chassis in the newer vehicles No zero emission vehicles on the market	No change as gasoline to gasoline	No change as gasoline to gasoline
2023 –Next Generation SeaBus	Battery-Electric	1,130 Tonnes/yr reduction (100 per cent)[6]	Zero Emissions	Zero Emissions

[6] These benefits will be realized only if the Next Gen SeaBus is procured and put in service.

RISKS

This request for GVRF funding will allow TransLink to begin the construction phase of the Marpole Transit centre and begin the procurement process for vehicle projects by early 2022 to ensure deliveries in 2022 to 2024 timeframe.

If funding is not received in time:

- TransLink will have to delay construction of the Marpole Transit Centre and delay advancement of TransLink's LCFS and meeting TransLink's GHG reduction goals;

- TransLink will have to continue to rely on deferred retirement vehicles. Continued use of deferred retirement vehicles pose a risk to reliability, as well as further cost in terms of continued maintenance and additional equipment costs to keep them in service. Furthermore, this would result in higher greenhouse gas (GHG) and criteria air contaminant (CAC) emissions than new vehicles. TransLink may lose credibility among the general public if service is not reliable.

- People of limited abilities will continue to have challenges accessing the transportation network due to Community Shuttles not having stepless low floor access.

CONCLUSION

TransLink relies on the FGTF, made available through the GVRF, to be able to construct key infrastructure and modernize our vehicles that have reached the end of their useful life and are ready for replacement. Further, the approval of the requested application will allow for the advancement of TransLink's Low Carbon Fleet Strategy by supporting the construction of our flagstone Electric Transit Centre. As well as support procurement of the vehicles necessary to ensure TransLink's revenue vehicle fleets are in a state of good repair, avoiding increased maintenance costs and protecting the reliability of the transit system. The application supports Metro Vancouver's *Metro 2040* in supporting urban centres and frequent transit development areas and encouraging transportation choices. Finally, reduction of GHG and CAC emission supports the environmental goals of Metro Vancouver's *IAQGGMP* and *Metro 2040, Climate 2050 goals,* and TransLink's Low Carbon Fleet Strategy.

Appendix A

TransLink 2018-2027 Investment Plan Capital Program and Funding Sources

	Project Budget	Project Expenditure prior to 2017	2017 Project Expenditure	Final Forecast Cost	Forecast Cost to Complete	Other Funding	Approved GVRF Funding	Requested GVRF Funding	Planned future GVRF Funding	Total GVRF Funding
Bus										
Equipment	**20,698**	**732**	**998**	**36,084**	**34,354**	**(9,122)**	**-**		**-**	**-**
Facilities	**23,365**	**246**	**8,801**	**93,479**	**84,432**	**(16,313)**	**-**		**-**	**-**
Infrastructure										
Depots	256,435	8,238	16,414	257,834	233,182	(77,091)	(4,000)		-	(4,000)
Exchanges	69,703	771	20,416	120,495	99,309	(46,657)	-		-	-
Other	75,406	3,646	15,777	112,405	92,983	(22,588)	-		-	-
Trolley Overhead	20,676	918	4,353	103,083	97,812	(10,439)	(4,725)		(0)	(4,725)
Technology	**7,216**	**311**	**1,918**	**9,547**	**7,318**	**-**	**-**		**-**	**-**
Vehicle Non-Revenue	**488,890**	**(14)**	**1,884**	**21,642**	**19,773**	**-**	**-**		**-**	**-**
Vehicle - Revenue										
Conventional Buses	513,420	59,777	21,437	1,960,466	1,879,252	-	(530,413)	(132,584)	(1,173,084)	(1,836,081)
Community Shuttles	27,106	1,105	12,627	129,410	115,678	-	(35,714)	(2,000)	(84,279)	(121,993)
Handy Darts	34,323	285	163	109,735	109,287	-	(17,168)	(7,528)	(64,340)	(89,037)
Sea Bus	37,356	1,486	13,051	35,927	21,390	(17,001)	(19,697)		-	(19,697)
Corporate										
Equipment	**1,511**	**379**	**1,121**	**1,725**	**225**	**-**	**-**		**-**	**-**
Facilities	**17,620**	**2,235**	**33**	**8,220**	**5,952**	**-**	**-**		**-**	**-**
Infrastructure										
Bridges	27,310	1,362	3,738	27,546	22,446	-	-		-	-
Depots	1,201	18	844	862	-	-	-		-	-
Other	4,352	660	1,621	17,141	14,861	(3,241)	-		-	-
Major Construction	**23,754**	**(1,373)**	**20,874**	**19,501**	**-**	**-**	**-**		**-**	**-**
Technology	**54,204**	**3,985**	**25,220**	**230,621**	**201,416**	**-**	**-**		**-**	**-**
Vehicle Non-Revenue	**9,988**	**-**	**1,238**	**5,811**	**4,573**	**-**	**-**		**-**	**-**
Rail										
Equipment	**84,883**	**6,121**	**20,586**	**155,799**	**129,091**	**(35,975)**	**(4,500)**		**0**	**(4,500)**
Facilities	**666,465**	**1,444**	**2,623**	**593,455**	**589,388**	**(600,518)**	**-**		**-**	**-**
Infrastructure										
Other	4,696,180	8,473	57,387	4,832,043	4,766,183	(3,548,008)	-		-	-
Stations	416,437	63,998	72,265	422,658	286,395	(128,683)	-		-	-
Wayside	18,470	888	10,996	46,646	34,761	(7,128)	-		-	-
Technology	**48,869**	**2,412**	**3,246**	**52,743**	**47,084**	**(0)**	**-**		**-**	**-**
Vehicle Non-Revenue	**718**	**5**	**669**	**3,096**	**2,421**	**-**	**-**		**-**	**-**
Vehicle - Revenue										
Canada Line	88,000	-	44,000	88,000	44,000	(79,853)	-		-	-
Sky Train	1,064,925	54,428	43,907	1,230,239	1,131,904	(939,213)	(24,360)		(40,055)	(64,415)
West Coast Express	21,000	-	-	23,235	23,235	(20,750)	-		-	-
Roads and Bridges										
Infrastructure										
Bike	13,410	47	2,504	35,382	32,831	-	-		-	-
Bridges	37,192	14,373	6,477	56,350	35,501	(150,000)	-		-	-
Road Network										
Infrastructure										
Bicycle Infrastructure	58,722	155	33	93,396	93,208	-	-		-	-
Major Road Network	255,895	140	1,419	165,611	164,053	-	-		-	-
MRNB Pavement rehab and BICCS	53,013	-	31,936	293,505	261,569	-	-		-	-
Transit Priority Implementation Program	10,062	-	-	486	486	-	-		-	-
Grand Total	**9,248,774**	**237,252**	**470,576**	**11,394,180**	**10,686,353**	**(5,712,579)**	**(640,579)**	**(142,112)**	**(1,361,759)**	**(2,144,449)**

Note: The above summary has been updated since the release of TransLink's Phase Two Investment Plan for the following:

- Some Projects categorized as "Corporate" were reclassified as "Rail" to better align with those projects' scope

Appendix B

Descriptions of items in the Capital Program

TransLink 2018-2027 Investment Plan Project Summary	Project Descriptions
Bus	
Equipment	A wide variety of equipment required to maintain and manage TransLink's systems related to the bus network. Examples include communication on system and camera equipment replacement and SeaBus terminal elevator/escalator replacement.
Facilities	Includes improvement projects such as garage roof replacements, hoist replacements, SeaBus Maintenance Dock Expansion; and other projects related to mechanical and civil retrofits to facilities. Also includes PowerSmart upgrades partially funded by BC Hydro.
Infrastructure	
Depots	Includes the new bus depot expansion and improvement to existing depot such as the Hamilton Transit Centre.
Exchanges/Bus loops	Various repairs, replacements and upgrades to keep the exchanges/bus loops in a state of good repair. For example, replacement of lighting and security equipment, shelters and crew washroom facilities. Also includes projects related to priority B-Line corridors.
Other	Includes general projects related to bus infrastructure such as maintenance and rehabilitation of SeaBus Infrastructure and other facilities and paving replacement.
Trolley Overhead (TOH)	Includes projects related to maintenance of infrastructure related to the trolley buses such as cables, poles and rectifier buildings and equipment.
Technology	Includes replacement of the Bus Daily Operations Management System as well as other projects related to software modernization and replacement.
Non-Revenue Vehicles	Includes modernization of non-revenue generating vehicles used by Transit supervisors, security and maintenance staff.
Revenue Vehicles	
Conventional Buses	Fleet expansion and modernization of conventional buses to support maintenance of the transit system and realize benefits such as reduced congestion and emissions.
Community Shuttle	Fleet expansion and modernization of community shuttle vehicles to support maintenance of the transit system and realize benefits such as reduced congestion and emissions.
HandyDART	Fleet expansion and modernization of HandyDART vehicles to support maintenance of the transit system and provide mobility to those with accessibility issues.
SeaBus	Procurement of one additional SeaBus vessel, retrofit of an older SeaBus vessel and projects related to ensuring TransLink continues to meet Transport Canada safety standards and also to reduce maintenance and repair costs associated with ageing assets.

TransLink 2018-2027 Investment Plan Project Summary	Project Descriptions
Corporate	
Equipment	A wide variety of equipment such as Ad Panels and radios for Transit Police.
Facilities	Includes renovation and upgrades to offices and related facilities.
Infrastructure	
Bridges	Includes Pattullo Bridge Rehabilitation Construction
Depots	Infrastructure being built at the UBC Bus Terminal
Other	Includes various general projects related to corporate infrastructure such as efficiency improvement and compliance.
Technology	Includes projects related to upgrades of various IT applications and systems, security programs, data warehousing etc.
Vehicles Non-Revenue	Includes projects related to non-revenue generating vehicles such as TransLink Police cars and administration vehicles.
Rail	
Equipment	A wide variety of equipment required to maintain and manage the SkyTrain lines. Examples include power supply installations, automatic train control equipment, station equipment, passenger address systems etc.
Facilities	Includes projects related to maintaining and upgrading facilities such as the operations maintenance and control centre. Examples include space modernization, safety upgrades, yard track reconditioning, seismic upgrades and land improvement cost for the Expo and Millennium Upgrade Program.
Infrastructure	
Other	Includes other rail infrastructure projects related to station escalator replacements, upgrades of guideway and running rail infrastructure, seismic upgrades, and various projects related to the Millennium Line Broadway Extension and Surrey - Langley Light Rail Train.
Stations	Includes projects related to upgrading SkyTrain stations consisting of station upgrades such as the Burrard, Surrey Central and Joyce Collingwood stations as well as minor equipment upgrades such as roof replacements to ensure assets are maintained in a state of good repair.
Wayside	Includes projects related to the propulsion power system for SkyTrain.
Technology	Includes projects related to the upgrade of various software and systems related to the smooth running of the train system.
Non-Revenue Vehicles	Includes projects related to non-revenue generating vehicles used by SkyTrain staff to respond to emergency and routine maintenance.
Revenue Vehicles	
Canada Line	Includes projects related to fleet expansion of the Canada Line cars.
SkyTrain	Includes acquisition of additional SkyTrain cars for Expo and Millennium Line fleet expansion, the refurbishment, mid-life overhaul or replacement of older SkyTrain cars.
WCE	Includes fleet expansion of the West Coast Express cars and refurbishment of 6 locomotives.

TransLink 2018-2027 Investment Plan Project Summary	Project Descriptions
Roads and Bridges	
Infrastructure	
Bikes	Includes projects related to the TransLink owned bicycle infrastructure.
Bridges	Includes rehabilitation of the Pattullo Bridge, rehabilitation of the Knight Street Bridge as well as other projects related to the Westham Island Bridge.
Roads Network	
Infrastructure	
Bike Infrastructure	Includes TransLink's contribution to bicycle infrastructure programs for municipal owned pathways.
MRN	Consists of TransLink's contributions to municipalities for rehabilitation of the Major Road Network (MRN).
MRNB pavement rehab and Bicycle Infrastructure Capital Cost Sharing Program	Consists of projects in three major categories: 1) TransLink's contribution to the MRN Pavement rehabilitation, 2) Minor capital funding to complete and improve as well as encourage construction of more bicycle routes and remove existing barriers to cyclists, and 3) Funding for bicycle infrastructure improvements across the region

APPLICATION FOR FUNDING FROM THE GREATER VANCOUVER REGIONAL FUND FOR FEDERAL GAS TAX FUNDS

Project 1 Marpole Transit Centre

(Ref#222039)

A. 10-YEAR INVESTMENT PLAN

Please describe how the project fits within, and provides support to, the 10-Year Investment Plan

This project is a key regional transportation investment necessary to stay on the aggressive path outlined in TransLink's Low Carbon Fleet Strategy (LCFS). Transportation accounts for over 35% of all greenhouse gas (GHG) emissions in Metro Vancouver. As one of the region's largest consumers of diesel fuel and operator of a fleet of heavy-duty vehicles, TransLink plays an important role in reducing emissions in our own operations. The Low Carbon Fleet Strategy lays out a path for meeting TransLink's environmental targets.

Marpole Transit Centre (MTC) will develop infrastructure to operate, maintain, and store a fleet of approximately 350 forty-foot equivalent (FFE) battery electric buses (BEB). TransLink requires this infrastructure, to operate, maintain, and store an electrified fleet replacing existing diesel buses. This facility will also free up space at existing depots to help facilitate future electrification and future service expansion.

The facility is identified in the Investment Plan approved on June 28, 2018.

B. PROJECT DESCRIPTION

Please complete the following for each project proposed for expenditure from the GVRF.

1. **Executive Summary (not to exceed two pages)**

Project Overview

Currently, all existing transit centers on the Burrard Peninsula are at, or approaching, capacity:

In October 2013, a Bus Operations and Maintenance Facility Plan was prepared to support long-term planning of operating facilities. This Plan identified the need for a new transit center in Vancouver/Burnaby. Since Transit centers require a long lead time owing to the planning, site remediation and site preparation, TransLink started working on the development of the Marpole site into a new transit center, beginning with pre-design work in 2018.

The Mayors' Council has directed TransLink to electrify its bus fleet which requires building MTC to be 100% electric ready including charging infrastructure, BC Hydro power and infrastructure upgrades and energy management, and other systems.

Project scope includes complete design, early site works and implementation. This facility will be designed for the operation and maintenance of 350 FFE Battery Electric Buses and to service a diesel fleet during the transition to all-electric operation.

Tangible Benefits and Outcomes

MTC will be home to TransLink's expanding battery electric fleet, a key element of TransLink's Low Carbon Fleet Strategy. Implementation of MTC will also support mode-shift away from automobile travel to transit as envisioned in the Mayors' Council, ensuring that TransLink continues the important transition toward a greener and more efficient transit system and contributing towards a carbon neutral region by 2050.

When MTC opens in 2025, approximately 60% of its fleet will be BEB and 40% hybrid-diesel. Between 2025 and 2031, MTC's fleet would transition to 100% of its routes being served by BEBs.

Implementation of MTC has several key benefits:

- Enables service expansion;
- Provides storage and maintenance capacity;
- Reduced bus fleet emissions;
- Mode-shift away from automobile travel to transit which will reduce vehicle congestion and associated GHG emissions; and,
- Increased ridership and reduced transit passenger congestion.

Summary of the fleet transition and GHG reductions achieved is as follows:

	Baseline	**2025**	**2031**
Fleet	100% Hybrid Diesel-Electric (350)	60% Battery-Electric (210) 40% Hybrid Diesel Electric (140)	100% Battery Electric (350)
Diesel Fuel Use	11.1 million litres	4.4 million litres	None
Electricity Use		17.2 GWh	28.5 GWh
GHG Emissions	**30,000 tonnes**	**11,568 tonnes**	**114 tonnes**

Note: Based on 18.9 million km/year for the MTC bus fleet, diesel fuel efficiency of 58.35 liters/100 km (40' buses), 66.26 liters/100 km (60' buses), and energy efficiency of 1.51 kWh/km for BEB.

Without MTC and the proposed charging infrastructure, the BEBs could not be operated and maintained. As shown in the above analysis, MTC would result in **18,400 tonne (rounded) reduction in CO2e per year in 2025** when compared to a baseline scenario. **By 2031, MTC would result in a reduction of 29,886 tonnes CO2e per year** (equivalent to 25% of TransLink's 2020 revenue fleet GHG emissions). Along with the reduction in GHG emissions, there would be a

corresponding reduction in criteria air contaminants (CAC), thereby improving regional air quality and human health.

To assess the potential impact of the increased ridership attributed to MTC routes, TransLink estimated the potential corresponding reduction in vehicle kilometers travelled (VKT). Based on the 2017 TransLink Trip Diary, the average automobile trip length is 7.9 kilometres. Transit typically accounts for 43% of all transit, walking, and cycling mode-share. Assuming that 66% of transit trips are attributed to bus, the Region is targeting an increase of 284,000 bus trips per day by 2045, of which 71,000 (an assumed 25% of the total) would be additional trips generated on routes operated by MTC. Assuming that each trip replaces a single automobile trip, the equivalent vehicle kilometre travelled would be approximately 204.7 million kilometres per year (based on average trip length). Using an average gasoline consumption of 8.9/litres per 100 km, the automobiles would consume 18.2 million litres of gasoline per year and emit 42,000 (rounded) tonnes CO2e per year based on an output of 2.3 kg CO2e per consumed litre of gas. Therefore, by 2045, **GHG emissions reduction associated with anticipated increased ridership and mode-switching would be 42,000 (rounded) tonnes CO2e per year.**

TransLink's Bus Storage and Maintenance Plan was developed to ensure adequate storage and maintenance capacity for all conventional and customer transit fleet required to the meet the region's long-term objectives, plans and policies including service expansion and fleet electrification. The most recent update to this plan, in 2020, includes adjustments to account for the impact of pandemic-induced changes in ridership, revenues and associated peak vehicle requirements. The plan reconfirmed that the Marpole Transit Centre site, in south Vancouver, represents the best opportunity to address these objectives including a more efficient deployment of bus routes and minimizing deadheading costs relative to other alternatives. The project is designed to support a transition to an electric bus fleet which is in alignment with TransLink's low carbon fleet and sustainability goals. It will include infrastructure that will allow the installation of electric charging stations. By undertaking this project, TransLink will support the direct reduction of GHG and CAC due to the transition of its fleet to BEB. In addition, it will have knock-on impact to support increased ridership and corresponding reduction in automobile generated GHGs and CACs as well as the reduction in road congestion.

Project Budget, Expenses, and GVRF Funding Request

The project budget is $308,170,850 with a GVRF request of $298,100,000. Expenses covered by this budget primarily include;

- Marpole Transit Centre construction including: Maintenance garage; Operations and admin building; Parking structure (houses bus and staff parking and charging equipment); Bus wash facility; Wastewater treatment plant; Fuel infrastructure and building; and Farebox building
- Fuel infrastructure and building; and Farebox building

- Charging infrastructure and supporting electrical infrastructure

The funding requested in this application will be applied towards expenses considered eligible per the terms of the Administrative Agreement.

Steps taken by TransLink to identify, evaluate, and prioritize the proposed project for inclusion in the Application.

This project is identified for GVRF funding in the draft 2022 Investment Plan. Expansion Projects supporting the Mayors' Vision are prioritized through the annual capital planning process for inclusion in the Investment Plan and GVRF Applications. TransLink Capital management Committee, the Investment Plan Steering Committee and the Board has endorsed the inclusion of this priority project in the 2022 GVRF Application.

2. Project Name

Marpole Transit Centre

3. Project Need and Location

This project is a key regional transportation investment necessary to stay on the aggressive path outlined in TransLink's Low Carbon Fleet Strategy (LCFS). Transportation accounts for over 35% of all greenhouse gas (GHG) emissions in Metro Vancouver. As one of the region's largest consumers of diesel fuel and operator of a fleet of heavy-duty vehicles, TransLink plays an important role in reducing emissions in our own operations. The Low Carbon Fleet Strategy lays out a path for meeting TransLink's environmental targets.

Marpole Transit Centre (MTC) will develop infrastructure to operate, maintain, and store a fleet of approximately 350 forty-foot equivalent (FFE) battery electric buses (BEB). The facility will provide capacity that would enable to the peak vehicle fleet to grow by 17% from 2057 FFE today to 2407. TransLink requires this infrastructure, to operate, maintain, and store an electrified fleet to replace existing hybrid-diesel buses. This facility will also free up space at existing depots to help facilitate the electrification of existing depots and future service expansion.

The scope of this project is to construct a Transit centre which would be 100% electric ready to support TransLink's original Low Carbon Fleet Strategy plan; will be designed for the operation and maintenance of 350 40' Equivalent Battery Electric Buses; and will service a hybrid-diesel fleet that will be phased out by 2031. By establishing a transit center in South Vancouver, the project would enable the expansion of the bus fleet required to support electrification, while also promoting a more efficient deployment of bus routes and minimizing deadheading costs.

4. Project Eligibility (check one):

☐ **Local Roads and Bridges, including active transportation**
☒ **Public Transit**

5. Project Purpose (check one):

☒ **Expansion:** Expands the carrying capacity of people and/or goods movement.
☐ **State of Good Repair:** Replaces or modernizes assets to keep the regional transportation system in a state of good repair.
☐ **Operational Efficiency/Effectiveness:** Improves the efficiency or effectiveness of the regional transportation system.
☐ **Refurbishment:** Extend the useful life of assets to maximize the utility of the regional investment in the transportation system.
☐ **Other (please specify :_____)**

6. Project Type (check one):

☒ **Growth**
☐ **Upgrade**
☐ **Risk (Resilience)**
☐ **Maintenance**
☐ **Opportunity**

7. Project Staging:

Year(s) of Acquisition or Start of Construction	Year of Completion of Construction	Year of Service Initialization	Year(s) of Renewal	Year(s) of End of Service
2023	**2025**	**2025**	**N/A**	**N/A**

8. Has the project previously received funding through GVRF? Please explain.

No. This is the first application for GVRF funding for this project.

9. Was GVRF funding previously declined for the project? Please explain.

No. This is the first application for GVRF funding for this project.

10. Is the project anticipated to require additional future GVRF funding? If so, please explain.

No. TransLink is planning to complete this project within budget.

11. Project Cost + Funding

11.a Budget & Expenditures

Budget	Expenditures to Date	Forecast to Complete	Final Forecasted Cost	Variance (budget – final forecasted cost)
$308,170,850	**$0**	**$308,170,850**	**$308,170,850**	**$0**

11.b Project Funding

Prior Approved GVRF Funding	Current Year GVRF Funding Request	Other Funding – Specify source and whether confirmed/pending
$0	**$298,100,000**	**N/A**

11.c Project Budget Schedule

Item	2022	2023	2024	2025	2026
GVRF-funded Project Budget		**$84,540,000**	**$136,640,000**	**$76,920,000**	
Total Project Budget		**$87,310,910**	**$141,203,260**	**$79,656,680**	

12. Project Budget Rationale

Describe the types of proposed project expenses to be funded by the Greater Vancouver Regional Fund

a. Explain how the project reflects the intent of the GVRF

This project will provide the parking structure, operations and maintenance buildings, bus wash facilities, fuel infrastructure and charging infrastructure for 350 buses. Replacing diesel buses with battery-electric contributes to lowering the fleet's GHG emissions, NOx and diesel particulate matter which aligns with Metro Vancouver's IAQGGMP, Metro 2040 and Climate 2050 goals and supports GHG emissions targets approved by TransLink's Board and supported by Mayors' Council. Additionally, this project supports to improve overall mobility, affordability and other objectives of the Regional Growth Strategy and 10-Year Plan by investing in much needed public transit infrastructure.

b. In the absence of GVRF funding, can the project proceed with other funding sources? What risks do the other funding sources present to the project?

No. The other source of funding available to TransLink is the Investing in Canada Infrastructure Program (ICIP). However, the ICIP program has been exhausted due to cost escalations and scope expansions of other major projects funded by that program (Surrey Langley SkyTrain Line and Expo Millennium Line Upgrade Project). The federal government announced new funding programs to support Public Transit infrastructure, Permanent Transit Fund and the Zero Emission Transit Fund, however these funding programs will not be accessible by the time this project initiates for it to be eligible. Accordingly, GVRF was deemed the optimal funding source for the Marpole Transit Centre Project.

c. Identify potential risks – corporate and regional – of this project that could result in this project not being completed or being unsuccessful. Describe possible mitigation strategies to address these risks.

Risks	Potential Impact		Mitigations
The City of Vancouver **(CoV)** has expressed its desire to develop a public park adjacent to the Marpole site and has retained consultants to review options to provide space for a City park. The City requirements may hinder the Development Permit approval process.	**Financial:** Cost overruns due to potential redesign of facility at a later stage to address CoV concerns.	**Schedule:** Schedule delays in the permitting process.	Engage with CoV to define concerns and get requirements as early as possible. Discuss and streamline options with design consultants.
TransLink does not own the Water Lots bordering the Fraser River. Without the Water Lots, TransLink has no access to the shoreline. This will impact ability to raise the site or develop a flood protection dike/wall system.	**Financial:** A further 10m setback will apply to current site resulting in challenge to meet functional requirements and less space for transit centre. Cost overruns due to design of flood protection system.	**Schedule:** Schedule delays due to additional work for implementing comprehensive flood protection measures.	TransLink has approached Ministry of Forests, Lands, Natural Resource Operations (FLNRO) and CoV to purchase or lease the Waterfront Lots to develop flood protection system.
The existing BC Hydro infrastructure (sub-station) and site servicing needs to be upgraded to support 100% Electric Fleet. BC Hydro upgrades may not be ready in time for the transit centre.	**Financial:** Cost overruns due to work arounds to meet energy needs in the interim period. BC hydro may require us to pay for a portion of the upgrade costs to service the site.	**Schedule:** Transit centre may not be functional despite completion if energy needs are not met.	Engage closely with BC Hydro and design team to ensure roadblocks are efficiently handled and schedules are aligned.

d. How may the project cost vary as a result of changing external factors, such as interest rates and currency exchange rates?

Project costs may vary due to foreign exchange rate fluctuations (as parts may be procured from the USA) and vendor pricing. Construction cost escalations have also been observed in the recent years due to inflationary pressures on raw material such as lumber, steel and labour. These uncertainties are mitigated with a sufficient contingency allowance to absorb price and foreign exchange rate fluctuations.

e. How may foreseeable changes in investment, regulation, or policies from other orders of government affect the project?

Due to recent increases in senior government funding for public transit projects, many suppliers could experience larger demands to supply the infrastructure required to support the battery-electric vehicles. This may create a backlog with vendors, and if procurement is not initiated soon, could result in delay.

f. How may foreseeable changes in technology affect the project?

Changes in battery-electric bus and charging technology are expected to improve in performance and reduce in cost. The design of the facility will incorporate modular components to facilitate upgrading of electric charging equipment over time. Maintenance activities for battery electric buses are different than those of diesel and CNG buses with less reliance on consumables like filters and greater emphasis on replacing modular component parts. The facility design provides for roof access to battery buses and flexible maintenance spaces.

g. What other corporate or external factors could alter the project need, scope, budget, or timeline for project delivery?

Project site requires specific trades and equipment for execution. Pile rigs need to be sourced and with a lot of construction activity in the market, these could be in short supply. Availability of the pile rigs will be aligned with the project schedule as this could significantly impact the project timelines.

The global COVID-19 pandemic may also affect supply chains needed to purchase and install the required equipment (e.g., if further shutdowns occur). Budget may fluctuate due to parts pricing and/or foreign exchange rates.

h. Describe how the project lowers the emissions profile of the transit fleet, for both greenhouse gas and common air contaminant emissions and advances the fleet towards the region's greenhouse gas emissions reduction targets.

MTC would operate a fleet of approximately 350 FFE battery-electric buses which are projected to use 28.5 GWh of electricity annually, with associated annual GHG emissions of 114 (rounded) tonnes CO_2e or 1.4 kg CO2e/fully loaded passenger kilometer. Absent the purchase of the battery-electric buses, 350 FFE hybrid-electric buses operating over the same routes would be expected to use 11.1 million liters of diesel fuel with associated life cycle GHG emissions of 30,000 (rounded) metric tons CO_2e or 369.72 kg CO2e / fully loaded passenger kilometer. This project is estimated to enable reducing net GHG emissions from CMBC bus operations by 29,886 tonnes of CO_2e per year. This is equivalent to approximately 25% of TransLink's 2020 revenue fleet GHG emissions. This is a significant step in TransLink reaching its target of 80% reduction in GHG emissions by 2050 and contributing to Metro Vancouver's Climate 2050 goal of a carbon neutral region.

From an air quality perspective, the current hybrid-electric transit buses emit 0.14 grams per brake horsepower-hour (g/bhp-hr) of nitrogen oxides (NOx) and 0.002 g/bhp-hr of particulate matter (PM). By comparison, the only CACs that would be emitted by the planned BEBs would be due to the anticipated diesel-powered heating units within the buses. As such, the planned electrification would significantly reduce CACs emitted due to bus operation, thereby contributing to improved air quality in the region.

C. EVALUATION CRITERIA

Please describe how project achieves or works towards each criterion by identifying and reporting on relevant performance measures. Where appropriate, present quantitative information. Please do not exceed 10 pages per project.

Two types of evaluation criteria are identified: Screening Criteria, which represent requirements that are mandatory for any project for which GVRF funding is requested; and Integrated Criteria, which allow for a qualitative assessment of proposed projects based on high priority objectives that reflect the intent of the Federal Gas Tax Fund, of Metro Vancouver goals, and of the Mayors' Council Vision.

Criterion	Description	Assessment (To be completed by MV)
SCREENING CRITERIA		
Eligible Project Category	☐ Local roads and bridges, including active transportation ☒ Public transit	
Eligible Expenses	As set out in the 2014 Administrative Agreement (Schedule C) Eligible Item — Expenditure[1] Equipment and installation — $298,100,000 Total — $298,100,000 [1] *Per Schedule C, Section 1.1, Part a)*	
Plan Consistency	Projects must be consistent with TransLink's Capital Plan, 10-Year Investment Plan, the Regional Growth Strategy and the Regional Transportation Strategy. ☒ 10-Year Investment Plan ☒ Mayors' Council Transportation and Transit Plan ☒ Metro 2040: Shaping our Future ☒ Regional Transportation Strategy ☒ Low Carbon Fleet Transition Plan	
Corporate Policies	Projects must be consistent with applicable TransLink policies such as sustainability, environmental responsibility, emissions and infrastructure. ☒ Sustainability policy ☒ Environmental policy ☐ Emissions policy ☒ Infrastructure policy	

Criterion	Description	Assessment (To be completed by MV)
INTEGRATED CRITERIA		
Regional Growth Strategy		
Supports the Regional Growth Strategy	*The degree to which the project assists in achieving the goals in the Regional Growth Strategy and directions set out in the Metro Vancouver Board Strategic Plan.* ☐ Create a Compact Urban Area ☐ Support a Sustainable Economy ☒ Protect Environment and Respond to Climate Change Impacts ☒ Develop Complete Communities ☒ Support Sustainable Transportation Choices	
Urban Centres and Frequent Transit Development Areas	*Where applicable, the project is located in, or demonstrates tangible benefits to the overall performance of Urban Centres and Frequent Transit Development Areas.* This project is located in the highly urbanized Vancouver city. Once operational, this location will provide services to Metro Vancouver communities within TransLink's transportation service region, streamline several bus routes, and offer an environmentally responsible and sustainable transportation alternative to single occupant vehicle travel. The bus routes will link communities with business, institutional and social hubs and destinations, and facilitate the creation and expansion of Transit Oriented Developments (TODs). They will also provide collector and distribution services to Expo, Millennium, and Canada Lines, West Coast Express and SeaBus. The urban centres that will benefit the most due to proximity include Vancouver, Burnaby, New West and Richmond due to it being one of the most central facilities geographically located in our region.	

Criterion	Description	Assessment (To be completed by MV)
Transportation Performance		
Headline Targets	*Demonstrates tangible beneficial effects on vehicle kilometres travelled and/or walk/cycle/transit/multiple occupancy vehicle mode share.* The Region is targeting an increase of 284,000 bus trips per day by 2045, of which 71,000 (an assumed 25% of the total) would be additional trips generated on routes operated by MTC. Assuming that each trip replaces a single automobile trip, the equivalent vehicle kilometre travelled would be approximately 204.7 million kilometres per year (based on average trip length). Using an average gasoline consumption of 8.9/litres per 100 km, the automobiles would consume 18.2 million litres of gasoline per year, and emit 126,000 (rounded) tonnes CO2e per year. Therefore, by 2045, **GHG emissions reduction associated with anticipated increased ridership and mode-switching would be 42,000 (rounded) tonnes CO2e per year.** This project also helps achieve TransLink's target of 50% of trips made by sustainable modes as noted in the Regional Transportation Strategy.	
Other Transportation Outcomes	*Demonstrates tangible beneficial effects on vehicle congestion, transit passenger congestion, transit ridership, transportation safety, and/or goods movement for the duration of the project.* This project provides the infrastructure to support the electrification of bus routes within metro Vancouver. The facility will provide capacity that would enable to the peak vehicle fleet to grow by 17% from 2057 FFE today to 2407. Additional capacity will allow for future service expansion facilitating reductions in vehicle congestion and transit passenger congestion. Surplus capacity in the short term will facilitate renovation of existing bus transit centres to support the transition to battery electric bus operation.	

Criterion	Description	Assessment (To be completed by MV)
Project Type	*Demonstrated value of the project type (refer to section 6).* This project is critical infrastructure to achieve the electrification of the fleet envisioned in the Low Carbon Fleet Strategy and the green house reduction strategy to support Greater Vancouver Regional target of achieving a carbon neutral region by 2050. .	
Regional Environmental Objectives		
Supports the Climate 2050 Strategic Framework and Integrated Air Quality and Greenhouse Gas Management Plan	*Contributes to the achievement of regional climate action and air quality goals, including directions set out in the Metro Vancouver Board Strategic Plan, the Regional Growth Strategy, Climate 2050, and the Integrated Air Quality and Greenhouse Gas Management Plan.* The electrical charging infrastructure would support reduction in diesel fuel use by the bus fleet by transitioning to BEBs. This will reduce GHG and CAC emissions such as NOx and PM, thereby improving air quality in the region.	
Quantifiable Emissions Impacts	Implementation of MTC to support a battery-electric buses fleet, under TransLink's Low Carbon Fleet Strategy, would contribute reductions to revenue fleet GHG emissions as follows: • 18,400 tonne (rounded) reduction in CO2e per year in 2025 (compared to baseline); and, • 29,886 tonne reduction in CO2e per year in 2031 (equivalent to 25% of TransLink's 2020 revenue fleet GHG emissions). The mode share changes described above contribute additional emissions reductions in the region (42,000 (rounded) tonnes CO2e per year).	

Criterion	Description	Assessment (To be completed by MV)
Economic Development		
Supports regional prosperity	*Contributes to a regional transportation system that moves people and goods and aligns with regional prosperity.* This project provides the charging infrastructure to support 350 40'-equivalent battery-electric buses. The buses will contribute to keeping the people and goods moving in the region contributing directly to its prosperity. The project will also provide overall operations flexibility to shift services between transit centers as required for renovations or to respond to other major construction projects. This flexibility will benefit regional planning in terms of ability to serve growing markets and be responsive to land use changes.	

APPLICATION FOR FUNDING FROM THE GREATER VANCOUVER REGIONAL FUND FOR FEDERAL GAS TAX FUNDS

Project 2 2023 Community Shuttle Replacements
(Ref# 222008)

A. 10-YEAR INVESTMENT PLAN

Please describe how the project fits within, and provides support to, the 10-Year Investment Plan

This project is a state of good repair project included in the 2018 Investment Plan

B. PROJECT DESCRIPTION

Please complete the following for each project proposed for expenditure from the GVRF.

1. **Executive Summary (not to exceed two pages)**

Project Overview

TransLink's Community Shuttle service began in 2001 and, prior to pandemic, has expanded steadily. Currently, the shuttle fleet comprises approximately 13% of TransLink's rubber-tired revenue vehicle fleet and totals 206 vehicles. Approximately 79% of the Community Shuttle fleet is operated by CMBC with the remaining 21% operated by private contractors.

This project will replace twenty-seven (27) conventional gasoline powered community shuttles in the community shuttle fleet. The shuttles to be retired were purchased in 2018 with a life expectancy of five (5) years. The new low floor shuttles improve accessibility over the existing high floor shuttle fleet. Procurement of new vehicles will allow the retirement of shuttles that have reached the end of their useful life thereby maintaining transit system reliability. The new vehicles have a person and seat capacity of 21 (consistent with vehicles being replaced). This project is consistent with the 2018 Investment Plan, approved in June 2018 by the Mayors' Council and the TransLink Board. This project is also included in the draft 2022 Investment Plan.

TransLink strives to optimize its resource allocation by matching service to passenger demand, including allocating vehicles of an appropriate size to serve the demand on a route. This allocation is optimized through continuous review and planning processes that allocates resources where they are most needed. This process is informed by ridership data, which has been substantially enhanced with the deployment of Compass Card. TransLink has also undertaken recent work to determine optimal fleet propulsion technology on each route, which is interdependent with vehicle size.

The fleet propulsion technologies currently available to TransLink consist of only conventional gasoline engines, as hybrid gasoline, hybrid diesel or battery-electric propulsion are not available for these vehicles. Choices of vehicle size and propulsion types will continue to be optimized, as determined by the ongoing monitoring of ridership and propulsion technologies. This may result in the vehicle technology mix changing, if it is subsequently determined that a different mix will better optimize our resource allocation.

Tangible Benefits and Outcomes

The new vehicles will allow CMBC to maintain existing service, reduce downtime, avoid incremental operating and maintenance costs.

Project Budget, Expenses, and GVRF Funding Request

The project budget is $6,900,050 with a GVRF request of $6,656,660. Expenses covered by this budget primarily include vehicle procurement, ancillary on-board equipment and labour, and other miscellaneous project costs. The funding requested in this application will be applied towards expenses considered eligible per the terms of the Administrative Agreement.

Steps taken by TransLink to identify, evaluate, and prioritize the proposed project for inclusion in the Application

This project was identified for GVRF funding in the 2018 Investment Plan (Appendix A, Table 8). State of good repair projects are prioritized through the annual capital planning process for inclusion in the Investment Plan and GVRF Applications. This state of good repair project ensures that TransLink can continue to deliver the Community Shuttle services.

2. Project Name

2023 Community Shuttle Replacements (Ref# 222150)

3. Project Need and Location

The objectives are to maintain high quality customer service, minimizing maintenance and operating costs and continuing to provide reliable, fully accessible transit vehicles that are appropriate for routes on which they operate. Community shuttles operate throughout the region. The community shuttles help connect transit exchanges/ Urban Centres to their surrounding residential communities.

The criteria for achieving these objectives are avoidance of incremental maintenance and operating costs, reduced vehicle breakdowns and vehicle downtime, improved accessibility.

4. Project Eligibility (check one):

☐ **Local Roads and Bridges, including active transportation**
☒ **Public Transit**

5. Project Purpose (check one):

☐ **Expansion:** Expands the carrying capacity of people and/or goods movement.
☒ **State of Good Repair:** Replaces or modernizes assets to keep the regional transportation system in a state of good repair.

☐ **Operational Efficiency/Effectiveness:** Improves the efficiency or effectiveness of the regional transportation system.

☐ **Refurbishment:** Extend the useful life of assets to maximize the utility of the regional investment in the transportation system.

☐ **Other (please specify :_____)**

6. Project Type (check one):

☐ **Growth**

☐ **Upgrade**

☐ **Risk (Resilience)**

☒ **Maintenance**

☐ **Opportunity**

7. Project Staging:

Year(s) of Acquisition or Start of Construction	Year of Completion of Construction	Year of Service Initialization	Year(s) of Renewal	Year(s) of End of Service
2023	**2024**	**2024**	**N/A**	**2028**

8. Has the project previously received funding through GVRF? Please explain.

No. This is the first application for GVRF funding for this project.

9. Was GVRF funding previously declined for the project? Please explain.

No. This is the first application for GVRF funding for this project.

10. Is the project anticipated to require additional future GVRF funding? If so, please explain.

No. TransLink is planning to complete this project within budget.

11. Project Cost + Funding

11.a Budget & Expenditures

Budget	Expenditures to Date	Forecast to Complete	Final Forecasted Cost	Variance (budget – final forecasted cost)
$6,900,050	$0	$6,900,050	$6,900,050	$0

11.b Project Funding

Prior Approved GVRF Funding	Current Year GVRF Funding Request	Other Funding – Specify source and whether confirmed/pending
$0	$6,656,660	N/A

11.c Project Budget Schedule

Item	2022	2023	2024	2025	2026	2027
GVRF-funded Project Budget		$6,036,560	$620,100			
Total Project Budget		$6,244,160	$655,890			

12. Project Budget Rationale

Describe the types of proposed project expenses to be funded by the Greater Vancouver Regional Fund

a. Explain how the project reflects the intent of the GVRF

This project ensures TransLink's assets are maintained in a state of good repair, so as to allow TransLink to efficiently and effectively provide transit service to the general public.

b. In the absence of GVRF funding, can the project proceed with other funding sources? What risks do the other funding sources present to the project?

No. TransLink relies on GVRF funding for replacement of its revenue vehicle fleets and plans its annual budgets accordingly. The other source of funding available to TransLink is the Investing in Canada Infrastructure Program (ICIP). The ICIP funding program is focused on infrastructure improvement related to capacity, quality and safety or, access to public transit systems. The projects chosen by TransLink for GVRF funding are better suited to GVRF funding compared to the other sources of funding.

c. Identify potential risks – corporate and regional – of this project that could result in this project not being completed or being unsuccessful. Describe possible mitigation strategies to address these risks.

TransLink requires these vehicles to be in service for 2023 in order to retire vehicles reaching the end of their useful service lives. There is an approximate lead time of 12 to 18 months between TransLink ordering the vehicles and those vehicles entering service. As such, it is important to have the funding in place to ensure the timely retirement of vehicles before they reach the end of their useful service lives.

If funding is not received in time, TransLink will have to rely on deferred retirement vehicles to deliver transit service. Continued use of deferred retirement vehicles poses a risk to reliability, as well as likely to result in incremental maintenance costs to keep them in service. This may result in lost opportunities to realize goals of reduced congestion, improved peak hour service and frequency. TransLink may lose credibility among the general public if service is not reliable as well as TransLink's ability to be accessible for people of all abilities. Further, use of deferred retirement vehicles could also result in higher CAC and GHG emissions than new vehicles as engines deteriorate.

d. How may the project cost vary as a result of changing external factors, such as interest rates and currency exchange rates?

Project costs may vary due to foreign exchange rate fluctuations (as vehicles are procured from the USA) and vendor pricing. These uncertainties are mitigated with a sufficient contingency allowance to absorb price and foreign exchange rate fluctuations.

e. How may foreseeable changes in investment, regulation, or policies from other orders of government affect the project?

Due to recent increases in senior government funding for public transit projects, many suppliers are experiencing larger demands to order vehicles. This may create a backlog with vendors, and if procurement is not initiated soon, could result in further delay in ordering and receiving vehicles.

f. How may foreseeable changes in technology affect the project?

This application is based on the new vehicles being powered by conventional gasoline engines. TransLink also has to consider that a number of these vehicles are operated and maintained by contractors who may not be able to support fueling or maintenance for a change in propulsion technology.

TransLink does not anticipate vendors coming out with alternative fuels for community shuttles that meet our needs to deliver reliable and cost-effective service to customers in the immediate future. TransLink continues to monitor the vehicle technology industry very closely to identify what options are available in the market, and to evaluate their suitability for its fleet.

g. What other corporate or external factors could alter the project need, scope, budget, or timeline for project delivery?

Project timeline may be affected by manufacturer's capacity and schedules, availability of parts and/or time for vehicle delivery from the manufacturer. The global COVID-19 pandemic may also affect supply chains needed to manufacture the shuttles (e.g. if further shutdowns occur). Budget may fluctuate due to parts pricing and/or foreign exchange rates.

h. Describe how the project lowers the emissions profile of the transit fleet, for both greenhouse gas and common air contaminant emissions and advances the fleet towards the region's greenhouse gas emissions reduction targets.

This is a like-for-like replacement. TransLink is currently focusing the Low Carbon Fleet Strategy (with support from the Mayors' Council), on the conventional bus fleet which makes up more than 80 per cent of fleet emissions. The conventional bus fleet transition to battery-electric buses is the biggest opportunity for GHG reductions, the main focus of the LCFS. Currently there are no suitable market ready battery-electric vehicles that meet the Community Shuttle needs. We consistently conduct market scans for readiness of battery-electric shuttles. When suitable battery-electric vehicles for this service are available, the LCFS working team will develop a transition plan away from gasoline vehicles. The baseline comparison is also gasoline vehicles as this is the only propulsion technology available that is suitable for this service. The 2020 Community Shuttle emissions from gasoline vehicles of 2,000 tonnes is expected to stay the same. This represents 1.5 per cent of TransLink's fleet emissions. It is expected that, when appropriate models are market ready, they will be incorporated into the fleet as part of the broader Low Carbon Fleet Strategy.

C. EVALUATION CRITERIA

Please describe how project achieves or works towards each criterion by identifying and reporting on relevant performance measures. Where appropriate, present quantitative information. Please do not exceed 10 pages per project.

Two types of evaluation criteria are identified: Screening Criteria, which represent requirements that are mandatory for any project for which GVRF funding is requested; and Integrated Criteria, which allow for a qualitative assessment of proposed projects based on high priority objectives that reflect the intent of the Federal Gas Tax Fund, of Metro Vancouver goals, and of the Mayors' Council Vision.

Criterion	Description	Assessment (To be completed by MV)
SCREENING CRITERIA		
Eligible Project Category	☐ Local roads and bridges, including active transportation ☒ Public transit	
Eligible Expenses	As set out in the 2014 Administrative Agreement (Schedule C) Eligible Item — Expenditure[1] Community Shuttles (27) — $6,417,000 On-board equipment — $239,660 Total — $6,656,660 [1] *Per Schedule C, Section 1.1, Part a)*	
Plan Consistency	Projects must be consistent with TransLink's Capital Plan, 10-Year Investment Plan, the Regional Growth Strategy and the Regional Transportation Strategy. ☒ 10-Year Investment Plan ☒ Mayors' Council Transportation and Transit Plan ☒ Metro 2040: Shaping our Future ☒ Regional Transportation Strategy	
Corporate Policies	Projects must be consistent with applicable TransLink policies such as sustainability, environmental responsibility, emissions and infrastructure. ☒ Sustainability policy ☒ Environmental policy ☐ Emissions policy ☐ Infrastructure policy – n/a	
INTEGRATED CRITERIA		
Regional Growth Strategy		
Supports the Regional Growth Strategy	*The degree to which the project assists in achieving the goals in the Regional Growth Strategy and directions set out in the Metro Vancouver Board Strategic Plan.* ☒ Create a Compact Urban Area ☐ Support a Sustainable Economy ☒ Protect Environment and Respond to Climate Change Impacts ☒ Develop Complete Communities ☒ Support Sustainable Transportation Choices	

Criterion	Description	Assessment (To be completed by MV)
Urban Centres and Frequent Transit Development Areas	*Where applicable, the project is located in, or demonstrates tangible benefits to the overall performance of Urban Centres and Frequent Transit Development Areas.* Community shuttles provide service to communities located outside of major bus routes and hubs and offer an environmentally responsible and sustainable transportation choice to single occupant vehicle travel. These vehicles transport passengers to Urban Centres and Frequent Transit Network (FTNs) to connect remote communities with populous destinations.	
Transportation Performance		
Headline Targets	*Demonstrates tangible beneficial effects on vehicle kilometres travelled and/or walk/cycle/transit/multiple occupancy vehicle mode share.* This is a like-for-like vehicle fleet replacement project with no change in service provided (i.e. incremental vehicle kilometers travelled or shift to walk/cycle/transit/multiple occupancy vehicle mode share).	
Other Transportation Outcomes	*Demonstrates tangible beneficial effects on vehicle congestion, transit passenger congestion, transit ridership, transportation safety, and/or goods movement for the duration of the project.* The replacement shuttles will be low-floor vehicles which will contribute to safety and accessibility.	
Project Type	*Demonstrated value of the project type (refer to section 6).* By maintaining TransLink's assets in a State of Good Repair, vehicles will have fewer breakdowns and service disruptions and operating costs will not increase.	
Regional Environmental Objectives		
Supports the Climate 2050 Strategic Framework and Integrated Air Quality and Greenhouse Gas Management Plan	*Contributes to the achievement of regional climate action and air quality goals, including directions set out in the Metro Vancouver Board Strategic Plan, the Regional Growth Strategy, Climate 2050, and the Integrated Air Quality and Greenhouse Gas Management Plan.* New vehicles built with year 2020 compliant gasoline engines will have lower GHG, NOx, thus reducing the emissions impact of the service provided by the project.	

Criterion	Description	Assessment (To be completed by MV)
	As such, this project supports IAQGGMP strategies 1.1 "Reduce emissions of and public exposure to diesel particulate matter", 1.4 "Reduce air contaminant emissions from cars, trucks, and buses".	
Quantifiable Emissions Impacts	*Achieves quantifiable beneficial impacts on greenhouse gas and common air contaminant emissions relative to baseline transit vehicles and lowers the emissions profile of the transit fleet. The information requirement for this criterion is fulfilled as follows:* 1. *For each transit vehicle project, provide a comparison of the emissions of the project versus the baseline vehicle.* 2. *For the application in aggregate, provide the:* • *Annualized transit fleet emissions in the current year;* • *Plus, incremental changes in transit fleet emissions with full deployment of any proposed expansion, modernized, or refurbished vehicles.* This is a like-for-like replacement. TransLink is currently focusing the Low Carbon Fleet Strategy (with support from the Mayors' Council) on the conventional bus fleet which make up more than 80 % of fleet emissions. Currently there are no suitable market ready battery-electric vehicles that meet the Community Shuttle needs. We consistently conduct market scans for readiness of battery-electric shuttles. The baseline comparison is also gasoline vehicles as this is the only propulsion technology available that is suitable for this service. The 2020 Community Shuttle GHG emissions from gasoline vehicles of 2,000 tonnes are expected to stay the same. This represents 1.5 % of TransLink's fleet emissions.	

Criterion	Description	Assessment (To be completed by MV)
Economic Development		
Supports regional prosperity	*Contributes to a regional transportation system that moves people and goods and aligns with regional prosperity.* Replacement of community shuttles will provide improved reliability of the Community Shuttle fleet, resulting in improved reliability to the regional transportation system, by offering reliable service to more remote communities not close to conventional bus routes and/or hubs. Passengers will continue to have reliable access to populous destinations for work and/or leisure activities, which would avoid otherwise having to rely on single occupant vehicle travel. Further, low-floor shuttles will improve safety and accessibility for people of all abilities.	

APPLICATION FOR FUNDING FROM THE GREATER VANCOUVER REGIONAL FUND FOR FEDERAL GAS TAX FUNDS

Project 3 2023 Conventional Bus Replacement (50 CNG Buses)
(Ref# 222009)

A. 10-YEAR INVESTMENT PLAN

Please describe how the project fits within, and provides support to, the 10-Year Investment Plan

This is a state of good repair project identified for GVRF duding in the 2018 Investment Plan. This project is also included in the draft 2022 Investment plan

B. PROJECT DESCRIPTION

Please complete the following for each project proposed for expenditure from the GVRF.

1. **Executive Summary (not to exceed two pages)**

Project Overview

This project replaces fifty (50) CNG buses with fifty (50) 40' CNG buses. Conventional buses have a life expectancy of 17 years/1,000,000 km. For this reason, the retiring 2006 service year 40' conventional CNG buses currently operating out of the Port Coquitlam Transit Centre (PTC) will be replaced on a one-for-one basis in 2023. The new buses will operate out of the Hamilton Transit Centre (HTC) and PTC which already have operating CNG facilities.

TransLink's corporate priority is to ensure a state of good repair. The purchase of fifty new CNG buses to replace retiring CNG buses is in alignment with this goal. The main benefit will be providing more reliable service with new buses, avoiding downtime and increasing maintenance costs associated with ageing vehicles.

Criteria for identifying vehicles due for retirement are based on a number of factors, including:

- Age (life expectancy of 17 years);
- Mileage (generally 1,000,000 km);
- State of repair/condition;
- Severity of service duty cycle; and
- Greenhouse gas and air emission reductions

This project is consistent with the 2018 Investment Plan, approved in June 2018 by the Mayors' Council and the TransLink Board. This project is also included in the draft 2022 Investment plan.
TransLink strives to optimize resources by matching service to passenger demand, including allocating vehicles of an appropriate size to serve the demand on a route. This allocation is optimized through continuous review and planning to distribute resources where they are most needed. This process is determined by ridership data, which has been substantially enhanced with the deployment of Compass Card. TransLink has also undertaken recent work to determine optimal fleet propulsion technology on each route, which is interdependent with vehicle size.

Tangible Benefits and Outcomes

The new vehicles will allow CMBC to maintain existing service, reduce downtime, avoid incremental operating and maintenance costs.

Project Budget, Expenses, and GVRF Funding Request

The project budget is $46,047,780 with a Greater Vancouver Regional Fund (GVRF) request of $44,440,000. Expenses covered by this budget primarily include vehicle procurement, ancillary on-board equipment and labour and other miscellaneous project costs. The funding requested in this application will be applied towards expenses considered eligible per the terms of the Administrative Agreement dated April 2014.

Steps taken by TransLink to identify, evaluate, and prioritize the proposed project for inclusion in the Application.

This project was identified for GVRF funding in the 2018 Investment Plan (Appendix A, Table 8). State of good repair projects are prioritized through the annual capital planning process for inclusion in the Investment Plan and GVRF Applications.

2. Project Name

2023 Conventional Bus Replacement (50 CNG Buses) (Ref# 222009)

3. Project Need and Location

The objectives are to maintain high quality customer service while minimizing maintenance and operating costs through continued provision of reliable, fully-accessible transit vehicles that are appropriate for routes on which they operate.

The criteria for achieving these objectives are: avoidance of incremental maintenance and operating costs, reduced vehicle breakdowns, less vehicle downtime, improved accessibility and fewer reservation cancellations.

Fifty new CNG buses will replace fifty existing CNG buses that are due for retirement. All 50 new CNGs will operate out of PTC and HTC as deemed optimal per the service plan.

4. Project Eligibility (check one):

☐ **Local Roads and Bridges, including active transportation**
☒ **Public Transit**

5. Project Purpose (check one):

☐ **Expansion:** Expands the carrying capacity of people and/or goods movement.
☒ **State of Good Repair:** Replaces or modernizes assets to keep the regional transportation system in a state of good repair.
☐ **Operational Efficiency/Effectiveness:** Improves the efficiency or effectiveness of the regional transportation system.
☐ **Refurbishment:** Extend the useful life of assets to maximize the utility of the regional investment in the transportation system.
☐ **Other (please specify :_____)**

6. Project Type (check one):

☐ **Growth**
☐ **Upgrade**
☐ **Risk (Resilience)**
☒ **Maintenance**
☐ **Opportunity**

7. Project Staging:

Year(s) of Acquisition or Start of Construction	Year of Completion of Construction	Year of Service Initialization	Year(s) of Renewal	Year(s) of End of Service
2023	**2024**	**2024**	**N/A**	**2041**

8. Has the project previously received funding through GVRF? Please explain.

No. This is the first application for GVRF funding for this project.

9. Was GVRF funding previously declined for the project? Please explain.

No. This is the first application for GVRF funding for this project.

10. Is the project anticipated to require additional future GVRF funding? If so, please explain.

No. TransLink is planning to complete this project within budget.

11. Project Cost + Funding

11.a Budget & Expenditures

Budget	Expenditures to Date	Forecast to Complete	Final Forecasted Cost	Variance (budget – final forecasted cost)
$46,047,780	**$0**	**$46,047,780**	**$46,047,780**	**$0**

11.b Project Funding

Prior Approved GVRF Funding	Current Year GVRF Funding Request	Other Funding – Specify source and whether confirmed/pending
$0	**$44,440,000**	**N/A**

11.c Project Budget Schedule

Item	2022	2023	2024	2025	2026	2027
GVRF-funded Project Budget		**$18,519,800**	**$25,920,200**			
Total Project Budget		**$19,042,210**	**$27,005,570**			

12. Project Budget Rationale

Describe the types of proposed project expenses to be funded by the Greater Vancouver Regional Fund

a. Explain how the project reflects the intent of the GVRF

This project ensures TransLink's assets are maintained in a State of Good Repair, allowing TransLink to efficiently and effectively provide transit service to the general public.

b. In the absence of GVRF funding, can the project proceed with other funding sources? What risks do the other funding sources present to the project?

No. TransLink relies on GVRF funding for replacement of its revenue vehicle fleets and plans its annual budgets accordingly.

The other source of funding available to TransLink is the Investing in Canada Infrastructure Program (ICIP). The ICIP funding program is focused on infrastructure improvement relating to capacity, quality and safety or, access to public transit systems. The projects chosen by TransLink for GVRF funding are better suited to GVRF funding compared to the other sources of funding.

c. Identify potential risks – corporate and regional – of this project that could result in this project not being completed or being unsuccessful. Describe possible mitigation strategies to address these risks.

TransLink requires these vehicles to be in service for 2023 in order to retire vehicles reaching the end of their useful service lives. There is an approximate lead time of 12 to 18 months between TransLink ordering the vehicles and those vehicles entering service. As such, it is important to have the funding in place to ensure the timely retirement of vehicles before they reach the end of their useful service lives.

If funding is not received in time, TransLink will have to rely on deferred retirement vehicles to deliver transit service. Continued use of deferred retirement vehicles poses a risk to reliability, as well as incremental maintenance costs to keep them in service. This may result in lost opportunities to realize goals of reduced congestion, maintain peak hour service and frequency.

d. How may the project cost vary as a result of changing external factors, such as interest rates and currency exchange rates?

Project costs may vary due to foreign exchange fluctuations (as vehicles are procured from the USA) and vendor pricing. These uncertainties are mitigated with a sufficient contingency allowance to absorb price and foreign exchange fluctuations.

e. How may foreseeable changes in investment, regulation, or policies from other orders of government affect the project?

Due to recent increases in senior government funding for public transit projects, many suppliers are experiencing larger demands to order vehicles. This may create a backlog with vendors, and if procurement is not initiated soon, could result in further delay in ordering and receiving vehicles.

f. How may foreseeable changes in technology affect the project?

This application is based on the new vehicles being powered by Compressed Natural Gas engines. TransLink also has to consider that a number of these vehicles are operated and maintained by contractors who may not be able to support fueling or maintenance for a change in propulsion technology. Advances in Renewable natural gas (RNG) extraction from waste continues to help reduce GHG emissions by capturing methane (CH4) and repurposing as RNG. Additionally,

TransLink does not have the charging infrastructure capacity to support replacing these 50 conventional buses with Batter electric buses until the completion of our Marpole Transit Centre.

g. What other corporate or external factors could alter the project need, scope, budget, or timeline for project delivery?

Project timeline may be affected by manufacturer's capacity and schedules, availability of parts and/or time for vehicle delivery from the manufacturer. The global COVID pandemic may also affect supply chains needed to manufacture the vehicles if further shutdowns are implemented. Budget may fluctuate due to parts pricing and/or foreign exchange.

h. Describe how the project lowers the emissions profile of the transit fleet, for both greenhouse gas and common air contaminant emissions and advances the fleet towards the region's greenhouse gas emissions reduction targets.

This is a like-for-like replacement of naturally gas powered vehicle. In 2019 Translink announced its partnership with FortisBC to source Renewable Natural Gas (RNG) for 100% of its natural gas fleet by 2024. RNG is a carbon neutral energy source as it does not contribute any net carbon dioxide into the atmosphere. Compressed natural gas vehicles, which make up roughly a fifth of TransLink's bus fleet, have close to 21% fewer emissions with 50% reduction in fuel costs versus diesel. RNG offers the same savings while further reducing emissions by an additional 80 per cent versus CNG. Overall reduction in the emission of atmospheric pollutants also helps to improve air quality of the region.

C. EVALUATION CRITERIA

Please describe how project achieves or works towards each criterion by identifying and reporting on relevant performance measures. Where appropriate, present quantitative information. Please do not exceed 10 pages per project.

Two types of evaluation criteria are identified: Screening Criteria, which represent requirements that are mandatory for any project for which GVRF funding is requested; and Integrated Criteria, which allow for a qualitative assessment of proposed projects based on high priority objectives that reflect the intent of the Federal Gas Tax Fund, of Metro Vancouver goals, and of the Mayors' Council Vision.

Criterion	Description	Assessment
	SCREENING CRITERIA	
Eligible Project Category	☐ Local roads and bridges, including active transportation ☒ Public transit	Required

Criterion	Description	Assessment
Eligible Expenses	As set out in the 2014 Administrative Agreement (Schedule C) Eligible Item — Expenditure[1] Conventional Bus Replacement (50 CNG) — $43,500,000 On-board equipment — 940,000 Total — $44,440,000 [1] *Per Schedule C, Section 1.1, Part a)*	Required
Plan Consistency	Projects must be consistent with TransLink's Capital Plan, 10-Year Investment Plan, the Regional Growth Strategy and the Regional Transportation Strategy. ☒ 10-Year Investment Plan ☒ Mayors' Council Transportation and Transit Plan ☒ Metro 2040: Shaping our Future ☒ Regional Transportation Strategy	Required
Corporate Policies	Projects must be consistent with applicable TransLink policies such as sustainability, environmental responsibility, emissions and infrastructure. ☒ Sustainability policy ☒ Environmental policy ☒ Emissions policy ☐ Infrastructure policy – n/a	Required
INTEGRATED CRITERIA		
Regional Growth Strategy		
Supports the Regional Growth Strategy	*The degree to which the project assists in achieving the goals in the Regional Growth Strategy and directions set out in the Metro Vancouver Board Strategic Plan.* ☒ Create a Compact Urban Area ☐ Support a Sustainable Economy ☒ Protect Environment and Respond to Climate Change Impacts ☒ Develop Complete Communities ☒ Support Sustainable Transportation Choices	Poor/Good/ Excellent
Urban Centres and Frequent Transit Development Areas	*Where applicable, the project is located in, or demonstrates tangible benefits to the overall performance of Urban Centres and Frequent Transit Development Areas.* Buses provide services to Metro Vancouver communities within TransLink's transportation service region and offer an environmentally responsible and sustainable	Poor/Good/ Excellent

Criterion	Description	Assessment
	transportation alternative to single occupant vehicle travel. They link communities with business, institutional and social hubs and destinations, and facilitate the creation and expansion of Transit Oriented Developments (TODs). They also provide collector and distribution services to Expo, Millennium, Evergreen and Canada Lines, West Coast Express and SeaBus.	
	Transportation Performance	
Headline Targets	*Demonstrates tangible beneficial effects on vehicle kilometres travelled and/or walk/cycle/transit/multiple occupancy vehicle mode share* This is a like for like vehicle fleet replacement project with no change in service provided (i.e. incremental vehicle kilometers travelled or shift to walk/cycle/transit/multiple occupancy vehicles mode share).	Poor/Good/ Excellent
Other Transportation Outcomes	*Demonstrates tangible beneficial effects on vehicle congestion, transit passenger congestion, transit ridership, transportation safety and/or goods movement for the duration of the project.* This is a like for like vehicle fleet replacement project with no change in service provided. As such, there are no incremental benefits tor vehicle congestion, transit passenger congestion, transit ridership and/or transportation safety.	Poor/Good/ Excellent
Project Type	*Demonstrated value of the project type (refer to section 6).* By maintaining TransLink's assets in good repair, vehicles will have fewer breakdowns and service disruptions, operating costs will not increase, and pollutant emissions will be reduced.	Poor/Good/ Excellent
	Regional Environmental Objectives	
Supports the Climate 2050 Strategic Framework and Integrated Air Quality and Greenhouse Gas Management Plan	*Contributes to the achievement of regional climate action and air quality goals, including directions set out in the Metro Vancouver Board Strategic Plan, the Regional Growth Strategy Climate 2050, and the Integrated Air Quality and Greenhouse Gas Management Plan.* This is a like-for-like replacement and the baseline vehicles are CNG, as this is the technology that is	Poor/Good/ Excellent

Criterion	Description	Assessment
	deemed most optimal by TransLink for this particular tranche of vehicle replacements.	
Quantifiable Emissions Impacts	*Achieves quantifiable beneficial impacts on greenhouse gas and common air contaminant emissions relative to baseline transit vehicles and lowers the emissions profile of the transit fleet. The information requirement for this criterion is fulfilled as follows:* *1. For each transit vehicle project, provide a comparison of the emissions of the project versus the baseline vehicle. For the application in aggregate, provide the:* • *Annualized transit fleet emissions in the current year; Plus, incremental changes in transit fleet emissions with full deployment of any proposed expansion, modernized, or refurbished vehicles.* Like-for-like replacement, however it supports IAQGGMP strategies 1.1 "Reduce emissions of and public exposure to diesel particulate matter". This is a like-for-like replacement and the baseline vehicles are CNG powered. TransLink has entered into a phased agreement to purchase of Renewable Natural Gas (RNG) to fuel its fleet of Compressed Natural Gas (CNG) buses by 2024. RNG is a biogas collected from landfills, wastewater treatment plants and manure digesters that is captured, purified and injected into the natural gas supply. By purchasing RNG for our fleet it reduces TransLink's carbon footprint by both collecting methane and CO2 that may have otherwise been emitted into the atmosphere as well as reducing the amount of conventional natural gas needed. Fuel efficiency improvements in the new vehicles is expected to reduce consumption by 2-3%, which will also translate to GHG reductions.	Poor/Good/ Excellent
	Economic Development	
Supports regional prosperity	*Contributes to a regional transportation system that moves people and goods and aligns with regional prosperity.* Replacement of buses will provide improved reliability of the fleet, resulting in improved reliability to the regional transportation system. Passengers will continue to have reliable access to populous destinations for work and/or	Poor/Good/ Excellent

Criterion	Description	Assessment
	leisure activities, which would avoid otherwise having to rely on single occupant vehicle travel.	

APPLICATION FOR FUNDING FROM THE GREATER VANCOUVER REGIONAL FUND FOR FEDERAL GAS TAX FUNDS

Project 4 2023 HandyDART Vehicle Purchase – Replacement
(Ref# 222013)

A. 10-YEAR INVESTMENT PLAN

Please describe how the project fits within, and provides support to, the 10-Year Investment Plan.

This is a state of good repair project identified for GVRF funding in the 2018 Investment Plan. This project is also included in the draft 2022 Investment Plan.

B. PROJECT DESCRIPTION

Please complete the following for each project proposed for expenditure from the GVRF.

1. **Executive Summary (not to exceed two pages)**

Project Overview

HandyDART vehicles are operated and maintained by TransLink's contractors First Canada ULC and Nat's Repair. These vehicles provide a valuable service to people with disabilities and are booked through a reservation system, with each vehicle being able to accommodate up to 2 wheelchairs.

Criteria for identifying vehicles due for retirement are based on a number of factors including:

- Age (life expectancy of 7 years for microbuses and midibuses);
- Mileage (generally 250,000 km);
- State of repair/condition; and
- Severity of service duty cycle.

This project is to replace forty-six (46) HandyDART vehicles that have reached the end of service life and meet criteria for replacement, with 46 new vehicles consisting of 31 microbuses and 15 midibuses. This project is consistent with the 2018 Investment Plan, approved in June 2018 by the Mayors' Council and the TransLink Board.

These vehicles must be replaced when they reach end of service life, because maintenance costs and downtime will increase substantially, affecting passenger service reliability. By 2022, major components (e.g. engine, transmission), minor components (e.g. air conditioning, wheelchair lift), and chassis and body (e.g. cracked frames, rusted doorframes, rotting floors) will be worn out. This project is also included in the draft 2022 Investment Plan.

The vehicles due to retire were acquired in 2015 and 2016, have a median age of 7-8 years and median mileage of 250,000 km. The new vehicles will have a capacity of 8 passengers for microbuses and 12 passengers for midibuses (consistent with vehicles being replaced). TransLink strives to optimize its resource allocation by matching service to passenger demand, which includes allocating vehicles of an appropriate size to serve the demand on a route. Optimization is achieved through continuous review and process planning to allocate resources where they are most needed. TransLink has also undertaken recent work to determine optimal fleet propulsion technology on each route, which is interdependent with vehicle size.

The fleet propulsion technologies currently available to TransLink consist of only conventional gasoline engines, as hybrid gasoline, hybrid diesel or battery-electric propulsion are not available

for these vehicles. Although diesel engines are available for the 31 microbuses being acquired, they are not considered due to the high maintenance costs. Choices of vehicle size and propulsion types will continue to be optimized, as determined by the ongoing monitoring of ridership and propulsion technologies. This may result in the vehicle technology mix changing if it is subsequently determined that a different mix better optimizes our resource allocation.

Tangible Benefits and Outcomes

The new vehicles will allow CMBC to maintain existing service, reduce downtime, and avoid incremental operating and maintenance costs.

Project Budget, Expenses, and GVRF Funding Request

The project budget is $6,960,731 with a GVRF funding request of $6,771,000. Expenses covered by this budget primarily include vehicle procurement, ancillary onboard equipment and labour, and other miscellaneous project costs. The funding requested in this application will be applied towards expenses considered eligible per the terms of the Administrative Agreement.

Steps taken by TransLink to identify, evaluate, and prioritize the proposed project for inclusion in the application.

This project was identified for GVRF funding in the 2018 Investment Plan (Appendix A, Table 8) and is a state of good repair project. State of good repair projects are prioritized through the annual capital planning process for inclusion in the Investment Plan and GVRF Applications. This state of good repair project ensures that TransLink can deliver the HandyDART service outlined in the 2018 Plan.

2. Project Name

2023 HandyDART Vehicle Purchase – Replacement (Ref# 222013)

3. Project Need and Location

The objective is to maintain high quality customer service while reducing maintenance and operating costs and continuing to provide reliable, fully accessible transit vehicles.

The criteria for achieving these objectives are avoidance of incremental maintenance and operating costs, reduced vehicle breakdowns and vehicle downtime, improved accessibility and fewer reservation cancellations.

HandyDarts are a demand responsive service throughout the region; as such, they do not operate on specific routes.

4. Project Eligibility (check one):

☐ **Local Roads and Bridges, including active transportation**

☒ **Public Transit**

5. Project Purpose (check one):

☐ **Expansion:** Expands the carrying capacity of people and/or goods movement.
☒ **State of Good Repair:** Replaces or modernizes assets to keep the regional transportation system in a state of good repair.
☐ **Operational Efficiency/Effectiveness:** Improves the efficiency or effectiveness of the regional transportation system.
☐ **Refurbishment:** Extend the useful life of assets to maximize the utility of the regional investment in the transportation system.
☐ **Other (please specify :_____)**

6. Project Type (check one):

☐ **Growth**
☐ **Upgrade**
☐ **Risk (Resilience)**
☒ **Maintenance**
☐ **Opportunity**

7. Project Staging:

Year(s) of Acquisition or Start of Construction	Year of Completion of Construction	Year of Service Initialization	Year(s) of Renewal	Year(s) of End of Service
2023	**2024**	**2023**	**N/A**	**2030**

8. Has the project previously received funding through GVRF? Please explain.

No. This is the first application for GVRF funding for this project.

9. Was GVRF funding previously declined for the project? Please explain.

No. This is the first application for GVRF funding for this project.

10. Is the project anticipated to require additional future GVRF funding? If so, please explain.

No. TransLink is planning to complete this project within budget.

11. Project Cost + Funding

11.a Budget & Expenditures

Budget	Expenditures to Date	Forecast to Complete	Final Forecasted Cost	Variance (budget – final forecasted cost)
$6,960,731	$0	$6,960,731	$6,960,731	$0

11.b Project Funding

Prior Approved GVRF Funding	Current Year GVRF Funding Request	Other Funding – Specify source and whether confirmed/pending
$0	$6,771,000	N/A

11.c Project Budget Schedule

Item	2022	2023	2024	2025	2026	2027
GVRF-funded Project Budget		$6,088,000	$683,000			
Total Project Budget		$6,238,730	$722,001			

12. Project Budget Rationale

Describe the types of proposed project expenses to be funded by the Greater Vancouver Regional Fund

a. Explain how the project reflects the intent of the GVRF

This project ensures TransLink's assets are maintained in a state of good repair, to allow TransLink to efficiently and effectively provide transit service to those who have accessibility challenges.

b. In the absence of GVRF funding, can the project proceed with other funding sources? What risks do the other funding sources present to the project?

No. TransLink relies on GVRF funding for replacement of its revenue vehicle fleets and plans its annual budgets accordingly. The other sources of funding available to TransLink is the Investing in Canada Infrastructure Program (ICIP). The ICIP funding program is focused on infrastructure improvement relating to capacity, quality and safety or, access to public transit systems. The projects chosen by TransLink for GVRF funding are better suited to GVRF funding compared to the other sources of funding.

c. Identify potential risks – corporate and regional – of this project that could result in this project not being completed or being unsuccessful. Describe possible mitigation strategies to address these risks.

TransLink requires these vehicles to be in service for 2023 in order to retire vehicles reaching the end of their useful service lives. There is an approximate lead time of 12 to 18 months between TransLink ordering the vehicles and those vehicles entering service. As such, it is important to have the funding in place to ensure the timely retirement of vehicles before they reach the end of their useful service lives.

If funding is not received in time, TransLink will have to rely on deferred retirement vehicles to deliver transit service. Continued use of deferred retirement vehicles poses a risk to reliability, as well as increases incremental maintenance costs to keep them in service. Further, use of deferred retirement vehicles could also result in higher criteria air contaminant (CAC) and GHG emissions than new vehicles.

d. How may the project cost vary as a result of changing external factors, such as interest rates and currency exchange rates?

Project costs may vary due to foreign exchange rates fluctuations (as vehicles are procured from the USA) and vendor pricing. These uncertainties are mitigated with a sufficient contingency allowance to absorb price and foreign exchange fluctuations.

e. How may foreseeable changes in investment, regulation, or policies from other orders of government affect the project?

Due to recent increases in senior government funding for public transit projects, many suppliers are experiencing larger demands to order vehicles. This may create a backlog with vendors, and if procurement is not initiated soon, could result in further delay in ordering and receiving vehicles.

f. How may foreseeable changes in technology affect the project?

This application is based on the new vehicles being powered by conventional gasoline engines. TransLink needs to consider that these vehicles are operated and maintained by contractors who may not be able to support fueling or maintenance for a change in propulsion technology.

TransLink does not anticipate vendors providing alternative fuel/propulsion options for HandyDART vehicles that meet our needs to deliver reliable and cost-effective service to customers in the immediate future. TransLink continues to monitor the vehicle technology industry very closely to identify what options are available in the market, and to evaluate their suitability for its fleet.

Project timeline may be affected by manufacturer's capacity and schedules, availability of parts and/or time for vehicle delivery from the manufacturer. The global COVID-19 pandemic may also

affect supply chains needed to manufacture the vehicles if shutdowns occur. Budget may fluctuate due to parts pricing and/or foreign exchange rates.

g. What other corporate or external factors could alter the project need, scope, budget, or timeline for project delivery?

h. Describe how the project lowers the emissions profile of the transit fleet, for both greenhouse gas and common air contaminant emissions and advances the fleet towards the region's greenhouse gas emissions reduction targets.

This is a like-for-like replacement. TransLink is currently focusing the Low Carbon Fleet Strategy (LCFS) (with support from the Mayors' Council) on the conventional bus fleet which make up more than 80 per cent of fleet emissions. The conventional bus fleet transition to battery-electric buses is the biggest opportunity for GHG reductions, and the main focus of the LCFS. Currently there are no suitable market ready battery-electric vehicles that meet the HandyDART service needs. We consistently conduct market scans for readiness of battery-electric shuttles. When suitable battery-electric vehicles for this service are available, the LCFS working team will develop a plan to transition away from gasoline vehicles. The baseline comparison is also gasoline vehicles as this is the only propulsion technology available that is suitable for this service. The new HandyDART vehicles will have an upgraded chassis and a new engine that will result in approximately 20% lower fuel consumption and GHG emissions when compared to the vehicles being replaced.

C. EVALUATION CRITERIA

Please describe how project achieves or works towards each criterion by identifying and reporting on relevant performance measures. Where appropriate, present quantitative information. Please do not exceed 10 pages per project.

Two types of evaluation criteria are identified: Screening Criteria, which represent requirements that are mandatory for any project for which GVRF funding is requested; and Integrated Criteria, which allow for a qualitative assessment of proposed projects based on high priority objectives that reflect the intent of the Federal Gas Tax Fund, of Metro Vancouver goals, and of the Mayors' Council Vision.

Criterion	Description	Assessment (To be completed by MV)
SCREENING CRITERIA		
Eligible Project Category	☐ Local roads and bridges, including active transportation ☒ Public transit	
Eligible Expenses	As set out in the 2014 Administrative Agreement (Schedule C)	

Criterion	Description	Assessment (To be completed by MV)
	Eligible Item — Expenditure[1] HandyDART vehicles (46) — $6,679,000 On-board equipment — 92,000 Total — $6,771,000 *[1] Per Schedule C, Section 1.1, Part a)*	
Plan Consistency	*Projects must be consistent with TransLink's Capital Plan, 10-Year Investment Plan, Regional Growth Strategy and the Regional Transportation Strategy.* ☒ 10-Year Investment Plan ☒ Mayors' Council Transportation and Transit Plan ☒ Metro 2040: Shaping our Future ☒ Regional Transportation Strategy	
Corporate Policies	*Projects must be consistent with applicable TransLink policies such as sustainability, environmental responsibility, emissions and infrastructure.* ☒ Sustainability policy ☒ Environmental policy ☐ Emissions policy ☐ Infrastructure policy – n/a	
INTEGRATED CRITERIA		
Regional Growth Strategy		
Supports the Regional Growth Strategy	*The degree to which the project assists in achieving the goals in the Regional Growth Strategy and directions set out in the Metro Vancouver Board Strategic Plan.* ☐ Create a Compact Urban Area ☐ Support a Sustainable Economy ☒ Protect Environment and Respond to Climate Change Impacts ☒ Develop Complete Communities ☒ Support Sustainable Transportation Choices	
Urban Centres and Frequent Transit Development Areas	*Where applicable, the project is located in, or demonstrates tangible benefits to the overall performance of Urban Centres and Frequent Transit Development Areas.* HandyDART vehicles provide a valuable service to the community for people with disabilities. The service promotes greater mobility for social connectivity, running errands, attending appointments and improving	

Criterion	Description	Assessment (To be completed by MV)
	quality of life. The vehicles also connect disabled people to the current transit network of train stations and bus hubs. HandyDART service operates throughout TransLink's service area.	
	Transportation Performance	
Headline Targets	*Demonstrates tangible beneficial effects on vehicle kilometres travelled and/or walk/cycle/transit/multiple occupancy vehicle mode share.* This is a like-for-like vehicle fleet replacement project with no change in service provided (i.e. incremental vehicle kilometers travelled or shift to walk/cycle/transit mode share).	
Other Transportation Outcomes	*Demonstrates tangible beneficial effects on vehicle congestion, transit passenger congestion, transit ridership, transportation safety, and/or goods movement for the duration of the project.* This is a like-for-like vehicle fleet replacement project with no change in service provided. As such, there are no incremental benefits to vehicle congestion, transit passenger congestion, transit ridership and/or transportation safety.	
Project Type	*Demonstrated value of the project type (refer to section 6).* By maintaining TransLink's assets in good repair, vehicles will have fewer breakdowns and service disruptions, and operating costs will not increase.	
	Regional Environmental Objectives	
Supports the Climate 2050 Strategic Framework and Integrated Air Quality and Greenhouse Gas Management Plan	*Contributes to the achievement of regional climate action and air quality goals, including directions set out in the Metro Vancouver Board Strategic Plan, the Regional Growth Strategy, Climate 2050, and the Integrated Air Quality and Greenhouse Gas Management Plan.* This is a like-for-like replacement and the baseline vehicles are gasoline, as this is the technology that is currently available to TransLink. However, the new HandyDART vehicles will have an upgraded chassis and new engine that will result in approximately 20% lower fuel consumption and GHG emissions.	

Criterion	Description	Assessment (To be completed by MV)
Quantifiable Emissions Impacts	*Achieves quantifiable beneficial impacts on greenhouse gas and common air contaminant emissions relative to baseline transit vehicles and lowers the emissions profile of the transit fleet. The information requirement for this criterion is fulfilled as follows:* 1. *For each transit vehicle project, provide a comparison of the emissions of the project versus the baseline vehicle.* 2. *For the application in aggregate, provide the:* • *Annualized transit fleet emissions in the current year;* • *Plus, incremental changes in transit fleet emissions with full deployment of any proposed expansion, modernized, or refurbished vehicles.* Like-for-like replacement, however it supports IAQGGMP strategies 1.1 "Reduce emissions of and public exposure to diesel particulate matter". This is a like-for-like replacement and the baseline vehicles are gasoline as this is the technology that is currently available to TransLink. The new HandyDART vehicles will have an upgraded chassis and new engine that will result in approximately 20% lower fuel consumption and GHG emissions when compared to the vehicles being replaced.	
Economic Development		
Supports regional prosperity	*Contributes to a regional transportation system that moves people and goods and aligns with regional prosperity.* Replacement of HandyDART vehicles will provide improved reliability to the regional transportation system, resulting in improved service reliability to people with disabilities. Passengers will have better access to conventional bus routes and hubs, train stations, healthcare providers, and social functions. Passengers will enjoy a better quality of life and benefit from greater independence.	

APPLICATION FOR FUNDING FROM THE GREATER VANCOUVER REGIONAL FUND FOR FEDERAL GAS TAX FUNDS

Project 5 Next Generation SeaBus Design
(Ref# 212024)

A. 10-YEAR INVESTMENT PLAN

Please describe how the project fits within, and provides support to, the 10-Year Investment Plan.

This is a state of good repair project identified for Greater Vancouver Regional Fund (GVRF) funding in the draft 2022 Investment Plan

B. PROJECT DESCRIPTION

Please complete the following for each project proposed for expenditure from the GVRF.

1. **Executive Summary (not to exceed two pages)**

Project Overview

SeaBus vessel M/V Burrard Beaver entered service in 1977 at the start of SeaBus service. Beaver has been in service for 45 years and is now operating beyond its expected design life of 40 years. The Burrard Beaver is currently used as a spare vessel to maintain service reliability. It requires replacement to maintain an overall state-of-good repair of the SeaBus fleet.

Criteria for identifying vehicles due for retirement are based on a number of factors including:

- Age (life expectancy of 40 years for diesel operated SeaBus);
- Mileage (SeaBus replaces main engines on a 30,000 hr schedule);
- State of repair/condition
- Severity of service duty cycle; and
- Greenhouse gas and air emission reductions

These vehicles must be replaced when they reach end of service life, because of higher maintenance costs and because service reliability could be compromised at times when the main vessels are out of service, affecting passenger service reliability and quality.

Beaver's operation is subject to Lloyds Register and Transport Canada regulations. Beaver is a grandfathered vessel and its ability to continue to meet regulations past 2025 is not guaranteed. SeaBus is currently renewing the exemptions in place for hull.

The Next Generation SeaBus has been identified as being suitable for battery electric propulsion. A zero emission battery-electric Next Generation SeaBus will eliminate significant GHG and criteria air contaminant emissions in support of TransLink's 2050 emissions reduction targets as well as Metro Vancouver's Climate 2050 Regional targets. The scope of this project will complete the design process, review design proposals and select the preferred proponent to complete the final design-build.

Tangible Benefits and Outcomes

The choice of zero emission battery-electric Next Generation SeaBus supports the Metro Vancouver's *Integrated Air Quality and Greenhouse Gas Management Plan (IAQGGMP), Metro*

2040, Climate 2050 and TransLink's efforts to reduce emissions under the Low Carbon Fleet Strategy.

This project is a critical requirement for ultimate procurement of the replacement vessel. When procured, the new vessel will allow CMBC to maintain existing service, reduce downtime, and avoid incremental operating and maintenance costs.

Project Budget, Expenses, and GVRF Funding Request

The project budget is $2,652,670 with a GVRF funding request of $2,509,700. Expenses covered by this budget primarily include design-build procurement process and detailed design of the vessel, and other miscellaneous project costs. The funding requested in this application will be applied towards expenses considered eligible per the terms of the Administrative Agreement.

Steps taken by TransLink to identify, evaluate, and prioritize the proposed project for inclusion in the application.

This project was identified for GVRF funding during the development of TransLink's upcoming 2022 Investment Plan. This project is considered a state of good repair project as it will ultimately lead to the replacement of the end of life Beaver Seabus. TransLink's Board of Directors has endorsed the inclusion of this priority project in the 2022 GVRF Application.

2. Project Name

Next Generation SeaBus Design (Ref# 212024)

3. Project Need and Location

The objectives are to maintain service reliability for the fleet as a spare vessel while minimizing maintenance and operating costs through continued provision of reliable, fully-accessible transit vehicles.

The criteria for achieving these objectives are avoidance of incremental maintenance and operating costs, reduced vehicle breakdowns and vehicle downtime and improved accessibility.

Currently, TransLink has two significant environmental targets: an 80 per cent reduction of GHG emissions by 2050, and to utilize 100 per cent renewable energy in all operations by 2050. Although ambitious, our analysis indicates that meeting these targets is possible with zero and low-carbon fuels and technologies, but it means that bold action is required through policy decisions, investment planning, and funding support. A zero emission battery-electric Next Generation SeaBus will contribute to improved air quality and enable TransLink's to meet its GHG emission reduction targets. This project will benefit the North Shore and Vancouver -UEL urban centres.

4. Project Eligibility (check one):

☐ **Local Roads and Bridges, including active transportation**

☒ **Public Transit**

5. Project Purpose (check one):

☐ **Expansion:** Expands the carrying capacity of people and/or goods movement.
☒ **State of Good Repair:** Replaces or modernizes assets to keep the regional transportation system in a state of good repair.
☐ **Operational Efficiency/Effectiveness:** Improves the efficiency or effectiveness of the regional transportation system.
☐ **Refurbishment:** Extend the useful life of assets to maximize the utility of the regional investment in the transportation system.
☐ **Other (please specify :_____)**

6. Project Type (check one):

☐ **Growth**
☒ **Upgrade**
☐ **Risk (Resilience)**
☒ **Maintenance**
☐ **Opportunity**

7. Project Staging:

Year(s) of Acquisition or Start of Construction	Year of Completion of Construction	Year of Service Initialization	Year(s) of Renewal	Year(s) of End of Service
2022	**2023**	**N/A**	**N/A**	**N/A**

8. Has the project previously received funding through GVRF? Please explain.

No. This is the first application for GVRF funding for this project.

9. Was GVRF funding previously declined for the project? Please explain.

No. This is the first application for GVRF funding for this project.

10. Is the project anticipated to require additional future GVRF funding? If so, please explain.

Yes. TransLink will seek GVRF funding for the construction phase, if no alternative funding programs are available.

11. Project Cost + Funding

11.a Budget & Expenditures

Budget	Expenditures to Date	Forecast to Complete	Final Forecasted Cost	Variance (budget – final forecasted cost)
$2,652,670	$0	$2,652,670	$2,652,670	$0

11.b Project Funding

Prior Approved GVRF Funding	Current Year GVRF Funding Request	Other Funding – Specify source and whether confirmed/pending
$0	$2,509,700	N/A

11.c Project Budget Schedule

Item	2022	2023	2024	2025	2026	2027
GVRF-funded Project Budget	$635,000	$1,874,700				
Total Project Budget	$677,840	$1,974,830				

12. Project Budget Rationale

Describe the types of proposed project expenses to be funded by the Greater Vancouver Regional Fund

a. Explain how the project reflects the intent of the GVRF

This project ensures TransLink's assets are maintained in a state of good repair, allowing TransLink to efficiently and effectively provide transit service to the general public. Replacing diesel vessel with battery-electric will contribute to lowering the fleet's GHG emissions, NOx and diesel particulate matter which aligns with Metro Vancouver's IAQGGMP, Metro 2040 and Climate 2050 goals.

b. In the absence of GVRF funding, can the project proceed with other funding sources? What risks do the other funding sources present to the project?

No. TransLink relies on GVRF funding for replacement of its revenue vehicle fleets and plans its annual budgets accordingly. The other sources of funding available to TransLink is the Investing in Canada Infrastructure Program (ICIP). The ICIP funding program is focused on infrastructure improvement relating to capacity, quality and safety or, access to public transit systems. The

projects chosen by TransLink for GVRF funding are better suited to GVRF funding compared to the other sources of funding.

c. Identify potential risks – corporate and regional – of this project that could result in this project not being completed or being unsuccessful. Describe possible mitigation strategies to address these risks.

If funding is not received in time, TransLink will have to rely on deferred retirement vehicles to serve as a spare vessel. Continued use of deferred retirement vehicles poses a risk to reliability, as well as incremental maintenance costs to keep them in service. Lack of a reliable spare vessel may result in lost opportunities to realize goals of reduced congestion, improved peak hour service and frequency by comprising overall service reliability of the SeaBus fleet.

Further, converting the diesel vessel is to a battery-electric vessel, will help accelerate TransLink's ability to meet internal GHG targets, along with actions supporting Metro Vancouver GHG and air quality efforts.

d. How may the project cost vary as a result of changing external factors, such as interest rates and currency exchange rates?

Project costs may vary due to foreign exchange rates fluctuations and vendor pricing. These uncertainties are mitigated with a sufficient contingency allowance to absorb price and foreign exchange fluctuations.

e. How may foreseeable changes in investment, regulation, or policies from other orders of government affect the project?

Beaver's operation is subject to Lloyds Register and Transport Canada regulations. Beaver is a grandfathered vessel and its ability to continue to meet regulations past 2025 is not guaranteed. SeaBus is currently renewing the exemptions in place for its hull. Accordingly, if the design of the next vessel is not completed per current schedule, for ultimate completion of the vessel, it may have impacts on our ability to maintain service reliability.

f. How may foreseeable changes in technology affect the project?

This application is based on the new vessel being zero emission battery-electric powered. TransLink has taken into account the upgrades necessary to its existing infrastructure, as well as the opportunity to transition to zero emissions vessel, in arriving at a decision on zero emission battery-electric technology.

Changes in battery-electric vehicles and charging technology are expected and will continually improve. Innovation in battery and charging technology is beneficial.

g. What other corporate or external factors could alter the project need, scope, budget, or timeline for project delivery?

Project timeline may be affected by vendors' capacity and schedules. The global COVID-19 pandemic may also affect availability of consultants needed to complete this project if shutdowns occur.

h. Describe how the project lowers the emissions profile of the transit fleet, for both greenhouse gas and common air contaminant emissions and advances the fleet towards the region's greenhouse gas emissions reduction targets.

TransLink undertook a propulsion study in 2020 to determine the preferred propulsion type for the Next Generation SeaBus vessel with the study recommending a battery electric propulsion system as a viable alternative to the current diesel direct drive model used on first and second generation vessels. A zero emission battery electric SeaBus would save approximately 430,000l of diesel fuel per year, eliminate the emission of 1130 tonnes CO2/yr and associate NOx and PM emissions. Infrastructure feasibility study is currently underway to determine the associated impacts, costs, and viability to implement a battery electric vessel for SeaBus service. Infrastructure feasibility study is currently underway to determine the associated impacts, costs, scope, and high-level design to implement electric vessel charging at both north and south terminals respectively. Study findings will be used to flesh out vessel performance requirements and future construction and implementation schedule.

C. EVALUATION CRITERIA

Please describe how project achieves or works towards each criterion by identifying and reporting on relevant performance measures. Where appropriate, present quantitative information. Please do not exceed 10 pages per project.

Two types of evaluation criteria are identified: Screening Criteria, which represent requirements that are mandatory for any project for which GVRF funding is requested; and Integrated Criteria, which allow for a qualitative assessment of proposed projects based on high priority objectives that reflect the intent of the Federal Gas Tax Fund, of Metro Vancouver goals, and of the Mayors' Council Vision.

Criterion	Description	Assessment (To be completed by MV)
SCREENING CRITERIA		
Eligible Project Category	☐ Local roads and bridges, including active transportation ☒ Public transit	
Eligible Expenses	As set out in the 2014 Administrative Agreement (Schedule C) Eligible Item — Expenditure[1] Next Generation SeaBus Design — $2,509,700 Total — $2,509,700 [1] *Per Schedule C, Section 1.1, Part a)*	
Plan Consistency	*Projects must be consistent with TransLink's Capital Plan, 10-Year Investment Plan, Regional Growth Strategy and the Regional Transportation Strategy.* ☒ 10-Year Investment Plan (Will be included in the 2022 Investment Plan) ☒ Mayors' Council Transportation and Transit Plan ☒ Metro 2040: Shaping our Future ☒ Regional Transportation Strategy	
Corporate Policies	*Projects must be consistent with applicable TransLink policies such as sustainability, environmental responsibility, emissions and infrastructure.* ☒ Sustainability policy ☒ Environmental policy ☒ Emissions policy ☐ Infrastructure policy – n/a	
INTEGRATED CRITERIA		
Regional Growth Strategy		
Supports the Regional Growth Strategy	*The degree to which the project assists in achieving the goals in the Regional Growth Strategy and directions set out in the Metro Vancouver Board Strategic Plan.* ☐ Create a Compact Urban Area ☐ Support a Sustainable Economy ☒ Protect Environment and Respond to Climate Change Impacts ☒ Develop Complete Communities ☒ Support Sustainable Transportation Choices	

Criterion	Description	Assessment (To be completed by MV)
Urban Centres and Frequent Transit Development Areas	*Where applicable, the project is located in, or demonstrates tangible benefits to the overall performance of Urban Centres and Frequent Transit Development Areas.* SeaBus provides services to Metro Vancouver communities within TransLink's transportation service region and offer an environmentally responsible and sustainable transportation alternative to single occupant vehicle travel. They link communities with business, institutional and social hubs and destinations, and facilitate the creation and expansion of Transit Oriented Developments (TODs). They also connect with services such as bus and rail transit.	
Headline Targets	*Demonstrates tangible beneficial effects on vehicle kilometres travelled and/or walk/cycle/transit/multiple occupancy vehicle mode share.* This is a one for one SeaBus replacement project with no change in service provided (i.e. incremental vehicle kilometers travelled or shift to walk/cycle/transit mode share).	
Other Transportation Outcomes	*Demonstrates tangible beneficial effects on vehicle congestion, transit passenger congestion, transit ridership, transportation safety, and/or goods movement for the duration of the project.* This is a one for one SeaBus replacement project with no change in service provided. As such, there are no incremental benefits to vehicle congestion, transit passenger congestion, transit ridership and/or transportation safety.	
Project Type	*Demonstrated value of the project type (refer to section 6).* By maintaining this spare vessel in good repair, our ability to maintain service reliability when the main vessels are out-of service for repairs, will not be compromised.	
	Regional Environmental Objectives	
Supports the Climate 2050	*Contributes to the achievement of regional climate action and air quality goals, including directions set out*	

Criterion	Description	Assessment (To be completed by MV)
Strategic Framework and Integrated Air Quality and Greenhouse Gas Management Plan	*in the Metro Vancouver Board Strategic Plan, the Regional Growth Strategy, Climate 2050, and the Integrated Air Quality and Greenhouse Gas Management Plan.* Operation of a zero-emission battery electric propulsion SeaBus vessel would eliminate GHG, NOx and PM emissions associated with the current diesel direct drive model used on first and second generation SeaBus vessels.	

Quantifiable Emissions Impacts	*Achieves quantifiable beneficial impacts on greenhouse gas and common air contaminant emissions relative to baseline transit vehicles and lowers the emissions profile of the transit fleet. The information requirement for this criterion is fulfilled as follows:* *1. For each transit vehicle project, provide a comparison of the emissions of the project versus the baseline vehicle.* *2. For the application in aggregate, provide the:* • *Annualized transit fleet emissions in the current year;* • *Plus, incremental changes in transit fleet emissions with full deployment of any proposed expansion, modernized, or refurbished vehicles.* If a battery-electric Seabus is procured, it is estimated to reduce CO2 emissions from SeaBus operations by 1,130 MT / year. By replacing the diesel direct drive M/V Burrard Beaver SeaBus for Next Generation battery electric propulsion SeaBus vessel, the diesel fuel usage will be reduced by 430,000 liters per year.	
Economic Development		
Supports regional prosperity	*Contributes to a regional transportation system that moves people and goods and aligns with regional prosperity.* Replacement of this spare SeaBus vessel will allow us to maintain service reliability of the fleet to the regional transportation system.	

To: Regional Economic Prosperity Management Board

From: Gregory Freeman, Senior Economist, Invest Vancouver
Megan Gerryts, Senior Policy Advisor, Invest Vancouver

Date: November 1, 2021 Meeting Date: November 17, 2021

Subject: **Clean Transportation: Findings and Actions to Strengthen the Sector in the Metro Vancouver Region**

RECOMMENDATION

That the MVRD Board receive for information the report dated November 1, 2021, titled "Clean Transportation: Findings and Actions to Strengthen the Sector in the Metro Vancouver Region."

EXECUTIVE SUMMARY

The report *Clean Transportation: Findings and Actions to Strengthen the Sector in the Metro Vancouver Region* (Attachment 2) presents an overview of the categories and competencies in the sector, an analysis of the challenges faced by firms in the region, and recommended policies and actions to support and grow the sector. Attachment 1 consists of promotional material for the clean transportation sector in the region.

The key to the clean transportation sector is talent: the firms in the sector overwhelmingly report that they are present in the region because of the collected knowledge and experience in the workforce. That talent is developed, supported and supplemented by strong ties to research universities, incubators and accelerators.

In the clean transportation sector as a whole, the most pressing challenges revolve around delays and uncertainty related to permitting and the general lack of available industrial land. These obstacles need to be urgently addressed as their persistence risks seeing growing, successful firms unwilling to invest further in the region or leaving entirely when they cannot find suitable space.

PURPOSE

To present to the Board the findings and recommendations from Invest Vancouver's research into the clean transportation sector in the region.

BACKGROUND

Invest Vancouver provides independent, objective recommendations intended to position the region for success in a rapidly evolving global economy. Reports are intended to provide actionable intelligence that will better inform and guide the work of Invest Vancouver itself, as well as the deliberations and work of key decision makers.

The clean transportation sector was chosen as a first area of study due to its strong alignment with regional priorities for emissions reductions and "green jobs", as well as alignment with upcoming mobility-related events and the advancement of the B.C. Hydrogen Strategy.

CLEAN TRANSPORTATION

Clean transportation firms serve global markets, meaning that firms have a choice about where to locate, and do not necessarily need to do more than sell products, service, and technologies in the markets they serve. To support a flourishing clean transportation industry, the Metro Vancouver region needs to do more than create a consumer market for their products; it must position itself as an attractive place for such firms to site their headquarters and/or part of their operations. Therefore, this report seeks to understand two aspects of clean transportation in the Metro Vancouver region: What competitive advantages (if any) do firms in the industry enjoy by locating here? And what barriers (if any) keep the region from being a more attractive place for firms?

Methodology

This report is based on primary qualitative research, consisting of interviews with chief executives (CEOs), founders, and senior executives from clean transportation firms at all stages of development and ownership types. Invest Vancouver conducted in-depth interviews covering everything from business climate, infrastructure, physical spaces, capital, and workforce, to network organizations, R&D, suppliers and customers. Interviewees were encouraged to discuss the production and strategic gaps they have encountered along the product / service value chain continuums, from "idea" to "export", in this industry. The interviews were supplemented with secondary research consisting of a literature review of existing studies, data from Emsi Analyst and PitchBook and other sources.

Findings and Recommendations

The findings are divided into six economic development-related themes, with 13 recommendations across all themes. The themes were assigned an urgency level based on the risk that the underlying gaps could prompt clean transportation firms to leave the region, or choose another location to set up or expand their operations.

The recommendations are summarized in the table below:

Economic Development-Related Theme	Theme Urgency Level	Key Recommendations
Talent Development and Training Programs	Low	• Expand capacity within the BCIT Chemical and Environmental Technology program to increase the number of students graduating from 30 to 60 by 2025
Permitting Processes and Rules	High	• Modernize permitting processes for projects to provide greater accountability, certainty, predictability, and reduced risk • Update and harmonize rules governing hydrogen
Physical Spaces	High	• Invest in industry-critical physical spaces to be leased to firms at below-market rates • Amend the CleanBC Facilities Electrification Fund eligibility to include utility upgrades of warehouses to meet clean technology R&D power needs

Financial Capital Formation and Access	Medium	• Assess the capital formation and syndication relationships and network interactions within the region's clean transportation industry through predictive analytics work
Cluster Capacity Building Opportunities	High	• Launch a hydrogen hub • Fund a large-scale hydrogen powered heavy-duty vehicle demonstration project • Establish a centre to assert global leadership in hydrogen certification • Create certainty by establishing a long-term electric power rate for hydrogen production • Expand eligibility for zero-emission vehicle (ZEV) subsidies to include hydrogen fuel cell vehicles • Strive for technology-neutral rules whenever possible
Culture of Innovation	Medium	• Encourage greater participation in "Project Greenlight" and other public-private partnerships to encourage a culture of innovation across the Metro Vancouver region

All recommendations are intended to position the Metro Vancouver region for success and ensure the region is an attractive place for investors. Invest Vancouver staff will be advancing these recommendations to the responsible decision makers.

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

FINANCIAL IMPLICATIONS
There are no financial implications associated with this report.

CONCLUSION
Invest Vancouver provides independent, objective recommendations intended to position the region for success in a rapidly evolving global economy. Reports are intended to provide actionable intelligence that will better inform and guide the work of Invest Vancouver itself, as well as the deliberations and work of key decision makers. This report presents an overview of the regional specializations and competencies in the sector, an analysis of the challenges faced by firms in the region, and recommended policies and actions to support and grow the sector. The high priority recommendations are related to permitting, physical spaces and opportunities to develop the hydrogen cluster in the region. These areas were assigned high priorities, as they represent the greatest threat to having clean transportation firms leave the region, or choose another location for their operations.

Attachments
1. "Innovation in Clean Transportation" Sector Profile (November, 2021)
2. Clean Transportation: Findings and actions to strengthen the sector in the Metro Vancouver region

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Innovation in Clean Transportation

Advantages and Specializations in the Metro Vancouver Region

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Sector Highlights

60 Firms
Operating in the region

2,800+ Employees
Median firm employment: 21

$2.6 Billion+ Invested
From 2017 to 2021

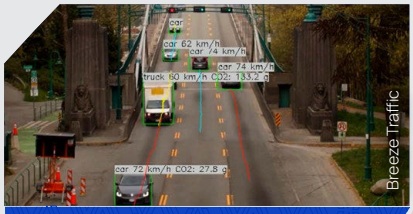
Anchored by a world-leading hydrogen cluster, these firms are scaling-up across many clean transportation specializations:

Low & Zero Emission Vehicles & Components

Alinker, AVL Fuel Cell Canada Inc., Ballard Power Systems, Blue-O Technology, cellcentric, Corvus Energy, Damon Motorcycles, ElectraMeccanica Vehicles, FTXT Energy Technology, FVT Research, GreenPower Motor Company, Grin Technologies, Ionomr Innovations, Loop Energy, Molicel, Nano One Materials, Rivian, Robert Allan Naval Architects and Marine Engineers, Sandvault, Unilia Fuel Cells, VeloMetro Mobility

Renewable & Low Carbon Fuels & Charging Infrastructure

AddEnergie Technologies, Analytics Systems, Consolidated Biofuels, Daanaa Resolution, Delta-Q Technologies, Ekona Power, Electrum Charging Solutions, Enbala, EverGen Infrastructure, G4, Greenlane Renewables, Greenlight Innovation, HTEC Hydrogen Technology and Energy Corporation, Hydra Energy, Hydrogen in Motion, IRDI System, Lab 498 Products/VoltSafe, Palcan Power Systems, Parkland Fuels, Powertech Inc, Quadrogen, Recharged Technologies, Shift Clean Energy, Tandem Technologies, West Coast Reduction, Westport Fuel Systems



Transferable Technologies & Services

7 Generation Capital, Breeze Traffic, Freightera, Greenline Technologies, Liftango, LOOPShare, Mojio, Plugzio, Poparide, Routific, Spare, Uplight, VuLog

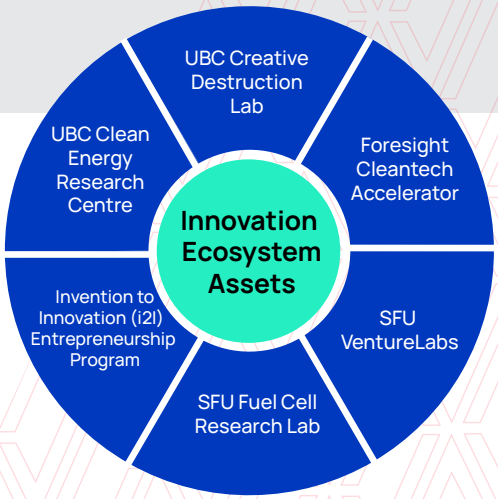
Firms identified in green are within the hydrogen cluster.

Metro Vancouver's clean transportation sector is buoyed by world-renowned research institutions and universities, sector-specific accelerators, and a supporting incentive and regulatory environment. Firms across the clean transportation industry value chain say their top reason for locating in the region is the access to a deep pool of talent across the educational attainment continuum.

The Metro Vancouver region has identified labour concentrations in the occupational categories:

- Mechanical Systems Engineers
- Infrastructure Team Leads
- Fuel Systems Engineers
- Test Engineers
- Research Scientists/ Engineers

Source: EMSI 2021.1



Capital Investment in Clean Transportation (2017-2021)

Investment in Firms Headquartered in the Region

Year	$ invested (millions)	Deal count
2017	94	22
2018	271	7
2019	102	19
2020	663	21
2021	1,536	16

Source: Pitchbook 2021

Where People Are Investing

67% Low & Zero Emission Vehicles & Components

29% Renewable & Low Carbon Fuels & Charging Infrastructure

4% Transferable Technologies and Services

Source: Pitchbook 2021

2021 Deals Highlights

- $922M cellcentric (Daimler Truck AG and Volvo Group)
- $217M HTEC
- $139M Westport Fuel Systems
- $100M Loop Energy

Source: Pitchbook 2021

Sector Support

- B.C. Hydrogen Strategy is setting the course for B.C. to be a world leader in the growing hydrogen economy
- Scientific Research and Experimental Development (SR&ED) tax programs to encourage Canadian businesses of all sizes and in all sectors to conduct research and development (R&D) in B.C. and Canada
- B.C. Low Carbon Fuel Standard provides a financial incentive for low carbon fuel use. This generates revenue for low carbon transportation fuel suppliers and supports investment in clean fuels and vehicles
- CleanBC Go Electric Advanced Research and Commercialization (ARC) program supports the development of companies operating in the zero-emission vehicle (ZEV) sector
- B.C. Centre for Innovation and Clean Energy will be an incubator for the research and commercialization of technologies, including carbon capture, utilization and storage, production and distribution of low-carbon hydrogen, biofuels, synthetic fuels, renewable natural gas, and battery technologies

Clean Transportation:

Findings and actions to strengthen the sector in the Metro Vancouver region

November 2021

Gregory Freeman, Senior Economist, Invest Vancouver

Megan Gerryts, Senior Policy Advisor, Invest Vancouver

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About Us

Invest Vancouver is the Metro Vancouver region's economic development leadership service, created to advance broadly shared prosperity for all residents of the region. This report has been prepared by Invest Vancouver, which offers independent, objective research, analysis, and economic development recommendations crafted to position the region for success in a rapidly evolving global economy; one in which capital is highly mobile and where firms have many choices about where to locate. The aim of the report is to provide actionable intelligence that will better inform and guide the strategic work of Invest Vancouver itself, as well as the work of key decision makers.

Invest Vancouver is a service of the Metro Vancouver Regional District, operating in support of the Metro Vancouver regional economy and the 2.7 million residents who depend on it.

I. Executive Summary

Advancements in clean transportation technologies are critical to reducing greenhouse gas emissions and addressing the ongoing climate emergency. The sector also presents an economic development opportunity, if the Metro Vancouver region can take urgent action to address obstacles faced by clean transportation firms seeking to start, locate or expand here.

The region is well-positioned for success, with a burgeoning clean transportation sector that includes strong entrants in particular niches and that has an advanced and growing hydrogen cluster. Invest Vancouver has undertaken this study as part of its work to build capacity in key industries in which the region has established and emerging industrial strengths, such as in the clean transportation sector.[1]

The key asset in the region's clean transportation sector is talent; firms in the sector overwhelmingly report that they are present in the region because of the access to and the leveragability of the collected knowledge and experience in the workforce. That talent is developed, supported, and supplemented by strong ties to research institutes and universities, incubators, and accelerators.

Policies that incentivize the reduction of greenhouse gas emissions are helping to create a local market in the Metro Vancouver region for clean transportation vehicles, components, and services. The firms that meet this demand, however, don't necessarily need to be located in the region. To support a flourishing clean transportation industry, the Metro Vancouver region needs to be an attractive place for firms that have a choice about where to locate.

Urgent Needs:

- Streamline industry-relevant permitting processes
- Invest in industry-critical physical spaces
- Launch a hydrogen hub in the region

In the clean transportation sector as a whole, the most pressing challenges revolve around delays and uncertainty related to permitting and the general lack of available industrial land. These obstacles need to be urgently addressed as their persistence risks seeing growing, successful firms unwilling to invest further in the region or leaving entirely when they cannot find suitable space.

The region also has a unique opportunity created by the presence of firms along the entire hydrogen value chain, from supply, transportation, and storage through membranes, fuel cells, and testing. The Metro Vancouver region has an early lead in the area due, in large part, to the presence and growth of Ballard Power Systems and the ecosystem that has developed around it. Other locations around the globe are moving forward with hydrogen; however, and the region needs to help early- and development- stage firms, particularly with the establishment of a hydrogen hub, if these firms are going to grow and thrive here.

Invest Vancouver seeks to understand two aspects of clean transportation in the Metro Vancouver region: What competitive advantages (if any) do firms in this industry enjoy by locating here? And what barriers (if any) keep the region from being a more attractive place for firms that have a choice about where to site their headquarters and operations? These questions are addressed based on primary qualitative research, consisting of interviews with chief executives (CEOs), founders, and senior executives from clean transportation firms at all stages of development and ownership types. This process led to the formulation of 13 recommendations to support a thriving clean transportation sector in the Metro Vancouver region.

1 For more on the regional economic development strategies pursued by Invest Vancouver, see the technical paper *Preparing Metro Vancouver for the Digital Economy*.

Recommendations Overview

Economic Development-Related Theme	Theme Urgency Level*	Key Recommendations
Talent Development and Training Programs	Low	• Expand capacity within the BCIT Chemical and Environmental Technology program to increase the number of students graduating from 30 to 60 by 2025
Permitting Processes and Rules	High	• Modernize permitting processes for projects to provide greater accountability, certainty, predictability, and reduced risk • Update and harmonize rules governing hydrogen
Physical Spaces	High	• Invest in industry-critical physical spaces to be leased to firms at below-market rates • Amend the CleanBC Facilities Electrification Fund eligibility to include utility upgrades of warehouses to meet clean technology research and development (R&D) power needs
Financial Capital Formation and Access	Medium	• Assess the capital formation and syndication relationships and network interactions within the region's clean transportation industry through predictive analytics work
Cluster Capacity Building Opportunities	High	• Launch a hydrogen hub • Fund a large-scale hydrogen powered heavy-duty vehicle demonstration project • Establish a centre to assert global leadership in hydrogen certification • Create certainty by establishing a long-term electric power rate for hydrogen production • Expand eligibility for zero-emission vehicle (ZEV) subsidies to include hydrogen fuel cell vehicles • Strive for technology-neutral rules whenever possible
Culture of Innovation	Medium	• Encourage greater participation in "Project Greenlight" and other public-private partnerships to encourage a culture of innovation across the Metro Vancouver region

*The urgency level has been assigned based on the risk that the underlying gaps could prompt clean transportation firms to leave the region, or choose another location to set up or expand their operations.

II. Clean Transportation Overview

The Metro Vancouver region is home to a vibrant network of emerging and mature clean transportation firms, which collectively benefit from the push to lower and eventually eliminate harmful transportation-related emissions. The sector is supported by research universities, specialized academic programs, start-up accelerators and incubators, and government policies.

Progressive municipal, regional, and provincial goals, targets, and initiatives aimed at lowering greenhouse gas emissions, particularly those from transportation, help create and sustain a local consumer market for low- and zero-emission mobility products and services. Indeed, the transition to clean transportation is well under way, with zero-emission vehicles (ZEVs) accounting for 9.4 percent of all light-duty vehicle sales in the province in 2020, the highest rate of adoption of ZEVs in North America.[2]

Creating a local market for clean transportation, while vital to meeting climate goals, is distinct from building and scaling a clean transportation *industry*. More specifically, ZEVs and their components, plus the related infrastructure, fuels, and services being adopted in the Metro Vancouver region, do not necessarily need to be designed, sourced or built locally. Firms located elsewhere, whether outside of the region or the nation, can and do meet many of these needs. **Supporting a clean transportation industry, therefore, begins with the recognition that firms serving global markets can choose where to site their headquarters, research and development (R&D) activities, and production facilities.**

To understand how to make the region an attractive place for clean transportation firms, consider the location decisions from their point of view. What is the cost and ease of doing business? How long does it take to get permits? Is a suitable location available? How difficult is it to find skilled workers? Are there opportunities to collaborate with and to transfer technologies out of research universities? Is it easy to connect with global suppliers, partners and customers? How is the access to capital? Are there investors? How hard will it be to find initial customers, especially for innovative early-stage products? This report considers these questions and more, with the **goal of identifying the challenges, roadblocks, and headaches faced by clean transportation firms in the Metro Vancouver region and recommending policies and actions to ameliorate them.**

2 Province of British Columbia, Zero-Emission Vehicle Update 2020.

Layout and Methodology

This report seeks to understand two aspects of clean transportation in the Metro Vancouver region: What competitive advantages (if any) do firms in the industry enjoy by locating here? And what barriers (if any) keep the region from being a more attractive place for firms? Answering these questions is critical for economic development, public policy, industry and labour association, and education and workforce development decision-makers. A purely statistical approach, such as an industry contribution analysis, would provide an estimate of economic, job, and fiscal impacts of clean transportation firms, but would not address competitive advantages or barriers. Indeed, there is no quantitative approach that will zero in on the answers to these specific questions.

Instead, this report is based on primary qualitative research, consisting of interviews with chief executives (CEOs), founders, and senior executives from clean transportation firms at all stages of development and ownership types, including, in certain instances, firms that no longer exist because they were acquired, or because they folded. Invest Vancouver conducted in-depth interviews lasting from 30 minutes to more than an hour covering everything from business climate, infrastructure, physical spaces, capital, and workforce, to network organizations, R&D, suppliers and customers. Interviewees were encouraged to discuss the production and strategic gaps they have encountered along the product / service value chain continuums, from "idea" to "export", in this industry.

Firms were identified for inclusion using existing industry resources and relevant news articles; by suggestions from local government members of the Invest Vancouver Advisory Committee; from industry associations and their memberships; by examining and classifying job postings aggregated by Emsi Analyst; by querying the PitchBook database of firms; and by reviewing relevant company materials.

Invest Vancouver met with interviewees from almost one-third of the region's clean transportation firms. The interviewees' experiences and insights underpin the report findings, and have not been attributed to specific individuals or firms to encourage candid discussion. Additional information was collected in helpful discussions with: the B.C. Ministry of Energy, Mines and Low Carbon Innovation; BC Hydro; FortisBC; and the Port of Vancouver, as well as with multiple industry associations.

Unless explicitly stated otherwise, the characterization of the industry gaps, and Invest Vancouver's recommendations for addressing them, do not represent the official policy or position of any of the firms, associations, or government entities mentioned in this report.

The report is presented in two sections. The first provides an overview of the clean transportation firms in the region, as well as the supporting assets that make it an advantage to locate, expand, hire and/or re-invest in the region. This section was prepared based on secondary research, including a literature review of previous studies supplemented with data from Emsi Analyst and PitchBook, and verified in discussions with the interviewees. The second describes the barriers preventing the region from being more attractive to clean transportation firms at different stages of firm development, and Invest Vancouver's specific, deployable recommendations for addressing them.

Identifying Clean Transportation Firms Based in the Metro Vancouver Region

The clean transportation sector is comprised of firms that are working to decarbonize transportation and to reduce greenhouse gas emissions. Following previous work done in this area, Metro Vancouver's clean transportation sector is divided into three categories: low- and zero-emission vehicles and components; renewable and low carbon fuels and charging infrastructure; and transferable technologies and services.

With these categories as a guide, deciding which firms to include still made for some hard choices. To be included, the firms have to be working on transportation (or an input to transportation, such as biofuels); their product, process, service, or technology needs to be exportable; and the firm has to be located in the Metro Vancouver region. Thus, local firms doing valuable work on renewable electricity, such as run-of-river hydroelectricity and tidal power, are not included despite the important contribution of clean energy to green transportation. Nor are firms doing innovative work on metal-air batteries, which are not primarily intended for transportation uses. There are firms providing mobility as a service that are helping reduce greenhouse gas emissions directly, for example by sharing electric cars or bikes, or indirectly by reducing demand for fossil fuel powered trips, that are not included because their focus is on the local market. And some leading B.C. companies in renewable fuels, for example, are not included because they are based outside the Metro Vancouver region.

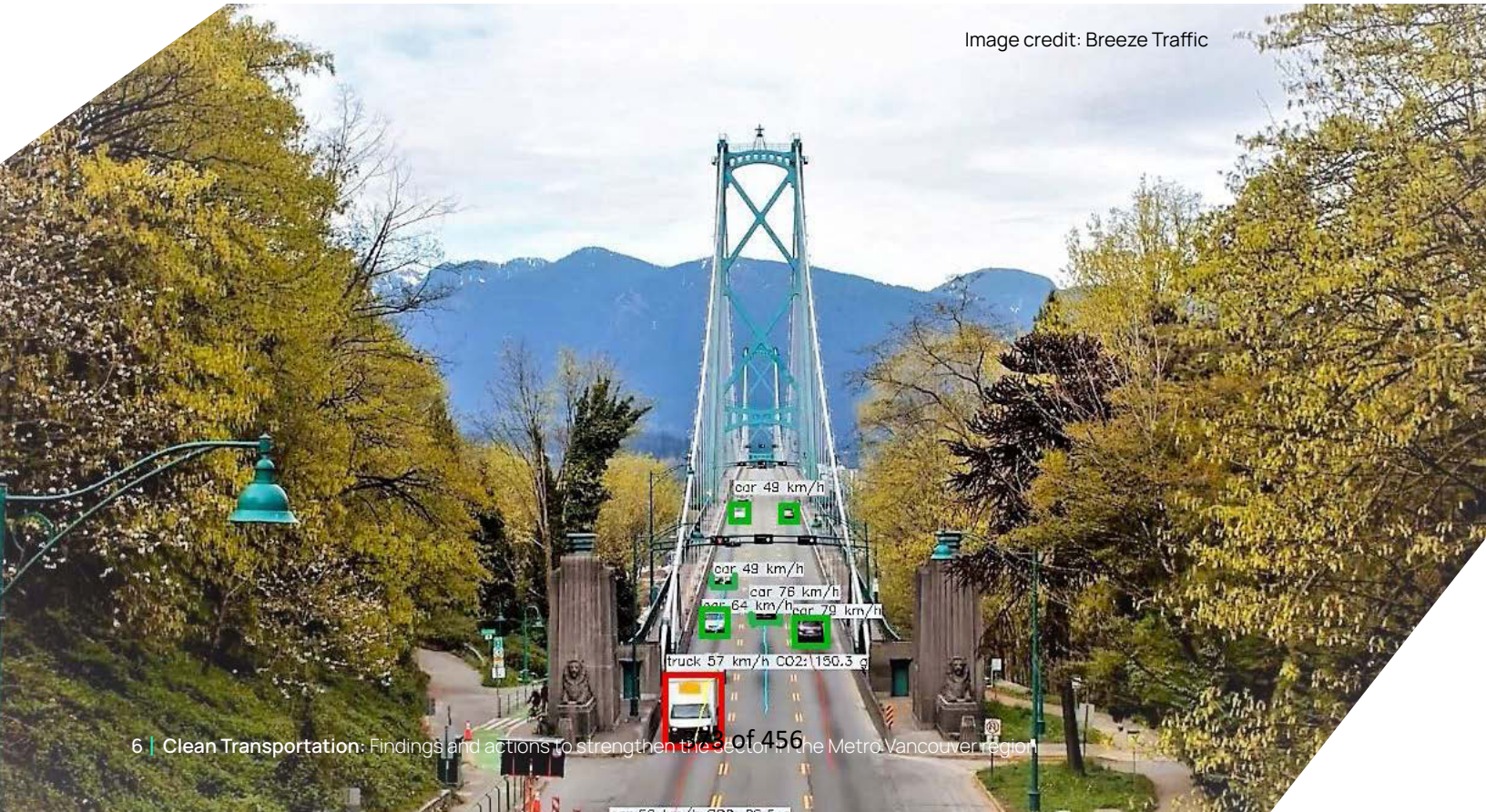


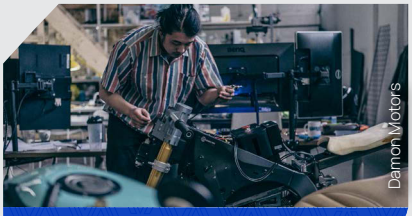
Image credit: Breeze Traffic

Clean Transportation Firms in the Metro Vancouver Region

In total, there are at least 60 export-oriented firms, of which 52 are firm headquarters, in the three above-identified clean transportation categories across the region. As locally anchored firms grow, their activity has major positive impacts, with a direct effect not only on employment, tax revenue, and earnings, which flow to the headquarters, but also on the municipalities in which they locate as they become part of the local social and community fabric. Region-wide, these firms directly employ more than 2,800 people,[3] and sustain many more indirect and induced jobs, which are created when the firms and their employees make purchases of goods and services in the local economy.

As a group, the firms are relatively young – 70 percent were founded in the past 15 years – which is unsurprising for an emerging field such as clean transportation. And, the presence of so many new and early-stage firms helps explain the median firm size of 21 employees.

Figure 1 lists firms in each clean transportation category in the region.

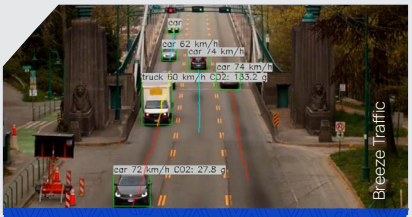


Low & Zero Emission Vehicles & Components

Alinker, AVL Fuel Cell Canada Inc., Ballard Power Systems, Blue-O Technology, cellcentric, Corvus Energy, Damon Motorcycles, ElectraMeccanica Vehicles, FTXT Energy Technology, FVT Research, GreenPower Motor Company, Grin Technologies, Ionomr Innovations, Loop Energy, Molicel, Nano One Materials, Rivian, Robert Allan Naval Architects and Marine Engineers, Sandvault, Unilia Fuel Cells, VeloMetro Mobility

Renewable & Low Carbon Fuels & Charging Infrastructure

AddEnergie Technologies, Analytics Systems, Consolidated Biofuels, Daanaa Resolution, Delta-Q Technologies, Ekona Power, Electrum Charging Solutions, Enbala, EverGen Infrastructure, G4, Greenlane Renewables, Greenlight Innovation, HTEC Hydrogen Technology and Energy Corporation, Hydra Energy, Hydrogen in Motion, IRDI System, Lab 498 Products/VoltSafe, Palcan Power Systems, Parkland Fuels, Powertech Inc, Quadrogen, Recharged Technologies, Shift Clean Energy, Tandem Technologies, West Coast Reduction, Westport Fuel Systems



Transferable Technologies & Services

7 Generation Capital, Breeze Traffic, Freightera, Greenline Technologies, Liftango, LOOPShare, Mojio, Plugzio, Poparide, Routific, Spare, Uplight, VuLog

Firms identified in green are within the hydrogen cluster.

Figure 1: Clean Transportation Firms by Category in the Metro Vancouver Region

3 The direct employment number will soon be higher still, as many of the firms report they are hiring now and/or expect to add more people soon.

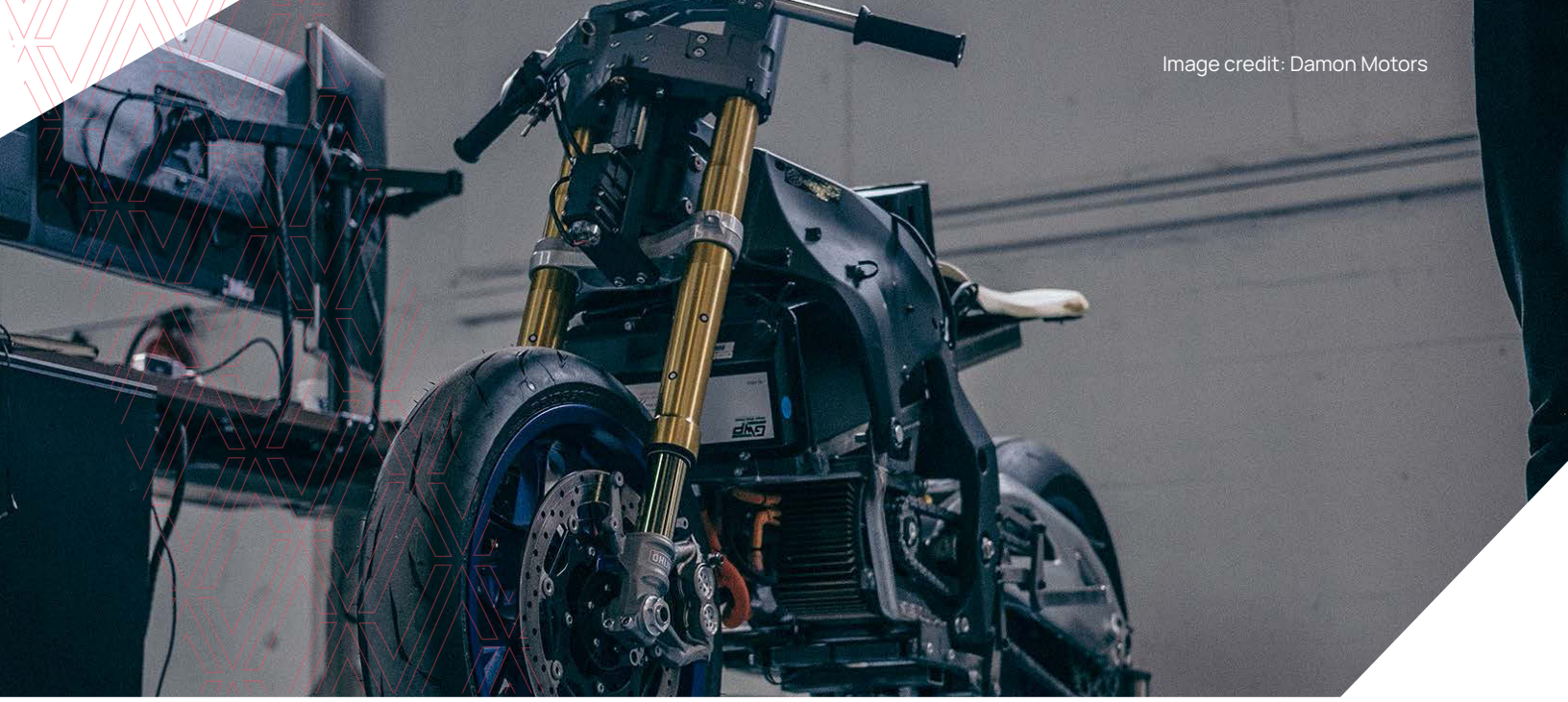


Image credit: Damon Motors

The internal combustion engine-based automotive manufacturing industry, including suppliers of parts and components, is highly concentrated in central Canada. Ontario accounts for virtually all light-duty passenger vehicles produced in Canada, while Quebec leads in recreational, heavy-duty, and speciality vehicles, plus buses. Given the deep supply chains and concentrations of talent there, it is unremarkable that Ford and GM are investing in battery electric vehicle production in Ontario.

The production of low- and zero-emission vehicles and components in the Metro Vancouver region, in contrast, is compromised of firms working in specialized niche markets. Surrey-based Damon Motors, for example, will soon begin commercial production of high-end electric motor cycles; Pitt Meadows-based FVT Research designs and installs electric drives that convert underground mining equipment to ZEVs; Vancouver-headquartered GreenPower Motor Company supplies electric buses; and Vancouver-based Robert Allan Naval Architects and Marine Engineers designs (among other things) electric tugboats. There is also an impressive collection of firms working on all aspects of hydrogen fuel cells, headlined by Burnaby-based Ballard Power Systems, cellcentric, and Loop Energy.

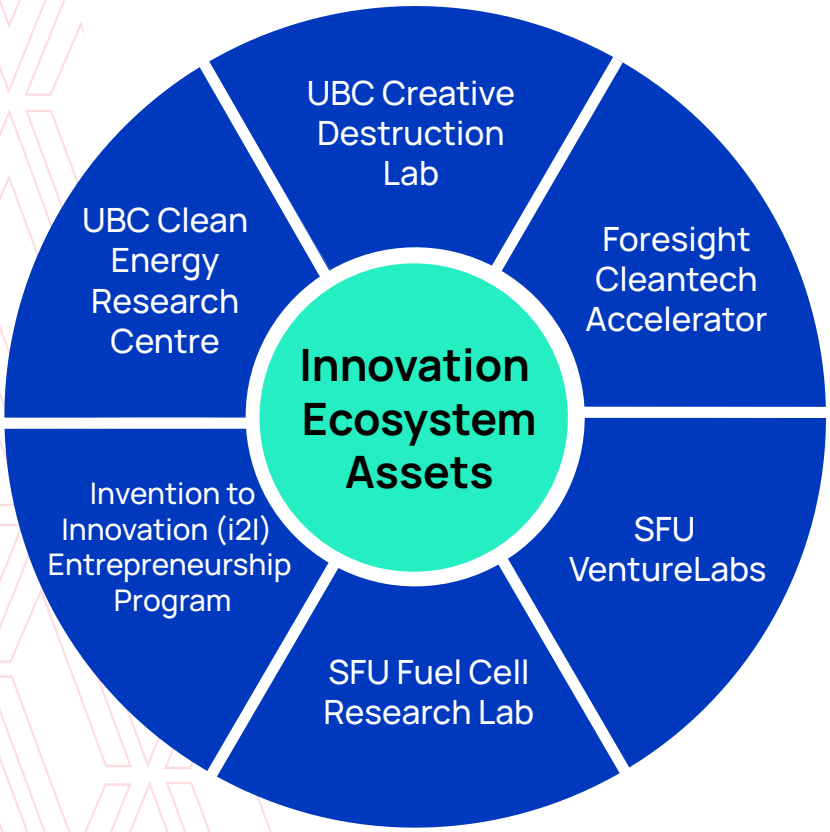
In renewables and low carbon fuels and charging infrastructure, there are firms working on renewable natural gas and biogas (such as Burnaby-based G4 and Quadrogen) and low carbon fuels (such as Burnaby-based Parkland Fuels, which uses feedstock from West Coast Reduction to produce biodiesel). Also batteries (Maple Ridge-based Molicel makes batteries for a variety of uses, including transportation) and battery chargers (Burnaby-based Delta-Q). Firms working on all aspects of hydrogen production and storage (such as Vancouver-based Ekona Power, Vancouver-based Hydrogen in Motion, North Vancouver-based HTEC, and many others) comprise the largest group in this category.

Transferable technologies and services is a small but exciting collection of firms working on clean transportation-related apps, software, technologies, and services. Vancouver-based Breeze Traffic, for example, converts "dumb" intersections to smart ones that can be optimized to reduce vehicles emissions using AI and machine vision; Richmond-based Plugzio sells a smart outlet and billing service that allows building owners to charge electric vehicle owners for power; and Vancouver-based 7 Generation Capital offers turn-key electric vehicle solutions for fleet operators.

Clean Transportation Assets in the Metro Vancouver Region

Firms across the clean transportation sector identify their top reason for locating in the Metro Vancouver region as frictionless access to skilled, "ready to work" talent. Firms started or moved here to take advantage of the knowledgeable and experienced workforce. In particular, the region has deep pools of talent in the following occupational categories: mechanical systems engineers; infrastructure team leads; fuel systems engineers; test engineers; and research scientists/engineers. The region's clean transportation sector is further supported by an active network structure and strong ties to research institutions and accelerators (see figure 2). Interviewees from firms in all three clean transportation categories praised the local innovation ecosystem.

Figure 2: Innovation Ecosystem Assets in the Metro Vancouver Region



Capital Investment

From 2017 through to 2021, firms headquartered in the region attracted more than $2.6 billion in capital investment (see figure 3).[4] This investment activity has been concentrated in low- and zero-emission vehicles and components (67%); followed by renewables and low-carbon fuels and charging infrastructure (29%), and transferable technologies and services (4%). The largest deals year-to-date are highlighted in the box (see figure 4).

Capital Investment (2017-2021)

Investment in Firms Headquartered in the Region		
Year	$ invested (millions)	Deal count
2017	94	22
2018	271	7
2019	102	19
2020	663	21
2021	1,536	16

Source: PitchBook 2021

Figure 3: Capital Investment in Firms Headquartered in the Region

2021 Deal Highlights

- $922M cellcentric (Daimler Truck AG and Volvo Group)
- $217M HTEC
- $139M Westport Fuel Systems
- $100M Loop

Source: PitchBook 2021

Figure 4: 2021 Deal Highlights

Public Sector Financial and Technical Support for the Clean Transportation Sector

B.C. Hydrogen Strategy is setting the course for B.C. to be a world leader in the growing hydrogen economy.

Scientific Research and Experimental Development (SR&ED) tax programs to encourage Canadian businesses of all sizes and in all sectors to conduct R&D in B.C. and Canada.

B.C. Low Carbon Fuel Standard provides a financial incentive for low carbon fuel use. This generates revenue for low carbon transportation fuel suppliers and supports investment in clean fuels and vehicles.

CleanBC Go Electric Advanced Research and Commercialization (ARC) program supports the development of companies operating in the zero-emission vehicle (ZEV) sector.

B.C. Centre for Innovation and Clean Energy will be an incubator for the research and commercialization of technologies, including carbon capture, utilization and storage, production and distribution of low-carbon hydrogen, biofuels, synthetic fuels, renewable natural gas and battery technologies.

BC-SMART Low Carbon Fuels Consortium brings together industry, the provincial government and UBC to encourage the production and use of drop-in biofuels to decarbonize long-distance transport.

4 The actual total is likely much higher, due to limitations with PitchBook which doesn't include, for example, a situation where a firm from outside the region sets up a new operation here.

III. Findings and Recommendations

Talent Development and Training Programs

Findings

The clean transportation sector requires specialized knowledge covering a wide range of occupations along the educational attainment continuum, including: mechanical and systems engineers; research scientists; technologists; machinists and technicians; and technical experts in areas ranging from software development to clean energy processes. The quality and specialization of the talent available in the Metro Vancouver region have been major draws for firms choosing to locate here. This is especially true of the hydrogen sector, where the engineering expertise in the region leads the world. Indeed, one firm described choosing to locate in the Metro Vancouver region "as a shortcut," because the ability to hire skilled engineers with hydrogen fuel cell expertise shaved years off its development schedule. Accordingly, this has also led to aggressive firm-to-firm competition for experienced engineers, with firms "poaching" talent from each other.

And while the clean transportation sector represents an attractive field for people looking for a career that contributes to a more sustainable future, the Metro Vancouver region faces significant challenges retaining talent and attracting new workers from outside the region due to the high overall cost of living, and in particular, high housing costs. This is especially seen in mid-career-level talent for in-demand positions, such as mechanical engineers, where a lack of affordable single-family homes deters relocations to the region. This could become an acute constriction point on growth as more affordable locales, such as the Calgary and Edmonton metropolitan regions, look to compete in the clean energy space, particularly in renewable natural gas (RNG).

Image credit: Loop Energy

Image credit: Damon Motors

In-Demand Hard Skills in the Hydrogen Cluster:

- New Product Development
- Mechanical Engineering
- Supply Chain
- Chemistry
- Instrumentation
- SolidWorks (CAD)
- Thermodynamics
- Chemical Engineering
- Data Analysis

Source: Emsi 2021.1

Figure 5: Top Hard Skills Identified in Hydrogen Sector Job Postings 2018-2021.

Technologists are an in-demand occupation in the region's hydrogen sector, with skills such as chemistry and instrumentation being highly sought after (figure 5). Technologists are also a critical component in the R&D phase of emerging clean energy technologies, such as hydrogen and biofuels. The British Columbia Institute of Technology (BCIT) Chemical and Environmental Technology program was specifically referenced during the interview process as an excellent program that graduates approximately 30 'ready to work' individuals per year in emerging clean energy fields. Often students graduating from this program have secured employment long before graduation, as their skill sets are in short supply. Fostering in-region talent is a critical step in offsetting the Metro Vancouver region's out-of-market talent attraction issues, as Metro Vancouver-based talent is often less willing to leave the region, housing challenges notwithstanding.

Recommendation:

Expand capacity within the BCIT Chemical and Environmental Technology program to increase the number of students graduating from 30 to 60 by 2025. A shortage of available technologists within the clean transportation sector has led to engineers and research scientists being underemployed as technologists. While BCIT currently does not have any plans to expand the program, it is in the midst of a program and curriculum review. That the program's graduates are effectively "over-subscribed" is clear evidence it is aligned with industry needs; increasing the capacity of such an industry-responsive program (or creating a similar program at another college or university campus) seems to be an easy choice.

Permitting Processes and Rules

Findings

Mirroring the experience of firms in other fast-growing industries, clean transportation firms are routinely encountering problems securing required permits in a timely fashion. Transferable technologies and services firms, whose physical space requirements are often modest, faced the least trouble, while those in renewable fuels and hydrogen reported the greatest difficulties. The process of getting permits for working with (and in particular, storing) hydrogen has been described by industry interviewees as "ridiculous," "frustrating," and "dreadful". In a related problem, existing regulatory regimes do not always account for hydrogen, as in rules covering the sale of gasoline and diesel at gas stations, which understandably did not anticipate the sale of hydrogen.

Interviewees were candid in describing the importance of a clear, timely, technology-based permitting process. One interviewee described the permitting issue as an "almost certain barrier to further in-region investment," and several interviewees acknowledged that their firms were adding space outside of the region in locations where permitting processes are perceived to be less onerous. The uncertainty, lack of transparency, and delays encountered in the permitting process could deter additional investments made in-market. Fixing burdensome and time-consuming permitting processes should be a top priority.

Recommendations:

Modernize permitting processes for projects to provide greater accountability, certainty, predictability, and reduced risk. Delays to obtaining permits are a significant barrier to success for clean transportation firms and risk future investments in this sector. A modernized approach needs to be implemented for the region to compete in this global market. As an example, Surrey City Council recently approved guaranteed permitting timelines as part of a shift to a more customer service-focused approach that includes multiple best practices such as:

- single point of contact / one project, one planner
- pre-application meetings
- enhanced digital service
- improved communications, including more regular permit status updates

A similar initiative of process reform should be considered by other cities within the Metro Vancouver region that are interested in attracting more clean transportation investment. Invest Vancouver will support this effort by conducting a best management practices scan of municipal permitting processes elsewhere in Canada and globally with the aim of identifying promising permit approval approaches that competitive firms expect when selecting a business location.

Update and harmonize rules governing hydrogen. There is currently a patchwork approach across the region to the rules governing hydrogen. Through relevant industry associations, such as the Canadian Hydrogen and Fuel Cell Association, industry and government should collaborate on a set of sample "model regulations" covering the distribution and sale of hydrogen that can be broadly relied upon, locally adapted, and eventually adopted by municipalities across the region.

Physical Spaces

Findings

Suitable physical spaces are in critical need for clean transportation firms, especially those that are engaged in industrial activities, such as storing of hydrogen and testing of hydrogen fuel cells or other clean energy processes including RNG or biofuels. The vacancy rate for industrial land region-wide has fallen below one percent (see figure 6), which is reflected in interviewees reporting site searches taking 12 to 18 months, or more. The problem is especially acute for light and heavy industrial spaces; the latter of which is required for chemical processes, for example, involved in low pressure hydrogen storage. Spaces larger than 50,000 square feet are particularly in need but hard to find, and those larger than 100,000 square feet are simply unavailable, which precludes many anchor-potential firms from considering and/or investing in the region.

Given these market conditions, it is unsurprising that many interviewees reported feeling "lucky" to have found the space(s) that they currently occupy. Policy makers should be worried about potential new entrants to the industry or market who are not as lucky, as well as existing firms looking to expand. All of the interviewees from firms in the hydrogen cluster, and many of those from non-hydrogen firms, reported their firms were growing, adding employees, and looking for space. If they were not currently looking for space, they expected to be looking within the next several years. If they are unable to find suitable industrial space in the region, these firms will be forced to look elsewhere, however deep the local pool of specialized talent.

Beyond issues of scarcity and cost, industrial land policy presents myriad challenges. From the perspective of clean transportation firms, they need options. As employers, they want centrally located, transit accessible sites that avoid burdening their employees with long commutes. Some firms working on RNG and hydrogen have addressed these needs by effectively converting warehouse space into de facto R&D spaces with addition of higher capacity electrical service. (Testing their prototypes, for example, requires considerably more power than is supplied to a typical warehouse, so the building's power supply has to be upgraded.)

Industrial Lands in Metro Vancouver

- Industrial lands comprise 4% of the region's land base, and accommodate 27% of the region's jobs.
- Industrial land prices in Metro Vancouver are amongst the highest in North America.
- Industrial jobs pay 10% higher than the regional average
- Business activity on industrial lands generates 30% of the region's total Gross Domestic Product (GDP).
- The Q3 2021 vacancy rate for industrial land in Metro Vancouver was 0.5%.

Sources: Metro Vancouver, Colliers

Figure 6: Industrial Lands in Metro Vancouver

Recommendations

Invest in sector-critical physical spaces to be leased to firms at below-market rates. For example, to assist with applied/translational research, prototyping, design, commercialization, production, and market penetration, the recently announced InBC fund should carve out a portion of the assets under management to invest in building or renovating clean transportation sector-supporting physical spaces, such as sites with hydrogen storage, and leasing them to clean transportation firms at below-market rates. Unlike investing directly or indirectly, through a fund-of-fund strategy or otherwise, in start-up and development-stage firms, investing in physical assets, such as sector-supporting facilities, would serve many vintages of start-up and development-stage firms, while providing the fund with an appreciating asset and coupon (in the form of lease payments) that could be re-invested in the fund.

Amend the CleanBC Facilities Electrification Fund eligibility to include utility upgrades of warehouses to meet clean technology R&D power needs. To reduce barriers to suitable industrial spaces, the eligibility of the CleanBC Facilities Electrification Fund should be amended to include clean technology R&D firms as eligible to receive a subsidy to upgrade their utility connections to meet their sizable power needs. Reducing the financial burden of having to upgrade warehouse spaces to suit their power needs will provide the clean transportation sector's R&D-intensive firms with more options when it comes to finding physical spaces in the region.

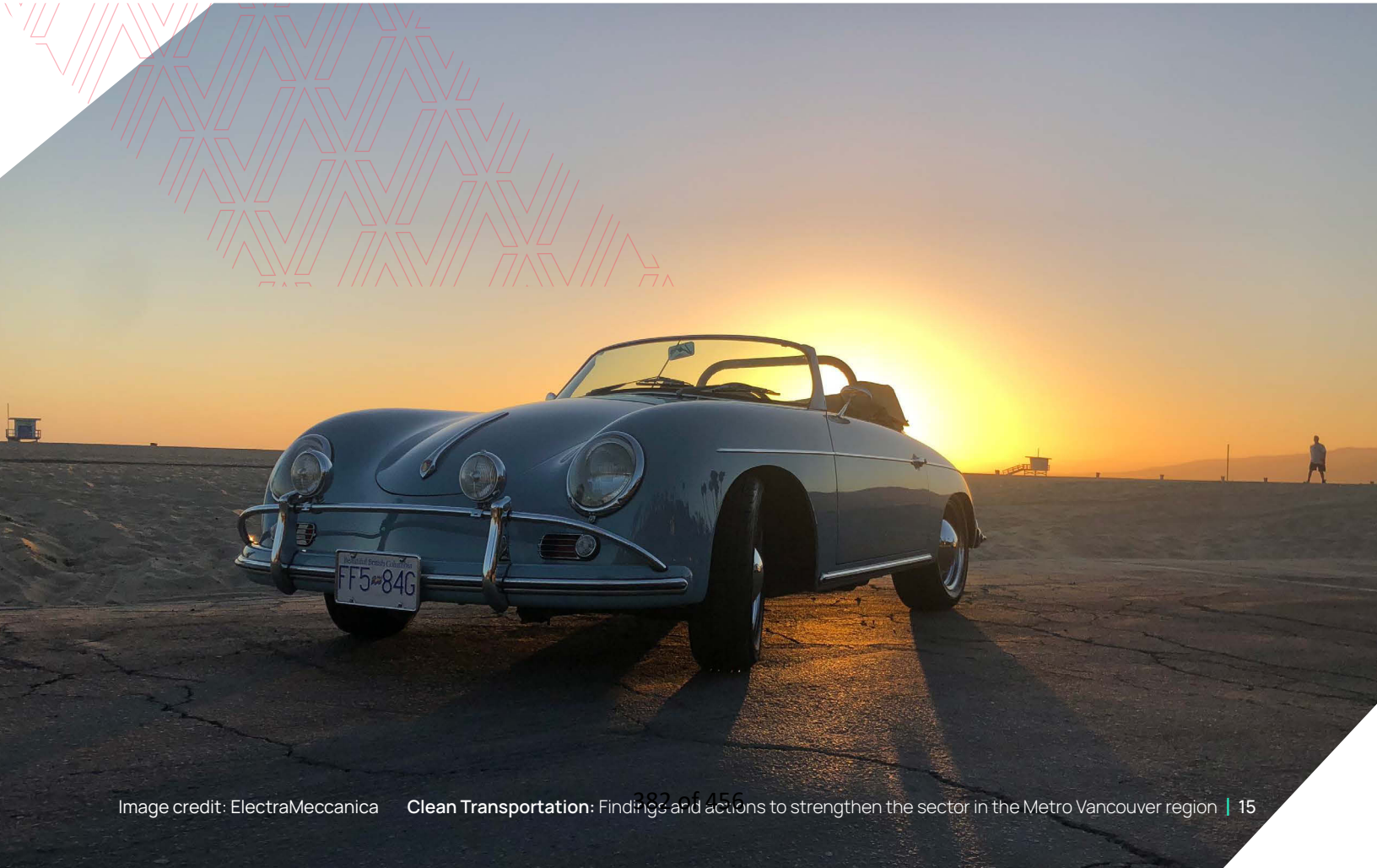


Image credit: ElectraMeccanica

Financial Capital Formation and Access

Findings

For firms operating in a globally competitive environment, access to debt, equity or specialty financial capital is a crucial input at every stage along a firm's development life-cycle. Many interviewees cited access to capital as a particular challenge. Fortunately, many of the interviewees said their firms have recently closed or are about to close funding rounds.

Generally, interviewees expressed support for the clean technology-related funding programs available through the federal and provincial governments, while still describing them as "difficult to access," even for interviewees who are serial entrepreneurs who have successfully secured funding from the same public sources for previous ventures. Some interviewees believed there is a public funding bias against certain clean fuel technologies, including hydrogen, associated with government funding programs. In addition, some interviewees also voiced concern that the financialization of real estate and the continued price escalations across most segments of the real estate market, with its potential for comparatively "quick and easy wins," were crowding out investment in other industries, including clean transportation.

Other interviewees expressed disappointment that despite the perceived environmentally conscious resident population of the province, local investors have been less willing to invest in clean transportation technologies compared to investors from the European Union and China. For some clean transportation firms, where the investment and demonstration opportunities for their technologies are coming from other countries, relocating out of the region becomes a more attractive option.

This was the case for Corvus Energy (Corvus), the battery technology company that found a receptive audience in Norway. In 2019, Corvus relocated their headquarters, effectively becoming a Norwegian company, with all the direct and downstream value-added economic benefits flowing to Norway instead of the Metro Vancouver region.

Finally, interviewees that had successfully built and 'exited' companies in the past were more easily able to navigate the capital finance and investing ecosystem due to relationships formed in past roles. This relationships-based funding often excludes women and communities of colour, who may be excluded from or not have access to the same network that traditionally offer connections to investors.

Recommendations

Assess the capital formation and syndication relationships and network interactions within the region's clean transportation industry through predictive analytics work. Private capital access, formation, and redeployment ('post-exit', for example) in the clean transportation sector, as well as across other industries in which the Metro Vancouver region has specialization, is a hotly debated issue; some believe there is a systemic lack of proof-of-concept, 'pre-seed', and 'seed'-stage capital in the Metro Vancouver region, while others believe the more pressing problem is not having enough "investment worthy" firms. And, of course, both could be equally or unequally true. This requires further analysis, as the economic development strategies differ markedly depending on what is found. For this reason, Invest Vancouver is undertaking a major investigation of the role of capital in this and other industries as a prelude to developing recommendations in this area.

Cluster Capacity Building Opportunities

Findings

A hydrogen-based industry cluster has developed in the Metro Vancouver region, encompassing all aspects of the hydrogen ecosystem, including production, transport, storage, membranes, fuel cells, testing, and consulting. Firms in the industry cluster have been attracting private capital investment and adding employees. The sector is poised to become an economic driver for the region if pressing challenges can be overcome, such as:

- breaking the supply/demand deadlock;
- creating opportunities to demonstrate hydrogen technology in the region; and
- addressing the lack of industrial space and resolving the difficulty with permits, as discussed above.

The growing hydrogen industry cluster represents a lucrative economic and fiscal opportunity for the region (see figure 7), as it is well positioned globally since so few other economic regions have an equally concentrated cluster of firms working with hydrogen. A concentration of firms in the same industry (or adjacent, complimentary industries) can foster the cross-pollination of ideas and create a reinforcing cycle where skilled workers are drawn to a regional industry's pooling of employment prospects in their respective fields, and new firms are attracted to or created by the collected pool of talent. This dynamic can be seen in the constellation of firms founded by former Ballard Power Systems employees, and the arrival in the region of AVL (an Austrian firm that is the world's largest independent powertrain company), as well as the joint venture between Daimler Truck and Volvo Group, cellcentric.

As touched on above, the hydrogen industry cluster's greatest strength is the presence of an unparalleled collection of experienced workers. It is bolstered by strong ties to the University of British Columbia (UBC), Simon Fraser University (SFU), and BCIT, along with locally-allied industry associations and accelerators, and the industry stands to benefit from provincial, and federal hydrogen strategies.

> It is estimated that by 2050 clean hydrogen will make up as much as 25 percent of the world's net-zero energy mix, generating a **$20 trillion** infrastructure investment opportunity, new technologies, companies, jobs, and ultimately a cheaper energy system.
>
> Source: Bloomberg New Energy Finance

Figure 7: the Future Hydrogen Economy

Yet, the development of the region's hydrogen industry cluster is at a critical juncture. The industry is plagued by a classic 'chicken-and-egg' problem with respect to supply and demand; namely, there is little incentive to supply hydrogen without demand, and such demand will never materialize without the promise of a steady supply. Access to readily available green hydrogen in the region (taking advantage of B.C.'s abundant supply of clean electricity) would encourage the testing of new technologies to lower greenhouse gas emissions, such as within heavy-duty vehicles. Firms that are pressing ahead with supply face multiple challenges, particularly with respect to regulations that do not account for hydrogen as a fuel.

Firms based here have to look elsewhere for demonstration opportunities, most notably in the Province of Alberta and countries, such as Italy, Germany, and China. One interviewee likened the situation in hydrogen to "trying to demonstrate a new computer graphics card by pointing to shelves full of computer parts in a room without an electrical outlet." Even more important than the obvious need to demonstrate new technologies, firms need opportunities for real-world testing. Multiple

Image credit: HTEC

interviewees stressed the importance of being able to test (and refine) their technologies closer to home. Deploying hydrogen applications in-region would be a powerful indication of support for the industry.

Permits and suitable workspace challenges (as described above) are acute for firms working with hydrogen. There is a real risk that unless these challenges can be overcome, firms will drift away one location, demonstration project, or permitting decision at a time, as happened with Corvus (described above).

Recommendations

Launch a hydrogen hub. Getting a reliable in-region hydrogen hub established in the Metro Vancouver region is a crucial component of the B.C. Hydrogen Strategy. The strategy emphasizes the importance of co-locating hydrogen production with end-use applications. In collaboration with the Ministry of Energy, Mines and Low Carbon Innovation and the Canadian Hydrogen and Fuel Cell Association, Invest Vancouver has agreed to convene member-municipalities to accelerate this project. Municipalities should support this effort as both a major economic development opportunity for the region's clean transportation sector and an opportunity to decarbonize hard-to-decarbonize sectors of the economy.

Fund a large-scale hydrogen powered heavy-duty vehicle demonstration project. No one wants to be the "first mover" on what are perceived to be unproven technologies. So understandably, municipalities and the Port of Vancouver are conservative in their procurement and purchasing decisions, and, for this reason, expecting them to commit huge sums to purchase early-stage technologies may not be realistic. The province, however, should purchase a small fleet (for example) of heavy-duty hydrogen-powered vehicles for lease to interested municipalities. By shifting some of the financial risk associated with early adoption, such a strategy might help encourage more expansive local deployment. And scaling up from tests to production will eventually help move hydrogen technologies along the cost curve towards lower prices and, most important, early deployments will serve as in-region 'test beds' for locally developed technologies. This is one way to move the industry along the development continuum from start-up stage, to development-stage, to commercial-stage, to production-stage, to global export-stage.

Establish a centre to assert global leadership in hydrogen certification. Create a centre that can test fuel cells and balance of plant components to the specifications of the U.S. Department of Energy, the European Union ("harmonized protocols", FCH-JU), and Japan (NEDO). The goal should be to follow the path in solar energy testing and certification blazed by Germany, and create accredited hydrogen

certification labs, much as the Fraunhofer Institute of Solar Energy Systems does for photovoltaics. This would deepen the R&D, design, and prototyping capacities of the hydrogen industry cluster here in the province, attract work from major original equipment manufacturers, and provide additional "stickiness" to the industry in the region. (Powertech Labs does some of the only global balance of system certification work and would be a logical partner.)

Create certainty by establishing a long-term electric power rate for hydrogen production. The new CleanBC industrial electrification rates offered by BC Hydro provide up to seven years of discounted power for industries setting up or expanding operations in B.C., including hydrogen. With the cost of major industrial facilities amortized over decades, it makes sense to create a matching, longer-lived rate structure as an incentive for "first movers" assuming the risk of building facilities for water electrolysis production of hydrogen in B.C. Certainty around the cost of green hydrogen production through electrolysis will act as signal to investors that hydrogen is a priority area for the province. Additionally, as more capital is invested in the production of hydrogen, technological improvements will be made and the cost of producing hydrogen will decline. Encouraging in-region production of green hydrogen will also mean that the need to use out-of-province higher carbon-intensity gray or blue hydrogen will decline in the region.

Expand eligibility for ZEV subsidies to include hydrogen fuel cell vehicles. Due to accelerating gains in productivity, specialization, and experience, hydrogen technologies will likely follow the same declining price per unit trend of other clean technologies, such as solar panels and electric vehicles. For now, hydrogen technology is earlier along the price curve (meaning it is more expensive), so the price cap for ZEV rebates, which were intended to prevent the public from subsidizing luxury battery electric vehicles, excludes fuel cell vehicles. The province should consider setting a provisionally higher limit for ZEV rebates specific to fuel cell vehicles, which would then decline over time as those productivity and other gains are realized and prices decline. This would have the effect of encouraging the use of hydrogen fuel cell vehicles in the province and Metro Vancouver region, providing industry with the opportunity to demonstrate their technologies and advancing improvements to bring the price down.

Strive for technology-neutral rules whenever possible. With rapidly changing technology, it is important to avoid locking in or locking out potential technological solutions, especially when the excluded ones just might beget entirely new industry sectors. For example, burning green hydrogen in a modified internal combustion engine is omitted from the provincial Commercial Vehicle Pilot program, and the Motor Fuel Tax regulation provides an exemption for hydrogen, but only "when used in fuel-cell vehicles." There is broad scope for applying this technological neutrality principle with respect to hydrogen in particular, and clean transportation in general. Technology-neutral policies should be standard, sending the signal to entrepreneurs and start-up companies all over the world that British Columbia offers a competitive landscape that values and wants you, your firm, and your intellectual property (and potential royalties) to come innovate, build, scale, headquarter, and export from here.

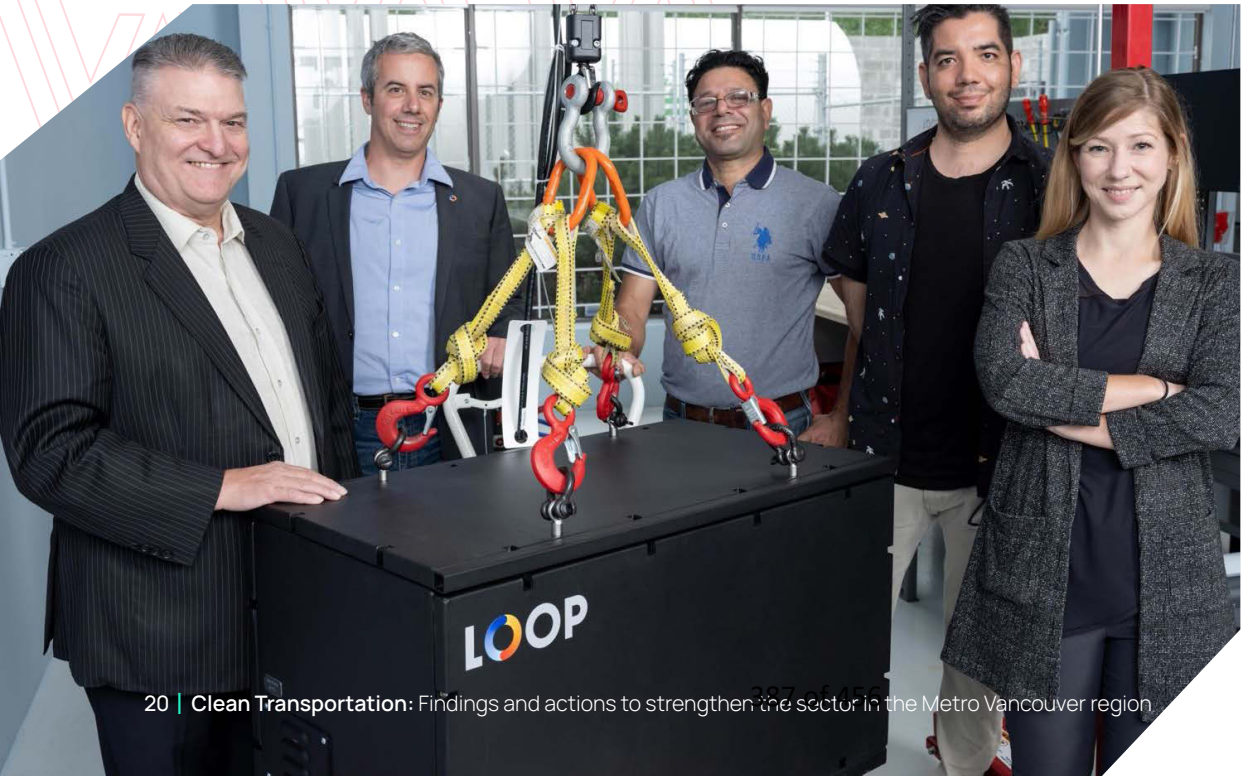
Culture of Innovation

Findings

Interviewees from firms in all three categories of clean transportation mentioned the need "to create a culture of innovation in the region." There is a general disappointment, amongst interviewees, that the commitment to tackling the climate emergency is not matched by public support for local firms developing the technologies that will make lowering greenhouse gas emissions possible. Municipalities, in particular, were cited for their "risk-aversion" when it comes to their procurement policies and purchasing new or emerging technologies from "home-grown" enterprises. Multiple firms described finding local governments in the U.S. and Alberta, for example, more open to supporting new technologies and enterprises in their procurement decisions than governments here.

Recommendations

Encourage greater participation in "Project Greenlight" and other public-private partnerships to encourage a culture of innovation across the Metro Vancouver region. Project Greenlight is a membership-driven demonstration platform that forges strategic partnerships between public and private enterprises ("members") and technology companies ("innovators"). Governments and government agencies should commit to greater participation in Project Greenlight, as well as in similar public-private partnership programs as a way to balance their understandable desire to de-risk their procurement decisions by purchasing "already commercialized" technologies with economic development. The goal should be to catalyze innovation and to build capacity within target industries, such as clean transportation, by using procurement levers to produce an environment in which innovative firms and new (and previously unknown) industry sectors can thrive, expand, hire and reinvest in the region.



IV. Conclusion

Talent, the innovation ecosystem, supporting incentive and regulatory environment, and leading hydrogen expertise mean that the Metro Vancouver region is well-positioned to seize the opportunities presented by the transition to a cleaner future. Yet, urgent action is needed to address barriers to investment for the clean transportation sector. Most time sensitive are the need to modernize and streamline the permitting process, improve access to highly-limited industrial space, and support a hydrogen hub to accelerate industry growth. The recommendations in this report will allow the region to go beyond creating a market for low carbon transportation and create a thriving clean transportation industry.

Invest Vancouver would like to thank all interviewees for their time and for sharing their insights.

INVEST VANCOUVER

Opportunity, Amplified.
In a region like no other.

InvestVancouver.ca

@Invest_Van

To: Regional Economic Prosperity Management Board

From: Katie Fitzmaurice, Vice President, Invest Vancouver

Date: October 29, 2021 Meeting Date: November 17, 2021

Subject: **Communications and Social Media Update**

RECOMMENDATION

That the MVRD Board receive for information the report dated October 29, 2021, titled "Communications and Social Media update."

EXECUTIVE SUMMARY

On September 24, 2021, Metro Vancouver's Regional Economic Prosperity Service (REPS) rebranded to *Invest Vancouver*. Launch activities included a media release, a targeted e-mail campaign to drive traffic to the new Invest Vancouver website, a presentation at a Greater Vancouver Board of Trade (GVBOT) event, an announcement related to a workforce development initiative, and social media posts. Between September 27 and October 27, the new website (investvancouver.ca) has received 2,331 visits from 1,535 unique visitors, posts on social media have been viewed 19,468 times, and ten earned media articles have referenced Invest Vancouver.

While the official launch of the brand occurred over a two-week period, the brand will continue to evolve going forward. Staff will continue to seek feedback from the Invest Vancouver Management Board and Regional Economic Prosperity Advisory Committee (REPAC) and ensure the brand and website best positions the region to a global audience while respecting and highlighting local nuances.

PURPOSE

To provide a summary of the activities associated with the launch of Invest Vancouver, an overview of key metrics associated with the Invest Vancouver website, social media platforms, and other communications activities, and to indicate next steps with respect to incorporating member jurisdiction feedback to further refine the website and other brand assets.

BACKGROUND

As set out in the REPS business plan endorsed by the MVRD Board at its July 26, 2019 meeting, the priority for this service is to attract strategic investment to the Metro Vancouver region. Foundational to attracting strategic investment to the region is the creation of a global brand to articulate and amplify the benefits of the Metro Vancouver region and the opportunities the region offers. Extensive research and engagement processes have occurred to date to support brand development. Application of the brand, including the website, occurred through an accelerated process, leading to the launch of Invest Vancouver on September 24.

The remainder of this report provides a summary of the launch activities, highlights key metrics, and outlines next steps with respect to incorporating member jurisdiction feedback to further refine the website and other brand assets.

LAUNCH ACTIVITIES

On Friday, September 24, the MVRD Board endorsed the launch of the Invest Vancouver brand and on Monday, September 27th, a media release related to the launch of Invest Vancouver was published (see Attachment 1). The following day a media release related to a regional tech workforce development initiative was also released under the new brand (see Attachment 2).

Through October 27, the Invest Vancouver media release announcing our launch has been viewed 310 times and the regional tech workforce development initiative media release was viewed 272 times. Following the media releases, two radio interviews were conducted (Business In Vancouver and CKNW) and Invest Vancouver appeared in ten earned media articles, including Business In Vancouver and relevant online technology journals.

Once the media releases were made public, targeted e-mails were distributed to over 200 key contacts including to boards of trade and chambers of commerce, economic development associations across Canada, industry associations, indigenous leaders, consulates-general, and local, provincial, and federal officials.

In addition, at the GVBOT event on "Economic Recovery – Shared Investments in Critical Infrastructure," Invest Vancouver was prominently featured by members of the Metro Vancouver panel.

KEY METRICS

Media releases, publications, and targeted e-mails all serve to drive traffic to the Invest Vancouver webpage and social media channels. The chart below outlines key metrics specific to the Invest Vancouver website and social media channels.

Table: Website and Social Media Metrics, Monday, September 27 through Wednesday, October 27

Item	Metric
Investvancouver.ca	2,331 Visits (also called Sessions--number of times a user visited the website) 1,535 Unique visitors (also called Users--number of different people who visited the website) 2.78 Average Pages viewed per session
Twitter	33 posts 14,379 impressions (views) for our posts 373 engagements (e.g. link click, like, reply) 34 total "retweets" of our content
LinkedIn	21 posts 5089 impressions (views) for our posts 439 engagements (e.g. link click, like, comment) 35 total shares of our content

FUTURE ENGAGEMENT AND COLLABORATION OPPORTUNITIES

Appreciating that the development and launch of the Invest Vancouver brand was an accelerated process, Invest Vancouver will continue to collaborate with member jurisdictions and the Invest Vancouver Management Board to refine the brand, and in particular the Invest Vancouver website, in a collaborative and iterative fashion. Going forward, following any significant updates to the website, member jurisdictions will be provided with input and feedback opportunities as well as key metrics related to the website pages in question.

In order to ensure that the website content is kept up to date, an e-mail will be sent to member jurisdictions on an annual basis requesting feedback, including to the "discover our region" webpage that features individual profiles of each member jurisdiction.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

There are no financial implications associated with the report.

CONCLUSION

To support the attraction of strategic investment into the region, Metro Vancouver's Regional Economic Prosperity Service (REPS) developed a global brand to articulate and amplify the benefits of the Metro Vancouver region and the opportunities the region offers. Invest Vancouver launched on September 24 and received notable media attention (582 views of media releases, ten publications). Launch activities included a targeted e-mail campaign, social media posts, a Greater Vancouver Board of Trade presentation, and the publication of two media releases. Invest Vancouver will continue to collaborate with member jurisdictions to ensure that the brand and website best present the region to a global audience while respecting local nuances.

Attachments

1. Media Release – NEW PLAYER IN METRO VANCOUVER'S ECONOMIC DEVELOPMENT LANDSCAPE TO PROPEL REGION INTO NEW ECONOMY, Invest Vancouver to Become the Region's Economic Prosperity Services
2. Media Release – INVEST VANCOUVER AND AMAZON WEB SERVICES COLLABORATE TO ENHANCE TECH SECTOR JOB TRAINING IN METRO VANCOUVER

48592990

September 27, 2021

Media Release - NEW PLAYER IN METRO VANCOUVER'S ECONOMIC DEVELOPMENT LANDSCAPE TO PROPEL REGION INTO NEW ECONOMY

Invest Vancouver to Become the Region's Economic Prosperity Service

Metro Vancouver is laying the foundation for regional prosperity with the launch of Invest Vancouver — an economic development leadership service with the goal of amplifying economic opportunity and prosperity for all the residents of the region.

"The global economy is rapidly evolving and our region is at a critical juncture — we either respond and evolve or get overtaken and passed by," said David Flaks, President of Invest Vancouver. "To help achieve the region's economic priorities, Invest Vancouver will advance greater coordination and collaboration that is necessary for economic development success in a digital age economy, moving beyond the zero-sum competition that is practiced in many other regions around the world, and bring the scale necessary to compete with the Shenzhens, Tokyos, and Mumbais of the world."

Formerly called the Regional Economic Prosperity Service, Invest Vancouver has connected extensively in 2021 with local leaders and organizations to identify the region's four economic development priorities: invest in the people of our region, catalyze innovation, build capacity in key export-oriented industries, and increase our global connectedness.

"Metro Vancouver has been repeatedly crowned as one of the most desirable places in the world to live by many global publications, however, too many residents living in this region face far too many economic hardships, including the unsustainably high cost of housing and a growing shortage of well-paying, future-proof jobs," said Sav Dhaliwal, Chair of the service's management board and the Metro Vancouver Board of Directors. "We are bringing regional scale and perspective to advance a more resilient economy and to usher in our region's next economic renaissance — one that grows prosperity outwards, not just upwards."

Invest Vancouver has accelerated its ambitious work in a myriad of ways, such as building and strengthening key economic development, trade, and investment partnerships and collaborations; engaging with decision-makers on industrial development policy and opportunities to catalyze innovation and investing in our people; and convincing global investors to consider the Metro Vancouver region as a global industry and innovation hub.

"Despite the challenges of the pandemic, British Columbia is leading Canada in economic growth, and we have no intention of slowing down," said Ravi Kahlon, Minister of Jobs, Economic Recovery and Innovation. "Invest Vancouver will support our economic recovery by attracting partners from around the world to support the people and businesses that make Metro Vancouver such a desirable place to work and live."

"The past 18 months have demonstrated the need for a dynamic and resilient regional economy. We know people and businesses have struggled. That's why I'm excited about the launch of Invest Vancouver. With guidance from some of the most forward-thinking leaders on economic development in the region, we're well positioned to enhance our place in the global economy and deliver prosperity for all people," said Linda Buchanan, Vice Chair of the Invest Vancouver management board and the Metro Vancouver Board of Directors.

For more information on Invest Vancouver, please visit www.investvancouver.ca.

Media contact:

media@investvancouver.ca

September 28, 2021

Media Release - INVEST VANCOUVER AND AMAZON WEB SERVICES COLLABORATE TO ENHANCE TECH SECTOR JOB TRAINING IN METRO VANCOUVER

Today, Invest Vancouver announced an agreement in principle with Amazon Web Services (AWS), a subsidiary of Amazon, to create a workforce development initiative that will prepare thousands of Metro Vancouver residents for well-paying jobs in the region's growing tech sector, helping to attract high-tech firms to the area.

Metro Vancouver will be the first region in Canada to introduce the regional training initiative that is based on a successful AWS program currently running across 100 community colleges through the California Cloud Workforce program. Since its launch in 2018, the program has provided thousands of learners with access to training that has led to employment in California's high-tech sector.

"Invest Vancouver identified a gap between high-tech sector employers seeking to fill positions and qualified candidates looking for work within the region, but there are barriers that keep people from entering the industry and upgrading their existing skills," said Sav Dhaliwal, Chair of the Invest Vancouver Management Board and the Metro Vancouver Board of Directors. "One key solution is to offer coordinated and equitable access to existing training at secondary, post-secondary and non-profit institutions that aligns with the evolving needs of industry. This new collaboration does just that."

Invest Vancouver and AWS will launch initially in Metro Vancouver with select post-secondary and non-profit institutions to help participants conveniently access training for some of the most in-demand tech sector careers, such as in cloud computing, artificial intelligence, cybersecurity, and data analytics.

For its part, Invest Vancouver will act as a regional convener to facilitate collaboration with industry, educational and non-profit institutions to:

- ensure that the program matches workforce demands;
- provide students with engagement opportunities with industry; and
- connect graduates with employers seeking skilled talent across the region.

This initiative with AWS squarely aligns with Invest Vancouver's goal to advance economic mobility within the region by fostering achievable career pathways for all residents; this includes creating opportunities for affordable and accessible training in careers that are at low-risk of automation and in high demand by the industries that are driving the region's economy.

AWS is supporting the program by offering resources such as access to AWS education programs, job skills mapping for relevant cloud-based jobs, as well as professional development for educators, curriculum collaboration, and free AWS account credits for students.

"Creating education-to-employment alignment is a key objective of both AWS and Invest Vancouver, who will collaborate to promote this opportunity in the Metro Vancouver region," said Coral Kennett, head of educational programs for AWS Canada, based in Vancouver. "My team looks forward to working hand-in-hand with Invest Vancouver, secondary and post-secondary institutions, industry and non-profits to address the gap in cloud education and provide targeted education opportunities."

As part of this initiative, Invest Vancouver and AWS have engaged the British Columbia Institute of Technology (BCIT) to support and promote the collaboration. Tasked with provincial strategic workforce development, BCIT is a critical player in the post-secondary system and, along with non-profit education organizations and the secondary system, will be critical to the initiative's success.

“BCIT is keen to explore opportunities with industry that can help augment and support the current, traditional secondary and post-secondary education ecosystem in meeting demand from the tech sector,” said Dean Hildebrand, Dean of the School of Computing and Academic Studies at BCIT. “BCIT is deeply committed to diversity and inclusion, and always aims to increase accessibility, whether through high-tech credentials, microcredentials, or new MOOCs (free online learning courses).”

For more news on the initiative between Invest Vancouver and AWS and invitations to events and workshops, learners, employers, and non-profits are encouraged to visit investvancouver.ca

Media contact:

media@investvancouver.ca

To: Regional Economic Prosperity Management Board

From: Chris Heine, Vice President, Strategic Investment

Date: November 1, 2021 Meeting Date: November 17, 2021

Subject: **Strategic Investment Operations Update**

RECOMMENDATION

That the MVRD Board receive for information the report dated November 1, 2021, titled "Strategic Investment Operations Update."

EXECUTIVE SUMMARY

Invest Vancouver had a successful brand launch on September 24, 2021 to establish the region's "front door" to a global investment audience and is actively servicing strategic investment prospects which are considering the region. To ensure the efficacy of regional efforts to service investment prospects (as well as regional business retention) Invest Vancouver is laying the necessary groundwork across three key operational areas to support and enhance the delivery of its strategic investment function:

1) Adoption of Strategic Investment Guiding Principles
2) Implementation of Strategic Investment Key Performance Indicators (KPIs)
3) Activation of a Customer Relationship Management (CRM) platform

Reports of these three operational aspects were presented to and endorsed by the Regional Economic Prosperity Advisory Committee (REPAC) on October 20, 2021.

PURPOSE

To provide a summary of three key operational areas which Invest Vancouver has implemented, or is in the process of implementing, with respect to its strategic investment function.

BACKGROUND

As a service to its member jurisdictions, Invest Vancouver is committed to working collaboratively on strategic investment projects and opportunities in order to guide and advance economic growth and shared economic prosperity for the region. The below noted operational elements provides structure to buttress the important work already underway, supports sound practices and collaboration amongst all partners in the region, and ensures actions relating to strategic investment attraction are done so in a transparent and thoughtful manner.

Strategic Investment Guiding Principles

Based on discussions with REPAC, Invest Vancouver has implemented a set of *Strategic Investment Guiding Principles* to serve as a universally acknowledged, compact "playbook" of engagement for Invest Vancouver and member jurisdiction partners across the region. It was recognized, based on direction from REPAC and comparison of like agencies, that these principles not be overly prescriptive (ie. adopted as malleable "guiding principles" as opposed to signatory-bound "protocols") and members subscribe to the spirit of these principles in their collective work.

The guiding principles are aligned with Invest Vancouver's values and objectives relating to attracting strategic investment for the greater benefit of the region, in concert with member jurisdictions. At a high level, the guiding principles echo key considerations raised by REPAC members and speak to the role of Invest Vancouver to:

- Deliver a transparent and equitable service and support a level playing field across the region
- Foster collaboration and information sharing via a common platform or process
- Amplify local value propositions and present investors intelligence on all corners of the region
- Ensure member jurisdictions are engaged early while ensuring quality and maturity of leads
- Provide comprehensive, end-to-end support throughout the entire investment cycle
- Facilitate relationship building amongst municipalities, industry and levels of government
- Champion regional successes and elevate matters of regional economic priority to government decision-makers

Key Performance Indicators (KPIs)

Invest Vancouver will be implement KPIs to track the performance of its strategic investment function for fiscal year 2022 (January – December 2022). These KPIs will be a key part of Invest Vancouver's KPIs for the service as a whole. The first year will be focused on collecting data in order to inform the benchmarking process for future years. The KPIs to be tracked will be:

- Value of new investment facilitated and retained in the region ($ millions)
- Number of jobs associated with investment facilitated and/or retained
- Number of qualified leads identified
- Percentage of qualified leads identified within Invest Vancouver's seven priority industry clusters

KPIs were identified as a priority in the Regional Economic Prosperity Service Business Plan (November 2019). The aforementioned KPIs were derived based on multiple factors including a survey of Metro Vancouver member jurisdictions, consultation with the Consider Canada Cities Alliance (an association of twelve of Canada's largest city/regional investment attraction agencies) and understanding of measures in use by federal and provincial partners. The KPIs identified are consistent in measure and approach with those used by other like agencies. Particularly in the inaugural year, tracking the number of identified qualified leads, ie. building an opportunity pipeline, is important, recognizing deals may take multiple years to come to fruition.

Customer Relationship Management (CRM) System

Invest Vancouver is in the process of procuring and deploying a CRM system. This is expected to be provided corporately by Metro Vancouver. The CRM will be an indispensable tool to manage and track all client and stakeholder interactions and will align the work of Invest Vancouver's three functional areas (Data, Research & Policy, Collaboration, and Strategic Investment) through a robust sales-oriented and partnership approach. Moreover, the CRM platform will provide a mechanism to track KPIs, generate data-driven reports, and will support joint efforts and alignment of Invest Vancouver and member jurisdiction partners.

One aim of the CRM implementation is to provide a requisite number of so-called "teams" licenses to offer access for member jurisdictional partners (ie. REPAC). Doing so will support the close coordination of Invest Vancouver and member jurisdiction partners for aspects such as lead hand-off, shared client engagement recording, information sharing, joint missions and campaigns, and more.

Invest Vancouver conducted a survey of REPAC in July on CRM usage and resource availability among members. The survey revealed approximately two-thirds do not currently employ a CRM platform. Given this result, Invest Vancouver is looking how its CRM implementation may be structured in a way to provide a basic level of CRM functionality for economic development leads from member jurisdictions which currently do not have such a tool.

RECOMMENDATIONS
N/A

FINANCIAL IMPLICATIONS
There are no financial implications associated with this report.

Attachments
N/A

48592209

To: Climate Action Committee

From: Cindy Onyejekwe, Senior Policy Analyst
Esther Berube, Division Manager, Bylaw and Regulation Development
Parks and Environment Department

Date: October 13, 2021 Meeting Date: November 5, 2021

Subject: **MVRD Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1332, 2021**

RECOMMENDATION

That the MVRD Board:

a) give first, second and third reading to *Metro Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1332, 2021*; and
b) pass and finally adopt *Metro Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1332, 2021*.

EXECUTIVE SUMMARY

A range of tools, including notices of bylaw violation and municipal tickets, can be used to promote compliance with Metro Vancouver's bylaws. The *Greater Vancouver Regional District (GVRD) Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No. 1117, 2010* (Bylaw 1117) allows contraventions to be addressed through a Notice of Bylaw Violation where enforcement is needed, as an initial enforcement measure. New types of bylaw violations were created with the adoption of the *Metro Vancouver Regional District (MVRD) Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021 (Bylaw 1329),* which repealed and replaced a previous version of the non-road diesel engine emission regulation bylaw. The proposed amendments to Bylaw 1117 identify the bylaw violations pertaining to non-road diesel engines, for which Notices of Bylaw Violation may be issued and the accompanying penalties.

PURPOSE

To propose amendments to *Greater Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No. 1117, 2010,* (Bylaw 1117) that introduce new bylaw violations and penalties to support the new Bylaw 1329, for MVRD Board adoption.

BACKGROUND

At its October 29, 2021 meeting, the MVRD Board adopted Bylaw 1329, which repealed and replaced *MVRD Non-Road Diesel Engine Emission Regulation Bylaw No. 1161, 2012* (Bylaw 1161), as described in the report dated October 5, 2021 provided as Reference 1. Consequently, the bylaw violations and associated penalties in Bylaw 1117 that relate to Bylaw 1161 need to be updated.

This report proposes amendments to Bylaw 1117 to authorize issuance of Notices of Bylaw Violation consistent with the new Bylaw 1329.

Bylaw 1117 and its amendments also sets out bylaw violations related to the Regional Parks function, and a separate report seeking Board adoption of amendments regarding that function will be considered by the Regional Parks Committee at its November meeting.

BYLAW AMENDMENTS

The *Greater Vancouver Regional District (GVRD) Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No. 1117, 2010*, as amended (Bylaw 1117), enables Metro Vancouver to promote compliance with its regulatory bylaws, by authorizing officers to issue a Notice of Bylaw Violation with accompanying penalties. Compliance with Metro Vancouver's air quality regulatory bylaws, including Bylaw 1329 and its predecessor Bylaw 1161, is primarily promoted through non-punitive education and warnings. However, in some cases, infractions require a stronger notice of bylaw violation with associated penalty as an effective and efficient alternative to legal action through the courts. A bylaw violation notice is generally used for minor bylaw infractions or as an initial form of enforcement, and disputes are screened internally, then heard and resolved through an adjudication process instead of through the Provincial judicial system.

Currently, Bylaw 1117 does not reflect the new bylaw violations associated with Bylaw 1329 adopted on October 29, 2021. Consequently, the types of bylaw violations and associated penalties in Bylaw 1117 that relate to Bylaw 1161 need to be amended to reflect contraventions of the provisions in Bylaw 1329 and to remove references to Bylaw 1161.

A summary of the main proposed amendments (Attachment 1) and the proposed amending bylaw, *MVRD Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No. 1332, 2021* (Attachment 2) remove references to the provisions in Bylaw 1161 and identify new types of bylaw violations that align with the new Bylaw 1329 such as:

- operation of a Tier 0 or Tier 1 non-road diesel engine near a sensitive receptor such as a hospital, elementary school, or community care facility;
- failure to report hour meter reading at 500h of use;
- operating an engine having a tampered emission control device; and
- prohibited operation of a Tier 0 or Tier 1 engine.

Penalties related to a Notice of Bylaw Violation are half the amount of Municipal Ticket Information fines for the corresponding contravention, since a Notice of Bylaw Violation is generally issued by officers as an initial form of enforcement. A separate report in the Climate Action Committee November 5, 2021 agenda presents proposed amendments to *Greater Vancouver Regional District Ticket Information Utilization Bylaw No. 1050, 2006.*

Future amendments to the Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw and the Ticket Information Utilization Bylaw are anticipated to reflect new requirements in Bylaw 1329 that will take effect in future years.

ALTERNATIVES

1. That the MVRD Board:
   a) give first, second and third reading to *Metro Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1332, 2021*; and
   b) pass and finally adopt *Metro Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1332, 2021*.

2. That the MVRD Board receive for information the report dated October 13, 2021, titled "MVRD Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1332, 2021" and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

If the Board approves Alternative 1, officers will be able to issue Notices of Bylaw Violation and associated penalties related to enforcement of the new *MVRD Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021* (Bylaw 1329).

SUMMARY / CONCLUSION

Proposed amendments to the *GVRD Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No. 1117, 2010* (Bylaw 1117) result from the repeal of *MVRD Non-Road Diesel Engine Emission Regulation Bylaw No. 1161, 2012* (Bylaw 1161) and its replacement by new Bylaw 1329, adopted by the MVRD Board on October 29, 2021. Currently, Bylaw 1117 does not reflect the new bylaw violations associated with Bylaw 1329. Staff recommend Alternative 1, to adopt the *Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1332, 2021* that amends the schedule of bylaw violations and penalties in Bylaw 1117 to add the new bylaw violations associated with Bylaw 1329. Issuing Notices of Bylaw Violation provides Metro Vancouver with an initial enforcement mechanism in the form of an administrative ticket where disputes are screened internally, then heard and resolved through an adjudication process instead of through the Provincial judicial system.

Attachments *(48803111)*

1. Summary: Proposed amendments to Schedule K of *Greater Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw 1117, 2010* referencing *MVRD Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021* *(48612093)*
2. *Metro Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1332, 2021* *(48500920)*

References

MVRD Climate Action Committee Report "MVRD Non-Road Diesel Engine Emission Regulation Bylaw No.1329, 2021", dated October 5, 2021

48456252

Summary: Proposed amendments to Schedule K of *Greater Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw 1117, 2010* referencing *MVRD Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021*

Schedule K

MVRD Non-Road Diesel *Engine* Emission Regulation Bylaw No. 1329, 2021

(New bylaw violations are shown in bold italicized text)

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Section	**Authorized Words or Expressions**	**Discounted Penalty**	**Penalty**	**Late Payment Penalty**	**Compliance Agreement Available**
13	***Discharge of emergency engine exhaust into building opening***	***$375***	***$500***	***$500***	***Yes***
14	***Failure to keep or to submit emergency engine records***	***$285***	***$375***	***$465***	***Yes***
15	Operating without registration	$375	$500	$500	*Yes*
19	***Obstructing an officer*** ~~Obstruction by an operator~~	~~*$95*~~***$285***	~~$125~~***$375***	~~$155~~***$465***	Yes
23(a), (b)	Operating without ***displaying*** registration no. or Tier label ~~displayed~~	~~*$95*~~***$190***	~~$125~~***$250***	~~$155~~***$310***	Yes
25	Failure to have functioning hour meter	~~*$95*~~***$190***	~~$125~~***$250***	~~$155~~***$310***	Yes

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Section	**Authorized Words or Expressions**	**Discounted Penalty**	**Penalty**	**Late Payment Penalty**	**Compliance Agreement Available**
25	Failure to notify of hour meter replacement	~~*$95*~~***$190***	~~$125~~***$250***	~~$155~~***$310***	Yes
26	Failure to keep, produce or deliver low-use records	$285	$375	$465	Yes
27(a)	Failure to report hour meter reading	$285	$375	$465	Yes
27(b)	Failure to report hour meter reading at 200 hours of use	$375	$500	$500	Yes
27(c)	Failure to provide meter manufacturer name, model or serial no.	$95	$125	$155	Yes
37	***Unauthorized discharge (registration invalid - changed ERM*)***	***$285***	***$375***	***$465***	Yes
38	***Failure to keep or to submit ERM* records***	***$285***	***$375***	***$465***	***Yes***
45	***Prohibited operation of a Tier 0 engine*** ~~Operating a~~	$375	$500	$500	Yes

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Section	**Authorized Words or Expressions**	**Discounted Penalty**	**Penalty**	**Late Payment Penalty**	**Compliance Agreement Available**
	~~prohibited Tier 0 engine~~				
47	**Prohibited operation of a Tier 0 or Tier 1 engine** ~~Operating a prohibited Tier 1 engine~~	$375	$500	$500	Yes
54	Unauthorized engine idling	$190	$250	$310	Yes
56	Failure to submit anti-idling procedure	$95	$125	$155	Yes
57	***Operating within 100 metres of a sensitive receptor***	***$375***	***$500***	***$500***	***Yes***
58	***Operating an engine having a tampered emission control system***	***$375***	***$500***	***$500***	***Yes***
59	Providing false information	~~*$190*~~ ***$285***	~~*$250*~~***$375***	~~*$310*~~***$465***	Yes

**** "ERM" means "emission reduction measure"***

48612093

METRO VANCOUVER REGIONAL DISTRICT
BYLAW NO. 1332, 2021
A Bylaw to Amend "Greater Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw 1117, 2010"

WHEREAS:

A. The Board of Directors of the Metro Vancouver Regional District has adopted "Greater Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No. 1117, 2010", a bylaw respecting the enforcement of Notices of Bylaw Violation and establishing a Bylaw Violation Dispute Adjudication System; and

B. The Board of Directors of the Metro Vancouver Regional District wishes to amend "Greater Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No. 1117, 2010."

NOW THEREFORE the Board of Directors of the Metro Vancouver Regional District enacts as follows:

Citation

1. The official citation of this bylaw is "Metro Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1332, 2021".

Schedule(s)

2. The following Schedules are attached to and form part of this bylaw:
   Schedule K - MVRD Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021.

Amendment of Bylaw

3. "Greater Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No. 1117, 2010" is hereby amended as follows:

   a) Schedule K is deleted and replaced by Schedule K, which is attached to and forms part of this bylaw.

Read a first, second and third time this _____ day of _____, _____.

Passed and finally adopted this _____ day of _____, _____.

_____
Sav Dhaliwal, Chair

_____
Chris Plagnol, Corporate Officer

Schedule K

MVRD Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Section	**Authorized Words or Expressions**	**Discounted Penalty**	**Penalty**	**Late Payment Penalty**	**Compliance Agreement Available**
13	Discharge of emergency engine exhaust into building opening	$375	$500	$500	Yes
14	Failure to keep or to submit emergency engine records	$285	$375	$465	Yes
15	Operating without registration	$375	$500	$500	Yes
19	Obstructing an officer	$285	$375	$465	Yes
23(a), (b)	Operating without displaying registration no. or Tier label	$190	$250	$310	Yes
25	Failure to have functioning hour meter	$190	$250	$310	Yes
25	Failure to notify of hour meter replacement	$190	$250	$310	Yes
26	Failure to keep, produce or deliver low-use records	$285	$375	$465	Yes

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Section	**Authorized Words or Expressions**	**Discounted Penalty**	**Penalty**	**Late Payment Penalty**	**Compliance Agreement Available**
27(a)	Failure to report hour meter reading	$285	$375	$465	Yes
27(b)	Failure to report hour meter reading at 200 hours of use	$375	$500	$500	Yes
27(c)	Failure to provide meter manufacturer name, model or serial no.	$95	$125	$155	Yes
37	Unauthorized discharge (registration invalid - changed ERM*)	$285	$375	$465	Yes
38	Failure to keep or to submit ERM* records	$285	$375	$465	Yes
45	Prohibited operation of a Tier 0 engine	$375	$500	$500	Yes
47	Prohibited operation of a Tier 0 or Tier 1 engine	$375	$500	$500	Yes
54	Unauthorized engine idling	$190	$250	$310	Yes
56	Failure to submit anti-idling procedure	$95	$125	$155	Yes

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Section	**Authorized Words or Expressions**	**Discounted Penalty**	**Penalty**	**Late Payment Penalty**	**Compliance Agreement Available**
57	Operating within 100 metres of a sensitive receptor	$375	$500	$500	Yes
58	Operating an engine having a tampered emission control system	$375	$500	$500	Yes
59	Providing false information	$285	$375	$465	Yes

* “ERM” means “emission reduction measure”

metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Climate Action Committee

From: Cindy Onyejekwe, Senior Policy Analyst
Esther Berube, Division Manager, Bylaw and Regulation Development
Parks and Environment Department

Date: October 13, 2021 Meeting Date: November 5, 2021

Subject: **MVRD Ticket Information Utilization Amending Bylaw No. 1333, 2021**

RECOMMENDATION

That the MVRD Board:

a) give first, second and third reading to *Metro Vancouver Regional District Ticket Information Utilization Amending Bylaw No. 1333, 2021*; and
b) pass and finally adopt *Metro Vancouver Regional District Ticket Information Utilization Amending Bylaw No. 1333, 2021*.

EXECUTIVE SUMMARY

A range of tools, including municipal tickets and notices of bylaw violation, can be used to achieve compliance with Metro Vancouver bylaws. The *Greater Vancouver Regional District (GVRD) Ticket Information Utilization Bylaw No. 1050, 2006*, as amended, (Bylaw 1050) allows offences to be addressed by issuing Municipal Ticket Information (MTI). Officers can consider the use of an MTI where the enforcement matter is serious but where the possibility of a more expedited prosecution is appropriate. New offences were created with the adoption of the *Metro Vancouver Regional District (MVRD) Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021 (Bylaw 1329),* which repealed and replaced a previous version of the non-road diesel engine emission regulation bylaw. The proposed amendments to Bylaw 1050 identify the new offences pertaining to non-road diesel engines, for which an MTI may be issued and the accompanying fine.

PURPOSE

To propose amendments to *Greater Vancouver Regional District Ticket Information Utilization Bylaw No. 1050, 2006*, (Bylaw 1050) that introduce new offences and fines to support the new Bylaw 1329, for MVRD Board adoption.

BACKGROUND

At its October 29, 2021 meeting, the MVRD Board adopted Bylaw 1329, which repealed and replaced *MVRD Non-Road Diesel Engine Emission Regulation Bylaw No. 1161, 2012* (Bylaw 1161). Consequently, the offences and associated fines in Bylaw 1050 that relate to Bylaw 1161 need to be updated. This report proposes amendments to Bylaw 1050 to authorize issuance of Municipal Ticket Information consistent with the new Bylaw 1329.

Bylaw 1050 and its amendments also sets out bylaw violations related to the Regional Parks function, and a separate report seeking Board adoption of amendments regarding that function will be considered by the Regional Parks Committee at its November meeting.

BYLAW AMENDMENTS

Greater Vancouver Regional District (GVRD) Ticket Information Utilization Bylaw No. 1050, 2006, as amended (Bylaw 1050), enables Metro Vancouver to promote compliance with its regulatory bylaws. Compliance with Metro Vancouver's air quality regulatory bylaws is promoted primarily through education, notices, and warnings. In some cases, infractions require a stronger ticket violation as an effective and efficient alternative to legal action through the courts.

On October 29, 2021, Bylaw 1161 was repealed and replaced with Bylaw 1329 to expand the non-road diesel engine emission reduction program, as described in the report provided as Reference 1. Currently, Bylaw 1050 does not reflect the new offences associated with Bylaw 1329. Consequently, the offences and associated fines in Bylaw 1050 that relate to Bylaw 1161 need to be amended to reflect contraventions of the provisions in Bylaw 1329 and to remove references to Bylaw 1161.

A summary of the main proposed amendments (Attachment 1) and the proposed amending bylaw, *MVRD Ticket Information Utilization Amending Bylaw No. 1333, 2021* (Attachment 2) remove references to Bylaw 1161 and replace them with references to ticketing offences for contraventions of the new Bylaw 1329, and add new offences related to Bylaw 1329, such as:

- operation of a Tier 0 or Tier 1 non-road diesel engine near a sensitive receptor such as a hospital, elementary school, or community care facility;
- failure to report hour meter reading at 500h of use;
- operating an engine having a tampered emission control device; and
- prohibited operation of a Tier 0 or Tier 1 engine.

Future amendments to the Ticket Information Utilization Bylaw are anticipated to reflect new requirements in Bylaw 1329 that will take effect in future years.

Fines related to Municipal Ticket Information are twice those of the Notice of Bylaw Violation penalties for the corresponding contravention, and are used as an escalated form of enforcement of bylaw provisions. A separate report in the Climate Action Committee November 5, 2021 agenda presents proposed amendments to *Greater Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No. 1117, 2010.*

Future amendments to the Ticket Information Utilization Bylaw are anticipated to reflect new requirements in Bylaw 1329 that will take effect in future years.

ALTERNATIVES

1. That the MVRD Board:
   a) give first, second and third reading to *Metro Vancouver Regional District Ticket Information Utilization Amending Bylaw No. 1333, 2021* and
   b) pass and finally adopt *Metro Vancouver Regional District Ticket Information Utilization Amending Bylaw No. 1333, 2021*.

2. That the MVRD Board receive for information the report dated October 13, 2021, titled "MVRD Ticket Information Utilization Amending Bylaw No. 1333, 2021" and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

If the Board approves Alternative 1, officers will be able to issue Municipal Ticket Information and associated fines related to compliance promotion with the new *MVRD Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021* (Bylaw 1329).

SUMMARY / CONCLUSION

Proposed amendments to the *GVRD Ticket Information Utilization Bylaw No. 1050, 2006* (Bylaw 1050) result from the repeal of *MVRD Non-Road Diesel Engine Emission Regulation Bylaw No. 1161, 2012* (Bylaw 1161) and its replacement by new Bylaw 1329, adopted by the MVRD Board on October 29, 2021. Currently, Bylaw 1050 does not reflect the new offences associated with Bylaw 1329. Staff recommend Alternative 1, to adopt *MVRD Ticket Information Utilization Amending Bylaw No. 1333, 2021* that amends the schedule of Municipal Ticket Information offences and fines in Bylaw 1050 to add the new offences associated with Bylaw 1329. Issuing Municipal Ticket Information provides Metro Vancouver with an effective and efficient mechanism to escalate enforcement against bylaw contraventions.

Attachments *(48818441)*

1. Summary: Proposed amendments to Schedule K of *MVRD Ticket Information Utilization Amending Bylaw No. 1333, 2021* *(48610773)*
2. *Metro Vancouver Regional District Ticket Information Utilization Amending Bylaw No. 1333, 2021* *(48500896)*

Reference

Climate Action Committee Report "MVRD Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021", dated October 5, 2021

48459485

Summary: Proposed Amendments in Schedule K of MVRD Ticket Information Utilization Amending Bylaw No. 1329, 2021

Schedule K

Metro Vancouver Regional District Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021

	Column 1 **Authorized Words or Expressions**	Column 2 **Section**	Column 3 **Fine**
1.	***Unauthorized*** ~~***D***~~***d***ischarge of air contaminant	***7, 12***	$1000
2.	***Discharge of emergency engine exhaust into building opening***	***13***	***$1000***
3.	***Failure to keep or to submit emergency engine records***	***14***	***$750***
4.	Operating without registration	***15***	$1000
5.	***Obstructing an officer*** ~~Obstruction by an operator~~	***19***	~~$250~~***$750***
6.	Operating without ***displaying*** registration no. or Tier label ~~displayed~~	***23(a), (b)***	~~$250~~***$500***
7.	Failure to have functioning hour meter	***25***	~~$250~~***$500***
8.	Failure to notify of hour meter replacement	***25***	~~$250~~***$500***
9.	Failure to keep, produce or deliver low-use records	***26***	$750
10.	Failure to report hour meter reading	***27(a)***	$750
11.	Failure to report hour meter reading at 200 hours of use	***27(b)***	$1000
12.	Failure to provide meter manufacturer, model or serial no.	***27(c)***	$250
13.	***Unauthorized discharge (registration invalid - changed ERM*)*** ~~Unauthorized alteration of emission reduction measure~~	***37***	***$750***~~$500~~
14.	***Failure to keep or to submit ERM* records***	***38***	***$750***
15.	***Prohibited operation of a Tier 0 engine*** ~~Operating a prohibited Tier 0 engine~~	***45***	***$1000***
16.	***Prohibited operation of a Tier 0 or Tier 1 engine*** ~~Operating a prohibited Tier 1 engine~~	***47***	***$1000***
17.	Unauthorized operation of non-road diesel engine	***53***	$1000

	Column 1 **Authorized Words or Expressions**	Column 2 **Section**	Column 3 **Fine**
18.	Unauthorized engine idling	***54***	$500
19.	Failure to submit anti-idling procedure	***56***	$250
20.	***Operating within 100 metres of a sensitive receptor***	***57***	***$1000***
21.	***Operating an engine having a tampered emission control system***	***58***	***$1000***
22.	Providing false information	***59***	~~$500~~***$750***

**** "ERM" means "emission reduction measure"***

48610773

METRO VANCOUVER REGIONAL DISTRICT
BYLAW NO. 1333, 2021
A Bylaw to amend "Greater Vancouver Regional District Ticket Information Utilization Bylaw No. 1050, 2006"

WHEREAS:

A. The Board of Directors of the Metro Vancouver Regional District (the "Board") has adopted "Greater Vancouver Regional District Ticket Information Utilization Bylaw No. 1050, 2006", a bylaw to authorize the use of the municipal ticket information for the enforcement of certain bylaws, to designate persons as bylaw enforcement officers, to authorize the use of certain words or expressions to designate certain bylaw offences and to set certain fine amounts; and

B. The Board of Directors of the Metro Vancouver Regional District wishes to amend "Greater Vancouver Regional District Ticket Information Utilization Bylaw No. 1050, 2006."

NOW THEREFORE the Board of the Metro Vancouver Regional District enacts as follows:

Citation

1. The official citation of this bylaw is "Metro Vancouver Regional District Ticket Information Utilization Amending Bylaw No. 1333, 2021".

Schedule(s)

2. The following Schedules are attached to and form part of this bylaw:
   Schedule A; and
   Schedule K, Metro Vancouver Regional District Non-Road Diesel Engine Emission Regulation Bylaw, No. 1329, 2021.

Amendment of Bylaw

3. "Greater Vancouver Regional District Ticket Information Utilization Bylaw No. 1050, 2006" is hereby amended as follows:

   a) Section 4 is deleted in its entirety and replaced with the following:

      4. For the purpose of Greater Vancouver Regional District Air Quality Management Bylaw No. 1082, 2008, Greater Vancouver Regional District Concrete and Concrete Products Industries Emission Regulation No. 1084, 2008, Greater Vancouver Regional District Gasoline Distribution Emission Regulation No. 1085, 2008, Greater Vancouver Regional District Automotive Refinishing Emission Regulation Bylaw No. 1086, 2008, Greater Vancouver Regional District Boilers and Process Heaters Emission Regulation Bylaw No. 1087, 2008, Greater Vancouver Regional District Agricultural Boilers Emission Regulation Bylaw No. 1098, 2008, Metro Vancouver Regional District Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021, and Metro Vancouver Regional District Residential Indoor Wood Burning Emission Regulation Bylaw

No. 1303, 2020, the word “officer” in Column 2 of Schedule A means any person appointed by the Board pursuant to section 31(2) of the *Environmental Management Act* to be an officer.

b) Schedules A and K are deleted and replaced respectively with Schedules A and K which are attached to and form part of this bylaw.

Read a first, second and third time this _____ day of _____, _____.

Passed and finally adopted this _____ day of _____, _____.

_____
Sav Dhaliwal, Chair

_____
Chris Plagnol, Corporate Officer

Schedule A

	Column 1 **Designated Bylaws**	Column 2 **Designated Bylaw Enforcement Officers**
1	Greater Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012	Park Officer Royal Canadian Mounted Police Officer Municipal Police Officer British Columbia Provincial Conservation Officer
2	Greater Vancouver Regional District Air Quality Management Bylaw No. 1082, 2008	Any person appointed by the GVRD Board to be an officer pursuant to section 31(2) of the *Environmental Management Act*
3	Greater Vancouver Regional District Concrete and Concrete Products Industries Emission Regulation No. 1084, 2008	Any person appointed by the GVRD Board to be an officer pursuant to section 31(2) of the *Environmental Management Act*
4	Greater Vancouver Regional District Gasoline Distribution Emission Regulation No. 1085, 2008	Any person appointed by the GVRD Board to be an officer pursuant to section 31(2) of the *Environmental Management Act*
5	Greater Vancouver Regional District Automotive Refinishing Emission Regulation Bylaw No. 1086, 2008	Any person appointed by the GVRD Board to be an officer pursuant to section 31(2) of the *Environmental Management Act*
6	Greater Vancouver Regional District Boilers and Process Heaters Emission Regulation Bylaw No. 1087, 2008	Any person appointed by the GVRD Board to be an officer pursuant to section 31(2) of the *Environmental Management Act*
7	Greater Vancouver Regional District Agricultural Boilers Emission Regulation Bylaw No. 1098, 2008	Any person appointed by the GVRD Board to be an officer pursuant to section 31(2) of the *Environmental Management Act*

8	Greater Vancouver Regional District Electoral Area A Zoning Bylaw No. 1144, 2011	Division Manager Electoral Area & Environment Building Inspector Regional Planner Division Manager Corporate Safety Emergency Preparedness & Security Coordinator Local Assistant to the Fire Commissioner Security and Crime Prevention Officer
9	Greater Vancouver Regional District Electoral Area A Building Administration Bylaw No. 1043, 2006	Division Manager Electoral Area & Environment Building Inspector Regional Planner Division Manager Corporate Safety Emergency Preparedness & Security Coordinator Local Assistant to the Fire Commissioner Security and Crime Prevention Officer
10	Metro Vancouver Regional District Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021	Any person appointed by the MVRD Board to be an officer pursuant to section 31(2) of the *Environmental Management Act*
11	Greater Vancouver Regional District Electoral Area A Unsightly Premises and Nuisance Bylaw No. 1198, 2014	Division Manager Electoral Area & Environment Building Inspector Regional Planner Division Manager Corporate Safety Emergency Preparedness & Security Coordinator Local Assistant to the Fire Commissioner Security and Crime Prevention Officer
12	Metro Vancouver Regional District Residential Indoor Wood Burning Emission Regulation Bylaw No. 1303, 2020	Any person appointed by the MVRD Board to be an officer pursuant to section 31(2) of the *Environmental Management Act*

Schedule K

Metro Vancouver Regional District Non-Road Diesel Engine Emission Regulation Bylaw No. 1329, 2021

Column 1		Column 2	Column 3
Authorized Words or Expressions		**Section**	**Fine**
1.	Unauthorized discharge of air contaminant	7, 12	$1000
2.	Discharge of emergency engine exhaust into building opening	13	$1000
3.	Failure to keep or to submit emergency engine records	14	$750
4.	Operating without registration	15	$1000
5.	Obstructing an officer	19	$750
6.	Operating without displaying registration no. or Tier label	23(a), (b)	$500
7.	Failure to have functioning hour meter	25	$500
8.	Failure to notify of hour meter replacement	25	$500
9.	Failure to keep, produce or deliver low-use records	26	$750
10.	Failure to report hour meter reading	27(a)	$750
11.	Failure to report hour meter reading at 200 hours of use	27(b)	$1000
12.	Failure to provide meter manufacturer, model or serial no.	27(c)	$250
13.	Unauthorized discharge (registration invalid - changed ERM*)	37	$750
14.	Failure to keep or to submit ERM* records	38	$750
15.	Prohibited operation of a Tier 0 engine	45	$1000
16.	Prohibited operation of a Tier 0 or Tier 1 engine	47	$1000
17.	Unauthorized operation of non-road diesel engine	53	$1000
18.	Unauthorized engine idling	54	$500
19.	Failure to submit anti-idling procedure	56	$250
20.	Operating within 100 metres of a sensitive receptor	57	$1000

Column 1 **Authorized Words or Expressions**		Column 2 **Section**	Column 3 **Fine**
21.	Operating an engine having a tampered emission control system	58	$1000
22.	Providing false information	59	$750

* “ERM” means “emission reduction measure”

To: Regional Parks Committee

From: David Leavers, Division Manager, Visitor & Operations Services, Regional Parks

Date: October 1, 2021 Meeting Date: November 10, 2021

Subject: **MVRD Regional Parks Regulation Amending Bylaw No. 1335, 2021 – Amends Bylaw 1177, 2012**

RECOMMENDATION

That the MVRD Board:

a) give first, second and third reading to *Metro Vancouver Regional District Regional Parks Regulation Amending Bylaw No. 1335, 2021*; and

b) pass and finally adopt *Metro Vancouver Regional District Regional Parks Regulation Amending Bylaw No. 1335, 2021*.

EXECUTIVE SUMMARY

This update presents amendments to the Regional Parks Regulation Bylaw to strengthen regulatory aspects of the Bylaw. The following amendments are included:

- An amendment to make it illegal to both harvest and possess a "natural park feature" addresses the harvesting of edible plants.
- An amendment focusing on noise or sound that produces a level of sound that causes a disturbance supports the ability to control the public use of portable devices that amplify sound.
- A maximum length of stay for the charging of electric vehicles is addressed.
- Clarity is provided regarding smoking and vaping of cannabis.
- The word "child" is added to section 3.7 to clarify the need for parental supervision of all minors.

Amendments to Schedule A – Fees and Charges are included in the report. While most fee changes are inflationary increases, a new Clean Energy discounted rate is proposed to provide filming projects with discounted fees for the reduction / elimination of diesel fueled power sources.

These amendments will strengthen the Regional Parks Regulation Bylaw and provide staff with tools for managing the regional parks system.

PURPOSE

To consider amendments to the *Metro Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012* that propose a number of regulatory changes and amended or new fees and charges (Attachment).

BACKGROUND

The Regional Parks Regulation Bylaw sets out prohibitions and a system for permitted use designed to regulate park visitor behaviour and activities. The bylaw is typically amended annually in the fall

to bring forward recommended changes to regulate visitor behavior and activities and to amend existing fees and charges, or establish new fees and charges. Proposed bylaw amendments help improve public safety, further protect park natural assets, and better define acceptable public conduct and park officer enforcement powers. Proposed changes to fees and charges help ensure the appropriateness of the fees based on current market conditions.

Regional Parks Regulations

The Regional Parks Regulation Bylaw provides the authority for staff to manage the use of regional parks by the public. Metro Vancouver requires the ability to manage and enforce acceptable public use on regional park land to enhance public safety and protect the visitor experience. Annually, updates are needed to keep the bylaw current and address emerging issues. Regulatory amendments are typically for immediate implementation.

Regional Parks Fees and Charges

Regional Parks fees and charges are established by comparing them with municipal parks systems across Metro Vancouver, the private sector and other government and non-profit agencies. The fee schedule is adjusted annually based on Regional Parks' approach to remain in the mid-range market of comparable fees, and avoid overly large, less frequent adjustments. Fees and charges generate revenues that help recover, or partially offset, operating and maintenance costs. Proposed regional park fees and charges are listed in Schedule A of the bylaw. The annual update of the bylaw ensures that fees and charges are appropriate and based upon current market conditions. Fee changes brought forward as part of the bylaw for MVRD Board approval are typically for implementation in the coming calendar year.

PROPOSED REGULATORY AMENDMENTS

1. "Metro Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012" is hereby amended as follows:

    a) In section 1.3, the following definitions are respectively deleted and replaced as follows in alphabetical order:

    "natural park feature" includes any tree, shrub, herb, flower, grass, turf, or other similar vegetation or fungus, and any soil, sand, silt, gravel, rock, mineral, wood, or other similar matter, and includes a waterbody;

    "smoke or smoking" to be replaced by **"smoke or vape"** that means to burn, use, hold or carry a lighted cigarette, cigar, pipe, or hookah pipe, or to use or hold an e-cigarette, activated e-cigarette or any other vapour product that actively heats or vapourizes an e-substance and includes to smoke or vape cannabis;

b) In section 1.3, the following definitions are added in alphabetical order:

"campground" means one or more campsites designated as a campground and managed by the Metro Vancouver Regional District or a contractor;

"campsite" means a space in a campground designated for camping;

"Clean Energy discounted rate" means a discounted filming fee rate, as prescribed in Schedule A, that applies to no more than two days of the total number of filming fee days authorized by a filming permit, upon the permittee demonstrating that it has substituted at least one 400 amperes (or greater) portable diesel generator with a Clean Energy source for the duration of the filming permit period;

"Clean Energy source" means a tie-in to an existing electrical power connection, a battery technology or other non-fossil fuel source of energy;

"**smoke or vape**" means to burn, use, hold or carry a lighted cigarette, cigar, pipe, or hookah pipe, or to use or hold an e-cigarette, activated e-cigarette or any other vapour product that actively heats or vapourizes an e-substance and includes to smoke or vape cannabis;

"**smoke or vape cannabis**" has the same meaning as in the *Cannabis Control and Licensing Act*, S.B.C. 2018, c. 29, as amended;

c) Park Officers have observed a sharp increase in the harvesting of natural park features. The most common are edibles such as fiddleheads, mushrooms and nettles. Harvesting occurs mainly in off-trail and remote areas of parks. The negative impacts of unregulated harvesting include specie and habitat loss, loss of biodiversity, food loss for wildlife and can include secondary impacts such as illegal trail building and sensitive ecosystem disturbances. It is rare that Park Officers intercept harvesting when it occurs. Often times, observations are made when a park visitor is departing the park with fiddleheads, mushrooms or nettles. Enforcement action is not available at this time as the offence has already occurred and there is no continuing of an offence under Section 3.4(a). Prohibiting the possession of "natural park features" would allow an additional tool for Park Officers to maintain park and ecosystem integrity while preventing the secondary impacts of harvesting.

Section 3.4 is amended to add a new proposed sub-section 3.4(h) to make it illegal to both harvest and possess a "natural park feature".

3.4 No person shall: …

(h) harvest or possess a natural park feature

d) Section 3.7 is deleted and replaced with the following as this section was not updated when the definition of "young person" was added in a recent amendment bylaw:

A parent must exercise reasonable supervision of a child or young person at all times and make reasonable efforts to prevent or discourage a child or young person from engaging in any activity that contravenes or may contravene this bylaw.

e) Section 4.4 is deleted and replaced with an amendment focusing on noise or sound devices that produce a level of sound that causes a disturbance:

4.4 No person shall:

(a) make or cause any noise or amplified sound; or

(b) use or operate, or permit another person to use or operate, any musical instrument, device, equipment, machinery, motor assisted cycle, or motor vehicle, in a manner or producing a level of sound that causes a disturbance or potential disturbance to the peace, enjoyment, or comfort of other persons or animals, or in a manner that is dangerous or potentially dangerous, or is otherwise harmful or disturbing to persons, natural park features, regional park property, or animals.

f) Section 6.1 is deleted and replaced as follows to include vaping as a permitted activity with same conditions previously provided to the activity of smoking under Provincial legislation:

6.1 (a) Subject to subsection 6.1 (b), no person shall smoke or vape except in an area designated by posted notice as allowing smoking or vaping, or except at the registered camper's campsite, if that person is a registered camper or is the guest of a registered camper;

(b) No person shall smoke or vape cannabis except if that person is a registered camper or a guest of a registered camper at the registered camper's campsite.

g) Section 10.6 is amended to include a new proposed sub-section (f) to introduce a maximum two-hour parking limit for electrical vehicles at electric vehicle parking stations where provided for public use:

10.6 No person shall park a motor assisted cycle or motor vehicle: …

(f) at an electric vehicle charging station, except if the cycle or motor vehicle is an electrical vehicle and it is parked for no more than two consecutive hours.

PROPOSED FEES AND CHARGES AMENDMENTS *(TO TAKE EFFECT JANUARY 1, 2022)*

a) General Fees (Section 1.0)

No changes proposed.

b) Commercial Use Permit and Permit Fees (Section 2.0)

Commercial Use Permit Application and Annual Fees (Section 2.1)

The purpose of issuing a commercial use permit is to monitor and manage how specific activities impact park and public use, and to ensure commercial park users adhere to the bylaw as well as provincial and federal enactments. The fees associated with commercial use permits help offset administrative and operating costs. It is proposed to increase the commercial use permit and application fee from $175 to $200 to offset operating costs and more accurately reflect staff time involved in processing such applications.

The commercial use permit fee for dog walking, up to four dogs, is proposed to increase from $460 to $470, and for more than four dogs, from $765 to $780. This increase matches the Consumer Price Index of 2%.

c) Commercial Use Permit Specialized Fees (Section 2.2)

The cost of the branded vest is proposed to be increased from $35 to $50 to reflect actual costs of supplying the vest.

d) Regional Park Facility Permit Fees (Section 3.0)

Outdoor Facilities (Section 3.1)

Fees for picnic shelters, field rentals, group camping and other miscellaneous outdoor amenities such as the equestrian riding rings are proposed to increase by the Consumer Price Index of 2.0%.

Outdoor Facilities (Section 3.4)

It is recommended to charge a new fee of $5 for any reservation made by phone for the Edgewater Bar campground located in Derby Reach Regional Park, to address the need for personal administration. Reservations made using the web interface remain at no charge.

e) Indoor Facilities (Section 3.2)

Fees for the use of Metro Vancouver indoor facilities including Cammidge House, Camp Capilano and Minnekhada Lodge, are proposed to be increased by the Consumer Price Index of 2%.

f) Special Event Permit Fees (Section 4.0)

No fee increases proposed. Special event programming has been impacted significantly by the pandemic.

g) Cancellation Fees (Section 5.0)

Cancellation fees for Edgewater Bar Camping are recommended to be changed as follows:

- Cancellation fee to cancel any reservation is $6.

- If a reservation is cancelled within 7 days of arrival date, the camping party also forfeits one night of camping fees.
- If a reservation is cancelled during the stay (after arrival), no refund will be issued.

h) Filming Fees (Section 6.0)

Filming fees for Regional Parks, Reserves, and Greenways are recommended to increase by 11% to match industry rates across the region. Therefore, the fee for film days will increase from $900 per day to $1,000 per day. The fee for a still shoot day will increase from $450 to $500. The fee for prep/wrap/hold days will increase from $450 to $500. The fee for crew and staging area will increase from $375 to $420 per day, and the fee for a minor shoot will increase from $450 to $500 per day.

The fee for filming at BC Mills House, the Houston House / Karr Mercer Barn, and Inverholme School house is also proposed to increase by 10%. The fee for filming at these locations would increase from $1,000 to $1,100 per day, and from $600 to $610 for prep/wrap/hold days.

Proposed for 2022 is the introduction of a Clean Energy discounted rate for film companies that use alternatives to fossil fuel powered generators in order to reduce GHG emissions and improve air quality. The Clean Energy discounted rate will provide up to a $1000 incentive for filming projects committed to utilizing clean energy sources.

ALTERNATIVES

1. That the MVRD Board:
   a) give first, second and third reading to *Metro Vancouver Regional District Regional Parks Regulation Amending Bylaw No. 1335, 2021*; and
   b) pass and finally adopt *Metro Vancouver Regional District Regional Parks Regulation Amending Bylaw No. 1335, 2021*.

2. That the MVRD Board receive for information the report dated October 1, 2021, titled "*Metro Vancouver Regional District Regional Parks Regulation Amending Bylaw*" and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

If the MVRD Board approves Alternative 1, the financial implications of the proposed regulatory amendments are negligible. It is not expected that more than a few violations would be written on these new offences in any given year.

The proposed regional park fees and charges are listed in Schedule A. Regional Parks' approach is to review fees annually and adjust as required to remain in the mid-range of comparable fee schedules and to avoid overly large, less frequent adjustments. Research is completed on comparable rentals and permits in municipal park systems across Metro Vancouver. A median rate is targeted for Metro Vancouver's Regional Parks' fees to generally stay in line with comparable market rates and to not compete unfairly by subsidizing rentals with tax levy revenue.

Based on the 2020 level of rentals and permits, the proposed fees and charges increases will generate an additional $5,000 in facility rental revenue. The proposed filming fee increase is predicted to increase filming revenue by $25,000 after factoring in the loss of revenue resultant from providing Clean Energy discounted rates for some projects.

If the MVRD Board approves Alternative 2, Regional Parks would enter 2022 with the current (2021) fee schedule in place. The additional $5,000 in facility rental revenue and $25,000 in filming revenue has been budgeted for the 2022 year, based on the recommended fee increases.

SUMMARY / CONCLUSION

The proposed bylaw amendments, subject to MVRD Board approval, will address emergent compliance issues, will keep the bylaw current, and will adjust existing fees and charges to better align them with current market conditions.

Staff recommends the MVRD Board adopt Alternative 1. The regulatory changes proposed will take effect immediately. Fees and charges changes will be implemented on January 1, 2022.

Attachment (48817769)

Metro Vancouver Regional District Bylaw No. 1335, 2021 – A Bylaw to Amend Metro Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012

47428809

METRO VANCOUVER REGIONAL DISTRICT
BYLAW NO. 1335, 2021
A Bylaw to Amend "Metro Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012"

WHEREAS:

A. the Board of Directors of the Metro Vancouver Regional District has adopted "Metro Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012", a bylaw to establish rules and regulations for the management, maintenance, operation, enforcement, control, and use of regional parks and property in regional parks; and

B. the Board of Directors of the Metro Vancouver Regional District wishes to amend "Metro Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012";

NOW THEREFORE the Board of Directors of the Metro Vancouver Regional District enacts as follows:

Citation

1. The official citation of this bylaw is "Metro Vancouver Regional District Parks Regulation Amending Bylaw No. 1335, 2021".

Schedule

2. The following Schedule is attached to and forms part of this Bylaw:
Schedule A - Fees and Charges

Amendment of Bylaw

3. "Metro Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012" is hereby amended as follows:

a) In section 1.3, the following definitions are added in alphabetical order:

"campground" means one or more campsites designated as a campground and managed by the Metro Vancouver Regional District or a contractor;

"campsite" means a space in a campground designated for camping;

"Clean Energy discounted rate" means a discounted filming fee rate, as prescribed in Schedule A, that applies to no more than two days of the total number of filming fee days authorized by a filming permit, upon the permittee demonstrating that it has substituted at least one 400 ampere (or greater) portable diesel generator with a Clean Energy source for the duration of the filming permit period;

"Clean Energy source" means a tie-in to an existing electrical power connection, a battery technology or other non-fossil fuel source of energy;

"**smoke or vape**" means to burn, use, hold or carry a lighted cigarette, cigar, pipe, or hookah pipe, or to use or hold an e-cigarette, activated e-cigarette or any other vapour product that actively heats or vapourizes an e-substance and includes to smoke or vape cannabis;

"**smoke or vape cannabis**" has the same meaning as in the *Cannabis Control and Licensing Act*, S.B.C. 2018, c. 29, as amended;

b) In section 1.3, the definition "**smoke or smoking**" is deleted.

c) In section 1.3, the definition "**natural park feature**" is deleted and replaced as follows:

"natural park feature" includes any tree, shrub, herb, flower, grass, turf, or other similar vegetation, any fungus or other similar matter, any soil, sand, silt, gravel, rock, mineral, wood, or other similar matter, or a waterbody;

d) Section 3.4 is deleted and replaced as follows:

3.4 No person shall:

(a) cut, trim, dig up, excavate, deface, remove, damage, log or prune any natural park features, or engage in any other similar activity that is harmful or potentially harmful to natural park features;

(b) construct, clear, or otherwise create trails or pathways, or modify, damage, move, or otherwise change trails or pathways that have been designated by posted notice;

(c) damage, deface, vandalize, tamper with, or destroy regional park property;

(d) build, place, erect, or install any permanent or temporary buildings, structures, improvements, facilities, or temporary shelter;

(e) place, store, use, manufacture, deposit, or release, or cause, permit or allow the placing, storing, using, manufacturing or releasing of any contaminant in, on, or under a regional park, regional park property, or natural park feature;

(f) remove regional park property;

(g) leave or abandon any non-regional park property in a regional park; or

(h) harvest or possess a natural park feature.

e) Section 3.7 is deleted and replaced as follows:

3.7 A parent must exercise reasonable supervision of a child or a young person at all times and make reasonable efforts to prevent or discourage a child or a young person from engaging in any activity that contravenes or may contravene this bylaw.

f) Section 4.4 is deleted and replaced as follows:

4.4 No person shall:

(a) make or cause any noise or amplified sound; or

(b) use or operate, or permit another person to use or operate, any musical instrument, device, equipment, machinery, motor assisted cycle, or motor vehicle, in a manner or producing a level of sound that causes a disturbance or potential disturbance to the peace, enjoyment, or comfort of other persons or animals, or in a manner that is dangerous or potentially dangerous, or is otherwise harmful or disturbing to persons, natural park features, regional park property, or animals.

g) Section 6.1 is deleted and replaced as follows:

6.1 (a) Subject to subsection 6.1 (b), no person shall smoke or vape except in an area designated by posted notice as allowing smoking or vaping, or except at the registered camper's campsite, if that person is a registered camper or is the guest of a registered camper;

(b) No person shall smoke or vape cannabis except if that person is a registered camper or a guest of a registered camper at the registered camper's campsite.

h) Section 10.6 is deleted and replaced as follows:

10.6 No person shall park a motor assisted cycle or motor vehicle:

(a) anywhere other than in a location designated by posted notice for parking;

(b) anywhere prohibited by posted notice for parking;

(c) overnight, or leave the motor assisted cycle or motor vehicle in a regional park when it is closed according to the posted notice designating the hours of operation;

(d) anywhere designated by posted notice as parking for persons with disabilities except with a valid disabled persons' parking permit issued under the B.C. *Motor Vehicle Act* that is displayed on the motor assisted cycle or motor vehicle;

(e) anywhere designated by posted notice as service or emergency vehicle parking; or

(f) at an electric vehicle charging station, except if the cycle or motor vehicle is an electric vehicle and it is parked for no more than two consecutive hours.

i) Effective January 1, 2022, Schedule A is deleted and replaced with Schedule A – Fees and Charges which is attached to and forms part of this Bylaw.

Read a first, second and third time this _____ day of _____, _____.

Passed and finally adopted this _____ day of _____, _____.

_____
Sav Dhaliwal, Chair

_____
Chris Plagnol, Corporate Officer

Schedule A – Fees and Charges

(Effective January 1, 2022)

Section 1.0 GENERAL FEES

1.1 Staff Assistance Fees

Staff Time	
Staff time – regular hours	$85/hour
Staff time - overtime	$170/hour
Pre-event Site Visit	$100/visit

1.2 Liquor Administration Fee

Number of Persons	Fee, per day
1 to 199 persons	$115
200 - 299 persons	$170
300 - 999 persons	$225
1000 or more persons	$335

1.3 Parking Permits / Reservation Fees

Regional Park	Location	Fee, per hour	Fee, per day
Pacific Spirit	Fraser Lot	$2.50	$12.50
Belcarra		$2.00	$12
Lynn Headwaters		$2.00	$12
		Fee, per half day	**Fee, per day**
Boundary Bay (Parking Reservation)	Centennial Beach	$5.00	$10.00

Section 2.0 COMMERCIAL USE PERMIT FEES

2.1 Commercial Use Permit Application and Annual Fees	Fee
Commercial use permit application fee	$200
Annual commercial use permit fee for general commercial activities	$200
Commercial use permit fee for dog walking, up to 4 dogs	$470
Commercial use permit fee for dog walking, more than 4 dogs	$780
Commercial use permit fee for equestrian usage	$2,000
Commercial use ID card for approved equestrian permittees	$35/ID

(Effective January 1, 2022)

Section 2.0 COMMERCIAL USE PERMIT FEES (Continued)		
2.2	**Commercial Use Permit Specialized Fees**	**Fees**
	Locker storage of commercial-use related equipment at Wreck Beach, where the maximum rental period permitted is April 1 to September 30 of each year	$100 per small bin per rental period (non-refundable) $200 per medium bin per rental period (non-refundable) $300 per large bin per rental period (non-refundable)
	Replacement key for locker storage at Wreck Beach	$15 per replacement
	Vest	$50 per vest
	Daily or Annual Parking Permit for buses and other motor vehicles that enter a regional park in connection with a commercial use	11 or fewer seats: $20 per vehicle per day or $700 annually per vehicle
		12 to 24 seats: $31 per vehicle per day or $1,000 annually per vehicle
		25 seats or more: $51 per vehicle per day or $1,450 annually per vehicle

Section 3.0 REGIONAL PARK FACILITY PERMIT FEES (Continued)				
3.1	**Outdoor Facilities – Picnic Shelters**			
	Regional Park	**Facility**	**Fee on weekends and holidays, per day**	**Fee on weekdays, per day**
	Aldergrove	Blacktail Picnic Shelter	$157	$77
	Belcarra	Belcarra 1 Picnic Shelter	$157	$77
	Belcarra	Belcarra 2 Picnic Shelter	$157	$77
	Boundary Bay	Cattail Picnic Shelter	$157	$77
	Boundary Bay	Sandpiper Picnic Shelter	$157	$77
	Campbell Valley	Old Orchard Picnic Shelter	$157	$77
	Crippen	Crippen 1 Picnic Shelter	$157	$77
	Crippen	Crippen 2 Picnic Shelter	$157	$77
	Crippen	Crippen 3 Picnic Shelter	$157	$77
	Deas Island	Deas Picnic Shelter	$157	$77
	Deas Island	Muskrat Meadows Picnic Shelter	$157	$77
	Derby Reach	Marpole Picnic Shelter	$157	$77
	Surrey Bend	Hawk Picnic Shelter	$157	$77
	Surrey Bend	Warbler Picnic Shelter	$157	$77
	Surrey Bend	Wren Picnic Shelter	$157	$77

(Effective January 1, 2022)

Section 3.0 REGIONAL PARK FACILITY PERMIT FEES (Continued)

3.2 Outdoor Facilities – Fields

	Regional Park	Facility	Fee
	Aldergrove	Aldergrove Bowl	$120
	Boundary Bay	Centennial Beach South End	$98
	Campbell Valley	Little River Bowl	$98
	Campbell Valley	Little River Field	$98
	Campbell Valley	Rowlatt Farm Field (with access to electrical power & washrooms)	$300
	Campbell Valley	Order of the Canada Grove	$98
	Capilano River	Cleveland Dam Field	$98
	Crippen	Middle Field	$98
	Crippen	Snug Cove Field (with access to electrical power and washrooms)	$300
	Deas Island	Fisher's Field	$98
	Pacific Spirit	Plains of Abraham	$98
	Pacific Spirit	Lily Site	$98
	Pacific Spirit	Heron Site	$98
	Pacific Spirit	Salish Site	$98

3.3 Outdoor Facilities - Miscellaneous

	Campbell Valley	Campbell Downs Equestrian Riding Rings	$157
	Campbell Valley	Campbell Downs Overflow Parking Lot	$98
	Campbell Valley	McLean Pond	$42

3.4 Outdoor Facilities - Camping

			Fee, per night	Youth group fee, per night
	Campbell Valley	Camp Coyote Group Camp	$229	$114
	Deas Island	Muskrat Meadows Group Camp	$229	$114
	Tynehead	Raven's Nest Group Camp	$229	$114
	Camping outside	$6 per person	$6 per person	$6 per person
				Seniors/Persons with disabilities fee, per night
	Derby Reach	Edgewater Bar Campground Site	$25	$22
		Reservation fee (via phone)	$5	$5
		Additional Vehicle	$12	$11

(Effective January 1, 2022)

Section 3.0 REGIONAL PARK FACILITY PERMIT FEES (Continued)					
3.5 Indoor Facilities					
				Fee	**Youth Group fee**
	Capilano River	Camp Capilano	Overnight rental	$1,142 per night	$477 per night
			Day use, from 9am to 5pm	$571 per day	$251 per day
			Late checkout	$200 per hour	$200 per hour
			Lifeguarding service	$40 per hour	$40 per hour
			Security Deposit (0-2 nights)		$250
			Security Deposit (3-6 nights)		$500
	Boundary Bay	Cammidge House	Facility rental	$86 per hour	n/a
			Tent or Over Occupancy Limit	$335 per day	n/a
			Late checkout	$200 per hour	n/a
			Security Deposit		$500
	Deas Island	Inverholme Schoolhouse	Facility rental	$64 per hour	n/a
			Security Deposit		$500
	Minnekhada	Minnekhada Lodge	Facility rental	$146 per hour	n/a
			Late checkout	$200 per hour	n/a
			Security Deposit		$500

Section 4.0 SPECIAL USE AND SPECIAL EVENT PERMIT FEES	
Type of Permit	**Fee per day**
Special Use Permit	NIL
Special Event Permit	**Fee per day**
Up to 75 persons	$250
76 to 300 persons	$435
301 to 500 persons	$650
501 - 1500 persons	$865
Over 1500 persons	$1,930

Section 5.0 CANCELLATION FEES		
Park Permit	**Cancellation Notification Period**	**Fee**
Outdoor Facilities, See Schedule A section 3.1	More than 2 months prior to the rental date	$25
	2 months or less prior to the rental date	100% of fee paid
Indoor Facilities, See Schedule A section 3.2	More than 6 months prior to the rental date	50% of security deposit
	6 months or less prior to the rental date	100% of security deposit
Special Events, See Schedule A section 4.0	More than 2 months prior to the event date	$25
	2 months or less prior to the event date	100% of fee paid
Private Group, See Part 14 section 14.3	At least 14 days prior to the program date	$25
	Fewer than 14 days prior to the program date	100% of fee paid
Edgewater Bar Camping, See Schedule A section 3.1	At any time	$6
	Fewer than 7 days prior to the arrival date	$6 + 1 night of camping fees
	During stay (after arrival)	100% of fee paid

Section 6.0 FILMING FEES	
Location	**Fee**
Application Fee	$250
MVRD Staff: Regular / Management	$85/hr
Parkland – Reserves & Greenways – Film Day	$1000
Parkland – Reserves & Greenways – Film Day – Clean Energy discounted rate (2 days maximum)	$500
Parkland – Reserves & Greenways – Still shoot Day	$500
Parkland – Reserves & Greenways – Prep/Wrap/Hold Day	$500
Parkland – Reserves & Greenways - Crew/Circus Staging Area Day	$420
Parkland – Reserves & Greenways - Crew/Circus Staging Area Day – Clean Energy discounted rate (2 days maximum)	$210

Section 6.0 FILMING FEES (Continued)	
Parkland – Reserves & Greenways – Minor Shoot Day (crews of 10 people or less)	$500
Parkland – Reserves & Greenways – Minor Shoot Day (crews of 10 people or less) – Clean Energy discounted rate (2 days maximum)	$250
BC Mills House Houston House / Karr Mercer Barn Inverholme Schoolhouse	$1,100/film day
Clean Energy discounted rate (2 days maximum): BC Mills House Houston House / Karr Mercer Barn Inverholme Schoolhouse	$610 / film day
BC Mills House Houston House Inverholme School House	$610 / film day prep/wrap/hold day
Burvilla Cammidge House Camp Capilano Delta Heritage Airpark Kanaka Creek Stewardship Centre Louck's House Minnekhada Lodge	$1,875/film day
Clean Energy discounted rate (2 days maximum): Burvilla Cammidge House Camp Capilano Delta Heritage Airpark Kanaka Creek Stewardship Centre Louck's House Minnekhada Lodge	$1375 / film day
Burvilla Cammidge House Camp Capilano Delta Heritage Airpark Kanaka Creek Stewardship Centre Louck's House Minnekhada Lodge	$1,125/film day prep/wrap/hold day

Section 6.0 FILMING FEES (Continued)	
Administration Fee - Electrical Supply / Tie In Agreement	$25 [*cost of electrical supply is in addition to Administration Fee*]
Security Deposit (Certified Cheque) Note: Security Deposits can be amended subject to impact, risk of the facilities and Regional Parks	$12,500

To: Regional Parks Committee

From: David Leavers, Division Manager, Visitor & Operations Services, Regional Parks

Date: October 7, 2021 Meeting Date: November 10, 2021

Subject: **MVRD Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw 1334, 2021 – Amends Bylaw 1117, 2010**

RECOMMENDATION

That the MVRD Board:

a) give first, second and third reading to *Metro Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1334, 2021*; and
b) pass and finally adopt *Metro Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1334, 2021*.

EXECUTIVE SUMMARY

A range of tools, including notices of bylaw violation and municipal tickets, can be used to encourage compliance with Metro Vancouver's bylaws. The Greater Vancouver Regional District (GVRD) Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No. 1117, 2010 (Bylaw 1117) allows contraventions to be addressed through a Notice of Bylaw Violation where enforcement is needed, as an initial enforcement measure.

One amendment is recommended at this time, that Schedule A be updated and replaced to better align with the proposed amendments to the Regional Parks Regulation Bylaw No. 1177.

PURPOSE

To consider amendments to the *Greater Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No. 1117, 2010 (Bylaw No. 1117)* that will help further protect Regional Parks' natural resources and assets, and better define acceptable public conduct.

BACKGROUND

The bylaw is amended annually with changes that further regulate visitor behavior and activities. Proposed changes to the regulations will help improve public safety, further protect park natural resources and assets, and better define acceptable public conduct and park officer enforcement powers. Metro Vancouver requires the ability to manage and enforce acceptable public use on regional park land to enhance public safety and enjoyment.

Bylaw No. 1117 sets Notice of Bylaw Violation penalty amounts for the *Metro Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012 (Regional Parks Regulation Bylaw No. 1177)* as well as for a number of other MVRD regulatory bylaws that have violations designated in Schedules A through K. The penalty amounts for *Metro Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012 (Regional Parks Regulation Bylaw No. 1177)* are set out in Schedule A of *Bylaw No. 1117*.

The proposed amendment to *Bylaw No. 1117*, *2010* is described in this report and supports the proposed amendments contained in the proposed *Metro Vancouver Regional District Regional Parks Regulation Amending Bylaw No. 1334, 2021.* This consequential amendment pertains to the Schedule A entries for the following sections / subsections:

a) Section 3.4 (h) – Harvesting or Possessing a Natural Park Feature
b) Section 3.7 – Inadequate Supervision of a Child or Young Person
c) Section 6.1 (a) – Smoking or Vaping in Unauthorized Area
d) Section 6.2 (b) – Unauthorized Smoking or Vaping of Cannabis
e) Section 8.2 – Disorderly Animal

Bylaw 1117 and its amendments also sets out bylaw violations related to the Air Quality and Climate Change function, and a separate report seeking Board adoption of amendments regarding that function will be considered by the Climate Action Committee at its November meeting.

REGULATORY CHANGES

The following proposed changes to Schedule A of *Bylaw No. 1117* will help further protect Regional Parks' natural resources and assets, and better define acceptable public conduct and park officer enforcement authorities.

a) Section 3.4 (h)

Recommend adding a new violation as a bylaw amendment called "*Harvesting or Possessing a Natural Park Feature*". This amendment would align with the proposed amendment to the Regional Parks Regulation Bylaw No. 1177.

Prohibiting the harvesting or possession of "natural park features" will better equip park officers to protect the natural ecology of regional parks.

It is therefore proposed that for *Bylaw No. 1117* the Schedule A designated violation for Section 3.4 be amended to include (h) "*Harvesting or Possessing a Natural Park Feature*" (Column 2). With the corresponding penalties set out in Columns 3, 4 and 5 this would allow bylaw enforcement officers to issue a notice of bylaw violation for violations of Section 3.4 (h) of the *Regional Parks Regulation Bylaw No. 1177*.

b) Section 3.7

Recommend amending the wording in column 2 of Schedule A of *Bylaw No. 1117* from "*Inadequate Supervision of a Young Person*" to "*Inadequate Supervision of a Child or a Young Person*". This amendment would align with the proposed amendment to the Regional Parks Regulation Bylaw No. 1177.

A previous amendment to this bylaw created new and distinct definitions for "Child" and "Young Person". This recommended amendment is administrative to update language related to this violation.

It is therefore proposed that for *Bylaw No. 1117* the Schedule A designated violation for Section 3.7 be amended to "*Inadequate Supervision of a Child or a Young Person*" (Column 2). With the corresponding penalties set out in Columns 3, 4 and 5 this would allow bylaw enforcement officers to issue a notice of bylaw violation for violations of Section 3.7 of the *Regional Parks Regulation Bylaw No. 1177*.

c) Section 6.1 (a)

Recommend amending the wording in column 2 of Schedule A of *Bylaw No. 1117* from "*Smoking*" by adding a new sub-section called "*Smoking or Vaping in Unauthorized Area*". This amendment would align with the proposed amendment to the Regional Parks Regulation Bylaw No. 1177.

The recommended wording in this amendment captures the violation more accurately. Updating the wording from *"Smoking"* to *"Unauthorized Smoking or Vaping in Unauthorized Area"* provides greater clarity of expectations for park visitors and provides park officers with added clarity when enforcing these activities except in an area designated by posted notice as allowing smoking or vaping.

It is therefore proposed that for *Bylaw No. 1117* the Schedule A designated violation for Section 6.1 be amended to 6.1 (a) "*Smoking or Vaping in Unauthorized Area*" (Column 2). With the corresponding penalties set out in Columns 3, 4 and 5 this would allow bylaw enforcement officers to issue a notice of bylaw violation for violations of Section 6.1 (a) of the *Regional Parks Regulation Bylaw No. 1177*.

d) Section 6.2 (b)

Recommend amending the wording in column 2 of Schedule A of *Bylaw No. 1117* from "*Smoking*" by adding a sub-section called "*Unauthorized Smoking or Vaping of Cannabis*". This amendment would align with the proposed amendment to the Regional Parks Regulation Bylaw No. 1177.

The recommended wording in this amendment captures the violation more accurately. Updating the wording from *"Smoking"* to *"Unauthorized Smoking or Vaping of Cannabis"* provides greater clarity of expectations for park visitors. It also provides park officers with an enforceable way to regulate cannabis use in Regional Parks.

It is therefore proposed that for *Bylaw No. 1117* the Schedule A designated violation for Section 6.1 be amended to 6.1 (b) "*Smoking or Vaping in Unauthorized Area*" (Column 2). With the corresponding penalties set out in Columns 3, 4 and 5 this would allow bylaw enforcement officers to issue a notice of bylaw violation for violations of Section 6.1 (b) of the *Regional Parks Regulation Bylaw No. 1177*.

e) Section 8.2

Regarding Disorderly Animal violation, this amendment proposes to increase the corresponding penalties set out in Columns 3, 4 and 5 from $95 (Discounted Penalty), $125 (Penalty), $155 (Late Payment Penalty) to $190 (Discounted Penalty), $250 (Penalty), $310 (Late Payment Penalty).

The recommended amendment of an increased fine in Section 8.2 better represents the potential impact of non-compliance and is consistent with fine for an Unleashed Animal.

It is therefore proposed that for *Bylaw No. 1117* the Schedule A designated violation for Section 8.2 be amended to increase the corresponding penalties set out in Columns 3, 4 and 5.

ALTERNATIVES

1. That the MVRD Board:
   a) give first, second and third reading to *Metro Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1334, 2021*; and
   b) pass and finally adopt *Metro Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1334, 2021*.

2. That the MVRD Board receive for information the report dated October 7, 2021, titled "*MVRD Notice of Bylaw Violation Enforcement and Dispute Adjudication Amending Bylaw 1334, 2021 - Amends 1117, 2010*" and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

If the MVRD Board approves Alternative 1, there are no financial implications. Notice of Bylaw Violation and Municipal Ticket Information ticketing penalties associated with the *Regional Parks Regulation Bylaw No. 1177* are not intended to comprise a stable revenue stream but do help to offset costs for in-house Notice of Bylaw Violation disputes adjudication and Municipal Ticket Information court disputes.

If the MVRD Board approves Alternative 2, there are no financial implications. This would deny bylaw enforcement officers these additional tools to seek regulatory compliance.

SUMMARY / CONCLUSION

Metro Vancouver requires the ability to manage and enforce acceptable public use on regional park land to enhance public safety and enjoyment. *Bylaw No. 1117* sets Notice of Bylaw Violation penalty amounts for the *Metro Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012* as well as for a number of other MVRD regulatory bylaws that have violations designated in Schedule A.

The proposed bylaw amendment, subject to MVRD Board approval, will address emergent Regional Parks compliance issues, will keep the bylaw current and will provide greater clarity and ease for officers carrying out enforcement duties. Amendments have only been made that reflect the

amendments proposed for the *Metro Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012.*

No changes have been made that affect any of the other bylaws referred to in *Bylaw No. 1117* including:

- *GVRD Air Quality Management Bylaw No. 1082, 2008*
- *GVRD Concrete and Concrete Products Industries Emission Regulation Bylaw No. 1084, 2008*
- *GVRD Gasoline Distribution Emission Regulation Bylaw No. 1085, 2008*
- *GVRD Automotive Refinishing Emission Regulation Bylaw No. 1086, 2008*
- *GVRD Boilers and Process Heaters Emission Regulation Bylaw No. 1087, 2008*
- *GVRD Agricultural Boilers Emission Regulation Bylaw No. 1098, 2008*
- *GVRD Vancouver Regional District Electoral Area A Zoning Bylaw No. 1144, 2011*
- *GVRD Vancouver Regional District Electoral Area A Building Administration Bylaw No. 1043, 2006*
- *Greater Vancouver Regional District Electoral Area A Unsightly Premises and Nuisance Bylaw No. 1198, 2014*
- *Greater Vancouver Regional District Non-Road Diesel Emission Regulation Bylaw No. 1161, 2012 (amended)*

Attachment *(48725196)*
Metro Vancouver Regional District Bylaw No. 1334, 2021 - A Bylaw to Amend Greater Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No. 1117, 2010

47815409

METRO VANCOUVER REGIONAL DISTRICT
BYLAW NO. 1334, 2021
A Bylaw to Amend "Greater Vancouver Regional District Violation Enforcement and Dispute Adjudication Bylaw 1117, 2010"

WHEREAS:

A. the Board of Directors of the Metro Vancouver Regional District has adopted "Greater Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No. 1117, 2010", a bylaw respecting the enforcement of Notices of Bylaw Violation and establishing a Bylaw Violation Dispute Adjudication System; and

B. the Board of Directors of the Metro Vancouver Regional District wishes to amend "Greater Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No. 1117, 2010";

NOW THEREFORE the Board of Directors of the Metro Vancouver Regional District enacts as follows:

Citation

1. The official citation of this bylaw is "Metro Vancouver Regional District Violation Enforcement and Dispute Adjudication Amending Bylaw No. 1334, 2021".

Schedule(s)

2. The following Schedule is attached to and forms part of this Bylaw:
   Schedule A - MVRD Regional Parks Regulation Bylaw No. 1177, 2012 (amended).

3. "Greater Vancouver Regional District Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No. 1117, 2010" is hereby amended as follows:

   a) Schedule A is deleted and replaced by the Schedule A which is attached to and forms part of this bylaw.

Read a first, second and third time this _____ day of _____, _____.

Passed and finally adopted this _____ day of _____, _____.

_____
Sav Dhaliwal, Chair

_____
Chris Plagnol, Corporate Officer

Schedule A

MVRD Regional Parks Regulation Bylaw No. 1177, 2012 (amended)

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Section	**Authorized Words or Expressions**	**Discounted Penalty**	**Penalty**	**Late Payment Penalty**	**Compliance Agreement Available**
2.5	Failure to Assist Park Officer	$190	$250	$310	No
2.5(d)	Failure to Obey Order	$190	$250	$310	No
2.6	Obstruction of Park Officer	$375	$500	$500	No
2.7	Misleading Park Officer	$190	$250	$310	No
3.1	Failure to Obey Bylaw	$375	$500	$500	No
3.2	Failure to Obey Posted Notice	$190	$250	$310	No
3.3	In Park When Closed	$190	$250	$310	Yes
3.4	Destroying or Damaging Park Property	$375	$500	$500	No
3.4(d)	Unauthorized Structure	$95	$125	$155	No
3.4(f)	Removing Park Property	$375	$500	$500	No
3.4(g)	Abandoning Non-Park Property	$95	$125	$155	No
3.4 (h)	Harvesting or Possessing Natural Park Feature	$190	$250	$310	No
3.6	Interfering with Park Permit	$190	$250	$310	No
3.7	Inadequate Supervision of a Child or Young Person	$95	$125	$155	No
4.1(a)	Disorderly, Dangerous or Violent Conduct	$375	$500	$500	No
4.1(b)	Lewd, Sexual or Offensive Conduct	$375	$500	$500	No

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Section	**Authorized Words or Expressions**	**Discounted Penalty**	**Penalty**	**Late Payment Penalty**	**Compliance Agreement Available**
4.2	Possessing Dangerous Device	$375	$500	$500	No
4.3	Defecating or Urinating Where Not Allowed	$95	$125	$155	No
4.4	Undue Noise or Disturbance	$190	$250	$310	No
5.1	Off Road or Trail	$375	$500	$500	No
5.2	Obstructing Road or Trail	$375	$500	$500	No
5.3	Unauthorized Group Gathering	$95	$125	$155	No
5.4	Unauthorized Activity	$95	$125	$155	No
5.4(f)	Unauthorized Drone Take-Off or Landing	$95	$125	$155	No
5.4(g)	Slacklining or Highlining	$95	$125	$155	No
6.1(a)	Smoking or Vaping in Unauthorized Area	$375	$500	$500	No
6.1(b)	Unauthorized Smoking or Vaping of Cannabis	$375	$500	$500	No
6.2	Discarding Burning Substance	$375	$500	$500	No
6.3	Use of Flame-Producing Device Where Not Allowed	$375	$500	$500	No
6.4	Open Fire	$375	$500	$500	No
6.5	Fireworks	$375	$500	$500	No
7.1	Waste in Non-Designated Receptacle	$95	$125	$155	No

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Section	**Authorized Words or Expressions**	**Discounted Penalty**	**Penalty**	**Late Payment Penalty**	**Compliance Agreement Available**
7.2	Depositing Waste	$375	$500	$500	No
7.4	Littering	$95	$125	$155	No
7.5(a)	Abandoning Dead or Living Vegetation	$190	$250	$310	No
7.6	Unattended or Accessible Garbage or Attractant	$375	$500	$500	No
8.1	Animal Not Under Control	$95	$125	$155	No
8.2	Disorderly Animal	$190	$250	$310	No
8.3	Dangerous Animal	$375	$500	$500	No
8.4	Unleashed Animal	$190	$250	$310	Yes
8.6	Animal Feces Left	$95	$125	$155	No
8.7	Animal Where Not Allowed	$190	$250	$310	No
8.8	Animal Not Leashed Near Horse	$190	$250	$310	No
8.10	Horse or Horse Drawn Vehicle Where Prohibited	$190	$250	$310	No
8.11	Disturbing An Animal	$190	$250	$310	No
8.12	Unauthorized Fishing	$190	$250	$310	No
8.13	Feeding An Animal	$95	$125	$155	No
8.14	Abandoning An Animal	$95	$125	$155	No
8.15	Failure to Carry a Leash	$95	$125	$155	No

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Section	**Authorized Words or Expressions**	**Discounted Penalty**	**Penalty**	**Late Payment Penalty**	**Compliance Agreement Available**
9.1	Swimming Where Not Allowed	$190	$250	$310	No
9.2	Tampering with Float or Lifesaving Device	$375	$500	$500	No
9.3	Unauthorized Mooring	$375	$500	$500	No
9.4	Unauthorized Use of Watercraft	$190	$250	$310	No
10.2	Unauthorized Use of Motor Vehicle	$375	$500	$500	No
10.3	Unauthorized Use of Motor Assisted Cycle	$95	$125	$155	No
10.4	All-Terrain Vehicle or Motorized Device	$190	$250	$310	No
10.5	Parking Without Permit	$95	$125	$155	No
10.6	Unauthorized Parking	$95	$125	$155	No
10.8	Cleaning or Repairing Vehicle	$95	$125	$155	No
11.1	Commercial Activity Without Permit	$375	$500	$500	Yes
12.2	Failure to Pay Permit Fees or Charges	$190	$250	$310	No
13.2	Failure to Comply With Permit	$375	$500	$500	No

To: Regional Parks Committee

From: David Leavers, Division Manager, Visitor & Operations Services, Regional Parks

Date: October 7, 2021 Meeting Date: November 10, 2021

Subject: **MVRD Ticket Information Utilization Amending Bylaw 1336, 2021 – Amends Bylaw 1050, 2006**

RECOMMENDATION

That the MVRD Board:

a) give first, second and third reading to *Metro Vancouver Regional District Ticket Information Utilization Amending Bylaw No. 1336, 2021;* and
b) pass and finally adopt *Metro Vancouver Regional District Ticket Information Utilization Amending Bylaw No. 1336, 2021*.

EXECUTIVE SUMMARY

A range of tools, including education, signage and notices of bylaw violation and municipal tickets can be used to promote compliance with Metro Vancouver's bylaws. The MVRD Ticket Information Utilization Bylaw 1050, 2006 allows contraventions to be addressed by issuing Municipal Ticket Information (MTI). Park officers can consider the use of an MTI where the enforcement matter is serious but where the possibility of a more expedited prosecution is appropriate.

One amendment is recommended at this time, that Schedule B be replaced with a Schedule B that includes charges associated with five regulatory changes to the bylaw described in the body of the report. This amendment will align with the proposed amendment to the Regional Parks Regulation Bylaw No. 1177.

PURPOSE

To consider amendments to the *Metro Vancouver Regional District Ticket Information Utilization Amending Bylaw No. 1050, 2006 (Bylaw No. 1050)* that will help further protect Regional Parks' natural resources and assets, and better define acceptable public conduct.

BACKGROUND

The bylaw is amended annually with changes that further regulate visitor behavior and activities. Proposed changes to the regulations will help improve public safety, further protect park natural resources and assets, and better define acceptable public conduct and park officer enforcement powers.

Metro Vancouver requires the ability to manage and enforce acceptable public use on regional park land to enhance public safety and enjoyment. *Bylaw No. 1050* sets municipal ticket information penalty amounts for the *Metro Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012 (Regional Parks Regulation Bylaw No. 1177)* as well as for a number of other MVRD

regulatory bylaws that have violations designated in the schedules. *Regional Parks Regulation Bylaw No. 1177* penalty amounts are set out in Schedule B of *Bylaw No. 1050*.

The proposed amendments to *Bylaw No. 1050, 2006* are described in this report and support the proposed amendments contained in the proposed *Metro Vancouver Regional District Regional Parks Regulation Amending Bylaw No. 1336, 2021.* This consequential amendment pertains to the Schedule B entries for the following sections:

a) Section 3.4 (h) – Harvesting or Possessing a Natural Park Feature
b) Section 3.7 – Inadequate Supervision of a Child or Young Person
c) Section 6.1 (a) – Smoking or Vaping in Unauthorized Area
d) Section 6.2 (b) – Unauthorized Smoking or Vaping of Cannabis
e) Section 8.2 – Disorderly Animal

Bylaw 1050 and its amendments also sets out bylaw violations related to the Air Quality and Climate Change function, and a separate report seeking Board adoption of amendments regarding that function will be considered by the Climate Action Committee at its November meeting.

REGULATORY CHANGES

The following proposed changes to Schedule B of *Bylaw No. 1050* will help further protect Regional Parks' natural resources and assets, and better define acceptable public conduct and park officer enforcement authorities.

a) Section 3.4 (h)

Recommend adding a new violation called "*Harvesting or Possessing Natural Park Feature*". This amendment would align with the proposed amendment to the Regional Parks Regulation Bylaw No. 1177.

Prohibiting the harvesting or possession of "natural park features" will better equip park officers to protect the natural ecology of regional parks.

It is therefore proposed that for *Bylaw No. 1050* the Schedule B designated violation for Section 3.4 be amended to include 3.4 (h) "*Harvesting or Possessing a Natural Park Feature*" (Column 2). With the corresponding penalty of $500 set out in Column 3, this would allow bylaw enforcement officers to issue an MTI for violations of Section 3.4 (h) of the *Regional Parks Regulation Bylaw No. 1177*.

b) Section 3.7

Recommend amending the wording in column 2 of Schedule B of *Bylaw No. 1050* from "*Inadequate Supervision of a Young Person*" to "*Inadequate Supervision of a Child or a Young Person*". This amendment would align with the proposed amendment to the Regional Parks Regulation Bylaw No. 1177.

A previous amendment to this bylaw created new and distinct definitions for "Child" and "Young Person". This recommended amendment is administrative to update language related to this violation.

It is therefore proposed that for *Bylaw No. 1050* the Schedule B designated violation for Section 3.7 be amended to "*Inadequate Supervision of a Child or a Young Person*" (Column 2). With the corresponding penalty of $250 set out in Column 3, this would allow bylaw enforcement officers to issue an MTI for violations of Section 3.7 of the *Regional Parks Regulation Bylaw No. 1177*.

c) Section 6.1 (a)

Recommend amending the wording in column 2 of Schedule B of *Bylaw No. 1050* from "*Smoking*" by adding a new sub-section called "*Smoking or Vaping in Unauthorized Area*". This amendment would align with the proposed amendment to the Regional Parks Regulation Bylaw No. 1177.

The recommended wording in this amendment captures the offence more accurately. Updating the wording from *"Smoking"* to *"Unauthorized Smoking or Vaping in Unauthorized Area"* provides greater clarity of expectations for park visitors and provides park officers with added clarity when enforcing these activities except in an area designated by posted notice as allowing smoking or vaping.

It is therefore proposed that for *Bylaw No. 1050* the Schedule B designated violation for Section 6.1 be amended to include 6.1 (a) "*Smoking or Vaping in Unauthorized Area*" (Column 2). With the corresponding penalty of $1000 set out in Column 3, this would allow bylaw enforcement officers to issue an MTI for violations of Section 6.1 (a) of the *Regional Parks Regulation Bylaw No. 1177*.

d) Section 6.1 (b)

Recommend amending the wording in column 2 of Schedule B of *Bylaw No. 1050* from "*Smoking*" by adding a sub-section called "*Unauthorized Smoking or Vaping of Cannabis*". This amendment would align with the proposed amendment to the Regional Parks Regulation Bylaw No. 1177.

The recommended wording in this amendment captures the offence more accurately. Updating the wording from *"Smoking"* to *"Unauthorized Smoking or Vaping of Cannabis"* provides greater clarity of expectations for park visitors. It also provides park officers with a legal means to regulate cannabis use in Regional Parks.

It is therefore proposed that for *Bylaw No. 1050* the Schedule B designated violation for Section 6.1 be amended to include 6.1 (b) "*Smoking or Vaping in Unauthorized Area*" (Column 2). With the corresponding penalty of $1000 set out in Column 3 this would allow bylaw enforcement officers to issue an MTI for violations of Section 6.1 (b) of the *Regional Parks Regulation Bylaw No. 1177*.

e) Section 8.2

Regarding the violation of Disorderly Animal, this amendment proposes to increase the corresponding penalty set out in Columns 3 from $250 (Fine) to $500 (Fine).

The recommended amendment of an increased fine in Section 8.2 better represents the potential impact of non-compliance.

It is therefore proposed that for *Bylaw No. 1050* the Schedule B designated violation for Section 8.2 be amended to increase the corresponding penalty set out in Column 3.

ALTERNATIVES

1. That the MVRD Board:
   a) give first, second and third reading to *Metro Vancouver Regional District Ticket Information Utilization Amending Bylaw No.1336, 2021*; and
   b) pass and finally adopt *Metro Vancouver Regional District Ticket Information Utilization Amending Bylaw No. 1336, 2021*.

2. That the MVRD Board receive for information the report dated October 7, 2021, titled "MVRD Ticket Information Utilization Amending Bylaw 1336, 2021 – Amends Bylaw 1050, 2006" and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

If the MVRD Board approves Alternative 1, there are no financial implications. Notice of Bylaw Violation and Municipal Ticket Information ticketing penalties associated with the *Regional Parks Regulation Bylaw No. 1177* are not intended to comprise a stable revenue stream but do help to offset costs for in-house Notice of Bylaw Violation disputes adjudication and Municipal Ticket Information court disputes.

If the MVRD Board approves Alternative 2, there are no financial implications. This would deny bylaw enforcement officers these additional tools to seek regulatory compliance.

SUMMARY / CONCLUSION

Metro Vancouver requires the ability to manage and enforce acceptable public use on regional park land to enhance public safety and enjoyment. The MVRD Ticket Information Utilization Bylaw 1050, 2006 allows contraventions to be addressed by issuing Municipal Ticket Information (MTI). Park officers can consider the use of an MTI where the enforcement matter is serious but where the possibility of a more expedited prosecution is appropriate.

One amendment is recommended at this time, that Schedule B be replaced with a Schedule B that includes charges associated with five regulatory changes to the bylaw. This amendment would better align with the proposed amendment to the Regional Parks Regulation Bylaw No. 1177.

No changes have been made that affect any of the other bylaws referred to in *Bylaw No. 1117* including:

- *GVRD Air Quality Management Bylaw No. 1082, 2008*
- *GVRD Concrete and Concrete Products Industries Emission Regulation Bylaw No. 1084, 2008*
- *GVRD Gasoline Distribution Emission Regulation Bylaw No. 1085, 2008*
- *GVRD Automotive Refinishing Emission Regulation Bylaw No. 1086, 2008*
- *GVRD Boilers and Process Heaters Emission Regulation Bylaw No. 1087, 2008*
- *GVRD Agricultural Boilers Emission Regulation Bylaw No. 1098, 2008*
- *GVRD Vancouver Regional District Electoral Area A Zoning Bylaw No. 1144, 2011*
- *GVRD Vancouver Regional District Electoral Area A Building Administration Bylaw No. 1043, 2006*
- *Greater Vancouver Regional District Electoral Area A Unsightly Premises and Nuisance Bylaw No. 1198, 2014*
- *Greater Vancouver Regional District Non-Road Diesel Emission Regulation Bylaw No. 1161, 2012*

Attachment *(48751993)*
Metro Vancouver Regional District Bylaw No. 1336, 2021 - A Bylaw to Amend MVRD Ticket Information Utilization Amending Bylaw 1050, 2006

47808336

METRO VANCOUVER REGIONAL DISTRICT
BYLAW NO. 1336, 2021
A Bylaw to amend "Greater Vancouver Regional District Ticket Information Utilization Bylaw No. 1050, 2006"

WHEREAS:

A. the Board of Directors of the Metro Vancouver Regional District has adopted "Greater Vancouver Regional District Ticket Utilization Bylaw No. 1050, 2006", a bylaw to authorize the use of the municipal ticket information for the enforcement of certain bylaws, to designate persons as bylaw enforcement officers, to authorize the use of certain words or expressions to designate certain bylaw offences and to set certain fine amounts; and

B. the Board of Directors of the Metro Vancouver Regional District wishes to amend "Greater Vancouver Regional District Ticket Utilization Bylaw No. 1050, 2006";

NOW THEREFORE the Board of Directors of the Metro Vancouver Regional District enacts as follows:

Citation

1. The official citation of this bylaw is "Metro Vancouver Regional District Ticket Information Utilization Amending Bylaw No. 1336, 2021"

Schedule(s)

2. The following Schedule is attached to and forms part of this Bylaw:
   Schedule B - Metro Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012 (amended).

3. "Greater Vancouver Regional District Ticket Information Utilization Bylaw No. 1050, 2006" is hereby amended as follows:

   Schedule B is deleted and replaced by the Schedule B which is attached to and forms part of this bylaw.

Read a first, second and third time this _____ day of _____, _____.

Passed and finally adopted this _____ day of _____, _____.

_____
Sav Dhaliwal, Chair

_____
Chris Plagnol, Corporate Officer

Schedule B

Metro Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012 (amended)

Column 1 **Authorized Words or Expressions**	Column 2 **Section**	Column 3 **Fine**
Failure to Assist Park Officer	2.5	$500
Failure to Obey Order	2.5(d)	$500
Obstruction of Park Officer	2.6	$1000
Misleading Park Officer	2.7	$500
Failure to Obey Bylaw	3.1	$1000
Failure to Obey Posted Notice	3.2	$500
In Park When Closed	3.3	$500
Destroying or Damaging Park Property	3.4	$1000
Unauthorized Structure	3.4(d)	$250
Removing Park Property	3.4(f)	$500
Abandoning Non-Park Property	3.4(g)	$250
Harvesting or Possessing Natural Park Feature	3.4 (h)	$500
Interfering with Park Permit	3.6	$500
Inadequate Supervision of a Child or Young Person	3.7	$250
Disorderly, Dangerous or Violent Conduct	4.1(a)	$1000
Lewd, Sexual or Offensive Conduct	4.1(b)	$1000
Possessing Dangerous Device	4.2	$1000
Defecating or Urinating Where Not Allowed	4.3	$250
Undue Noise or Disturbance	4.4	$500
Off Road or Trail	5.1	$1000
Obstructing Road or Trail	5.2	$1000
Unauthorized Group Gathering	5.3	$250
Unauthorized Activity	5.4	$250
Unauthorized Drone Take-Off or Landing	5.4(f)	$250
Slacklining or Highlining	5.4(g)	$250
Smoking or Vaping in Unauthorized Area	6.1(a)	$1000
Unauthorized Smoking or Vaping of Cannabis	6.1(b)	$1000
Discarding Burning Substance	6.2	$1000
Use of Flame-Producing Device Where Not Allowed	6.3	$1000
Open Fire	6.4	$1000
Fireworks	6.5	$1000
Waste in Non-Designated Receptacle	7.1	$250
Depositing Waste	7.2	$1000
Littering	7.4	$250
Abandoning Dead or Living Vegetation	7.5(a)	$500
Unattended or Accessible Garbage or Attractant	7.6	$1000
Animal Not Under Control	8.1	$250
Disorderly Animal	8.2	$500
Dangerous Animal	8.3	$1000

Metro Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012 (amended) – (Continued)

Column 1 **Authorized Words or Expressions**	Column 2 **Section**	Column 3 **Fine**
Unleashed Animal	8.4	$500
Animal Feces Left	8.6	$250
Animal Where Not Allowed	8.7	$500
Animal Not Leashed Near Horse	8.8	$500
Horse or Horse-Drawn Vehicle Where Prohibited	8.10	$500
Disturbing An Animal	8.11	$500
Unauthorized Fishing	8.12	$500
Feeding An Animal	8.13	$250
Abandoning An Animal	8.14	$250
Failure to Carry a Leash	8.15	$250
Swimming Where Not Allowed	9.1	$500
Tampering with Float or Lifesaving Device	9.2	$1000
Unauthorized Mooring	9.3	$1000
Unauthorized Use of a Watercraft	9.4	$500
Unauthorized Use of Motor Vehicle	10.2	$1000
Unauthorized Use of Motor Assisted Cycle	10.3	$250
All-Terrain Vehicle or Motorized Device	10.4	$500
Parking Without Permit	10.5	$250
Unauthorized Parking	10.6	$250
Cleaning or Repairing Vehicle	10.8	$250
Commercial Activity Without Permit	11.1	$1000
Failure to Pay Permit Fees or Charges	12.2	$500
Failure to Comply With Permit	13.2	$1000

COMMITTEE INFORMATION ITEMS AND DELEGATION SUMMARIES

Metro Vancouver Regional District
Board Meeting Date –Friday, November 26, 2021

This information item, listing recent information received by committee, is provided for the MVRD Board's information. Please access a complete PDF package here.

Regional Planning Committee – November 5, 2021

Delegation Summaries:

3.1 No delegations presented

Information Items:

5.2 Increasing Fines for the Illegal Removal of Trees

Climate Action Committee – November 5, 2021

Delegation Summaries:

No delegations presented

Information Items:

5.4 Managing Metro Vancouver's Corporate Energy and Greenhouse Gas Emissions (2016 to 2020)

5.7 Air Quality Advisories During the Summer of 2021

Regional Parks Committee – November 10, 2021

Delegation Summaries:

No delegations presented

Information Items:

5.2 Regional Parks Plan Update – Research Summary and Draft Plan Content

5.6 Crippen Regional Park – Dorman Point Concept

Mayors Committee – November 18, 2021

Delegation Summaries:

3.1 Les Hagen and Eva Habib, Action of Smoking and Health Canada; Dr. Meena Dawar and Randall Ash, Vancouver Coastal Health; Dr. Ariella Zbar and Gwenyth Dwyn, Fraser Health Authority.

Information Items:

No items presented.

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