AGENDA INFORMATION	
☑ Regular Meeting	Date: DEC. 2, 2019
☐ Other:	Date:

Dept. Manager	GM/ Director	CAO
TA		

The District of North Vancouver
REPORT TO COUNCIL

November 19, 2019
File: 13.6770/ENV Energy DNV/File

AUTHOR: Shazeen Tejani, Community Planner
Adam Wright, Community Planner

SUBJECT: Final Draft IMPACT2050: Community Energy and Emissions Plan

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RECOMMENDATION:
THAT Council approve the IMPACT2050: Community Energy and Emissions Plan (CEEP);

AND THAT Council direct staff to report back on the following aspects of, or potential additions to, the CEEP in or before Fall 2020:

1. Moving toward zero use of fossil fuels by January 2021 for projects involving rezoning and earlier than 2026 for buildings not requiring rezoning, where feasible and where legislation permits;

2. Further analysis of the energy reduction targets and how these may be influenced by the reduced use of fossil fuels; and,

3. The potential impacts and accounting of embodied energy and emissions and natural forms of carbon sequestration.

REASON FOR REPORT:
The purpose of this report is to seek Council approval of the final draft of IMPACT2050: Community Energy and Emissions Plan **(Attachment 1).** The CEEP seeks to reduce the District's emissions by 45% below 2007 levels by 2030 and 100% by 2050. Council's approval of the CEEP and submission of a summary report are required before December 31st, 2019 to meet the District's funding agreement.

BACKGROUND:
The process to develop the District's CEEP began in 2017 and has included five phases:

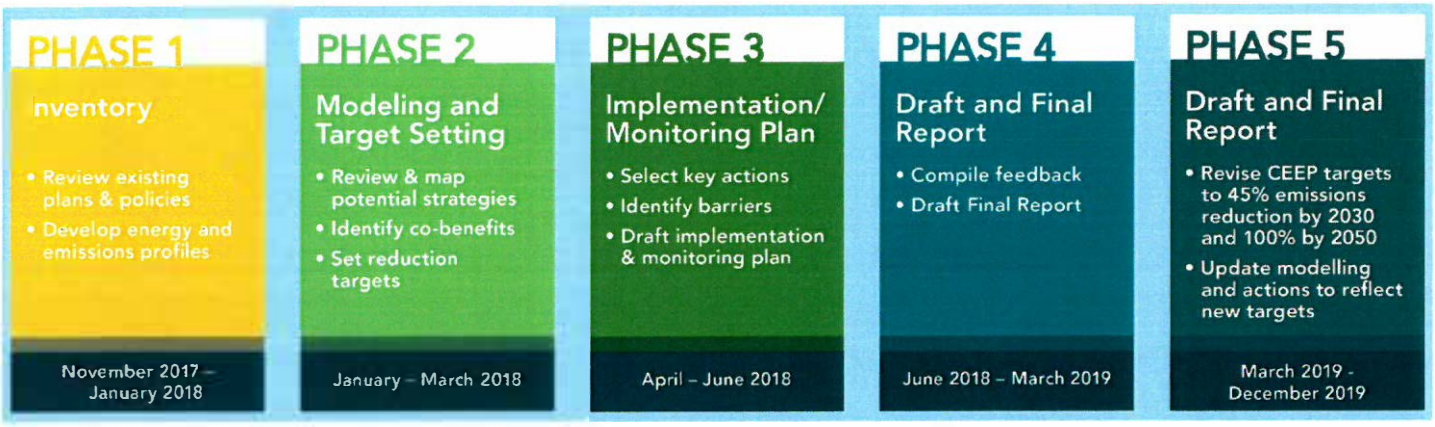

Figure 1: CEEP Project Phases & Timelines

At a Council Workshop on October 28, 2019, Council directed staff to forward the IMPACT2050: Community Energy and Emissions Plan to a Regular Meeting of Council for consideration of adoption. Additional motions are included in this report to respond to Council comments at that workshop. The final draft of the CEEP has been reformatted to enhance readability.

EXISTING POLICY:
The OCP currently identifies a target of reducing community GHG emissions by 33% below 2007 levels by 2030. The OCP has policies to improve the energy efficiency of new and existing buildings, to reduce waste, and to adapt to climate change. An OCP amendment will be required to establish the updated targets in the OCP. Staff propose to bring forward the OCP amendment in conjunction with any amendments arising out of the OCP targeted review in September 2020.

The District has previously approved other plans and strategies to address energy and emissions and adapt to climate change impacts:

- **2009 Climate Action Revenue Incentive Program (CARIP):** The District is a signatory to the BC Climate Action Charter and participates in the CARIP program to report on climate action that reduces GHG emissions. The District was recognized as a leader in 2016, 2017, and 2018 for its efforts to reduce GHG emissions.
- **2012 Development Permit Areas:** designates specific areas in the District for the protection of environmental features, the protection of development from hazards, and for energy and water conservation, and GHG emissions reductions;
- **2014 Electric Vehicle (EV) Charging Infrastructure Policy:** expands EV charging infrastructure within new developments;
- **2017 Climate Change Adaptation Strategy (CCAS):** coordinates initiatives that support climate change adaptation;

- **2018 BC Energy Step Code (ESC):** a voluntary provincial standard the District elected to make mandatory in order to achieve more energy efficient buildings (implemented in the Construction Bylaw);
- **2019 Council Directions:** identifies climate action as a priority issue to address during Council's mandate; and,
- **2019 Corporate Strategic Energy Management Plan (SEMP):** reduces energy and GHG emissions from corporate infrastructure. (An information report on the 2019 Strategic Energy Management Plan will be prepared for Council).

Climate Change Adaptation Actions
The District is currently involved in the following climate adaptation initiatives:

- **North Shore Sea Level Rise Risk Assessment and Adaptive Management Strategy**: will identify risks and potential responses to sea level rise coordinated by multiple North Shore partners and managed by District staff;
- **North Shore Resilience Strategy:** will provide a comprehensive framework that will enable the North Shore to better withstand and bounce back from natural and human-induced hazards, managed by North Shore Emergency Management;
- **Integrated Stormwater Management Plan:** will guide stormwater management to reduce stress on municipal infrastructure and improve groundwater and riparian conditions; and,
- **Community Wildfire Protection Plan Update:** will allow the District to better prepare for, respond to, and recover from wildfires.

Climate Emergency
On July 8th, 2019 Council passed a resolution declaring a climate and ecological emergency and calling for transformative climate action. Council directed staff to incorporate more urgent climate action and ecological protection into strategic and financial planning processes and to establish an annual carbon budget for corporate and community carbon pollution beginning no later than January 2020.

The District is anticipating or undertaking the following initiatives that will help respond to the July 8th, 2019 resolutions:

- **Climate and Innovation Reserve Fund**: may be used to fund innovative measures that reduce greenhouse gas emissions. The District is also exploring opportunities to integrate climate action into financial planning processes (e.g. corporate decision-making that reflects carbon impacts);
- **Carbon Budget**: The District is developing the parameters of a corporate carbon budget that could be scaled to the broader community. This may entail identifying annual GHG emissions that support reaching emissions reduction targets.
- **Targeted OCP Review:** identifies Climate Emergency as one the four key areas of focus. The **Climate Emergency White Paper** will support the development of an action plan for further opportunities to mitigate impacts and adapt to the challenges posed by climate change.

ANALYSIS:

Key Action Areas

The IMPACT2050: Community Energy and Emissions Plan focuses on four key categories for action:

1. **Transportation & Land Use:** Designing connected and efficient communities and reducing the District's reliance on vehicles powered by fossil fuels.

2. **Buildings & Energy:** Improving new and existing building performance, and exploring opportunities for renewable energy and energy savings.

3. **Solid Waste:** Reducing energy and emissions by reducing waste sent to landfill and by lowering emissions generated from waste.

4. **Urban Forestry:** Preserving, enhancing and expanding the District's urban canopy, managing existing eco-assets, and planting more trees.

A primary focus of the CEEP is reducing our reliance on fossil fuels and switching to zero carbon fuel sources. Each of the categories above is intended to address the key sources of emissions in the District, as shown in Figure 2 below.

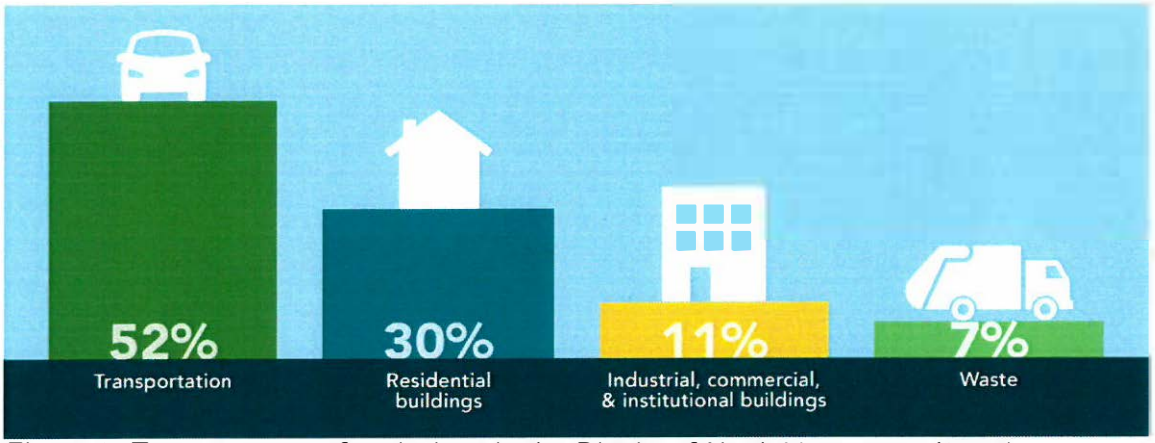

Figure 2: Top 4 sources of emissions in the District of North Vancouver (2016)

The CEEP focuses on actions that can be implemented by the District of North Vancouver. Municipalities play a critical role in the creation and implementation of regulations and land use policy, which together can have significant impacts on how people live, work, and play. The CEEP, however, also recognizes that partnerships with other levels of government, funding agencies, and community organizations will be critical to achieving District energy and emissions targets.

The actions in the CEEP, especially those related to complete communities and transportation emissions reduction, are designed to achieve multiple co-benefits, including addressing the challenges of congestion, affordability, and equity. The CEEP acknowledges that achieving carbon neutrality by 2050 will require additional measures such as carbon

sequestration, carbon offsets, negative emissions technology, and other emerging technologies that remove carbon from the atmosphere.

The CEEP is an over-arching document that will be responsive to new information and technology that may offer additional pathways to energy and emissions reductions. The list of individual actions required to achieve 100% emissions reduction by 2050 is intentionally supplementary to the CEEP **(Attachment 2)**. This will allow the District to adopt additional and/or more ambitious actions, as may be warranted.

Areas for Future Climate Action

Energy Reduction Targets and Moving Towards Zero Fossil Fuels

In addition to setting targets to reduce GHG emissions in the District, the Community Energy and Emissions Plan also includes the following energy reduction targets:

- 15% reduction in energy from 2007 levels by 2030; and,
- 45% reduction in energy from 2007 levels by 2050

The CEEP provides estimates of current and predicted energy consumption to 2050. It focuses on tools available to the District that would reduce energy use by sector (e.g. buildings and transportation) and by energy source (e.g. electricity and natural gas).

Moving towards zero use of fossil fuels in an accelerated manner (e.g. by 2021 for projects requiring rezoning and sooner than 2026 for other buildings where feasible) is an area proposed for further exploration. Further analysis of energy reduction targets, including how they may be influenced by a reduction in fossil fuel use, is also proposed.

Embodied Energy and Emissions and Natural Sequestration

Energy and emissions that are 'embodied' within good and services, (e.g. emissions released from producing concrete for buildings) is an area proposed or further exploration. This may involve seeking new sources of data, exploring low carbon goods and services, or considering additional opportunities for reducing the carbon impact related to the use of materials and services.

Natural forms of carbon sequestration including from the protection, restoration, and enhancement of ecological areas is an area identified for further research. This may involve analysing the potential carbon reductions from accelerated tree planting or from restoring sensitive natural areas.

Staff propose to report back on these areas, in or before Fall 2020.

Implementation and Monitoring

Timely and aggressive implementation of the CEEP is critical to meeting the District's targets of 45% emissions reduction below 2007 levels by 2030 and 100% emissions reduction by 2050. Implementation and monitoring have a number of important elements, including:

- Education and awareness;

- Partnerships, lobbying and advocacy;
- Resourcing; and,
- Regular monitoring of targets.

The CEEP outlines several short-term actions (e.g. those that can be achieved within 10 years) that will be crucial to achieving the District's climate goals. Action cannot be delayed. It will become more challenging and more expensive to achieve the required magnitude of emissions reductions, as time goes on.

The actions in IMPACT2050 reflect the District's unique circumstances. The CEEP calls for complete and compact communities, reduced single-occupant vehicle trips, and retrofits to existing single-family homes; actions that are closely aligned with other leading municipalities in Canada. The CEEP is the first critical step in setting the District on an ambitious and clear path to a carbon neutral future.

Key actions in the CEEP will continue to evolve over time and may reflect new research, data, and emerging technology with the potential for achieving greater emissions reductions than originally forecasted. Additional work to address ecosystem health and wellness, biodiversity, embodied emissions, and local food production are among other further actions the District may explore to respond to the climate and ecological emergency declared on July 8, 2019.

Financial Impacts

The CEEP categorizes actions according to their impact on meeting's the District's energy and emissions targets, anticipated timeline for implementation, and magnitude costs. This weighting of actions will assist the District in financial and resource allocation.

Staff estimate that the cost of implementing key short term CEEP actions in 2020 to be approximately $150,000 to $250,000 not including staff resources. The District's five-year financial plan will report more fully on CEEP costs and impacts, including related capital improvements which help reduce the District's carbon footprint.

Staff will continue to assess potential cost savings from reductions in energy use, accelerated adoption of higher efficiency heating and cooling systems, avoided carbon tax, and potential revenues from installing renewable energy systems. The District will also continue to leverage grant opportunities that may be available to support its climate actions.

Timing/Approval Process:

Work on the CEEP was enabled through funding from the Federation of Canadian Municipalities (FCM) ($158,600), BC Hydro ($15,000), and Vancouver Coastal Health ($10,000). The funding agreements signed with FCM established a deadline of September 30th, 2019 for plan approval by Council. FCM agreed to revise this agreement and extend the deadline to December 30th, 2019.

Council approval of the plan and submission of an accompanying summary report to FCM outlining key elements of the CEEP is required by December 31st, 2019. Refinement of the

list of actions to achieve targets and identification of new actions and priorities can continue after plan approval.

Public Input:
Development of the CEEP included public input gained from six key events held at District Hall: a public information and idea generating session on February 15, 2018, a stakeholder workshop on February 16, 2018, as well as four inter-departmental staff committee workshops in 2018 and 2019. There were a total of 40 people at both the public information session and stakeholder workshop. A summary of this consultation is available as **Attachment 3** of this report.

Additionally, a survey was available in September and October of 2018 which asked for input on draft CEEP actions. In total, 152 survey responses were received and 22 actions were ranked. All of the actions identified in the survey (e.g. in transportation and land use, buildings and energy, urban forestry, and solid waste) were supported or strongly supported by at least 60% of respondents. At least half of the actions were supported or strongly supported by 75% of the respondents. A summary of the survey responses is available as **Attachment 4** of this report.

Concurrence:
Since the project's inception in November 2017, the CEEP process has included active and continued participation from the following departments:

- Community Planning
- Transportation
- Buildings
- Solid Waste & Fleet
- Engineering Design
- Development Engineering
- Finance
- Environmental Services
- Parks
- Facilities
- Development Engineering
- Development Planning
- Utilities
- GIS

These departments participated in quarterly Interdepartmental Steering Committee Meetings, where they were required to draft, review, and revise specific actions for the detailed action plan to get to 80% emissions reduction by 2050, and more recently, 100% emissions reduction by 2050. The multi-departmental CEEP team will help ensure that implementation across the organization is immediate and efficient.

Conclusion:
The IMPACT2050: Community Energy and Emissions Plan has been prepared following two years of planning and engagement. The draft Plan has been presented to Council and received feedback at Council Workshops on March 11, 2019 and on October 28, 2019. Staff are now forwarding the final draft of the CEEP to Council for consideration of approval.

The CEEP is a first critical step toward achieving the District's climate and ecological emergency goals. The CEEP provides the District with direction to take climate action in the near term while providing Council with the flexibility to adjust, refine, and add additional actions as emerging data, research and technology presents new and promising pathways to achieving carbon neutrality.

Options:

1. THAT Council approve the IMPACT2050: Community Energy and Emissions Plan;

   OR

2. That Council take no further action on the CEEP.

Respectfully submitted,

Shazeen Tejani
Community Planner

Adam Wright
Community Planner

Attachment 1: IMPACT2050 – Community Energy and Emissions Plan
Attachment 2: IMPACT2050 – List of Actions to Achieve Target
Attachment 3: Community Energy & Emissions Plan – Phase 2 Stakeholder & Public Engagement Summary (July 2018)
Attachment 4: Community Energy & Emissions Plan – Phase 4 Survey Response Summary (January 2019)

REVIEWED WITH:

☑ Community Planning		☐ Clerk's Office		External Agencies:	
☐ Development Planning		☐ Communications		☐ Library Board	
☐ Development Engineering		☑ Finance	RD	☐ NS Health	
☐ Utilities		☐ Fire Services		☐ RCMP	
☐ Engineering Operations		☐ ITS		☐ NVRC	
☐ Parks		☐ Solicitor		☐ Museum & Arch.	
☐ Environment		☐ GIS		☐ Other:	
☐ Facilities		☐ Real Estate			
☐ Human Resources		☐ Bylaw Services			

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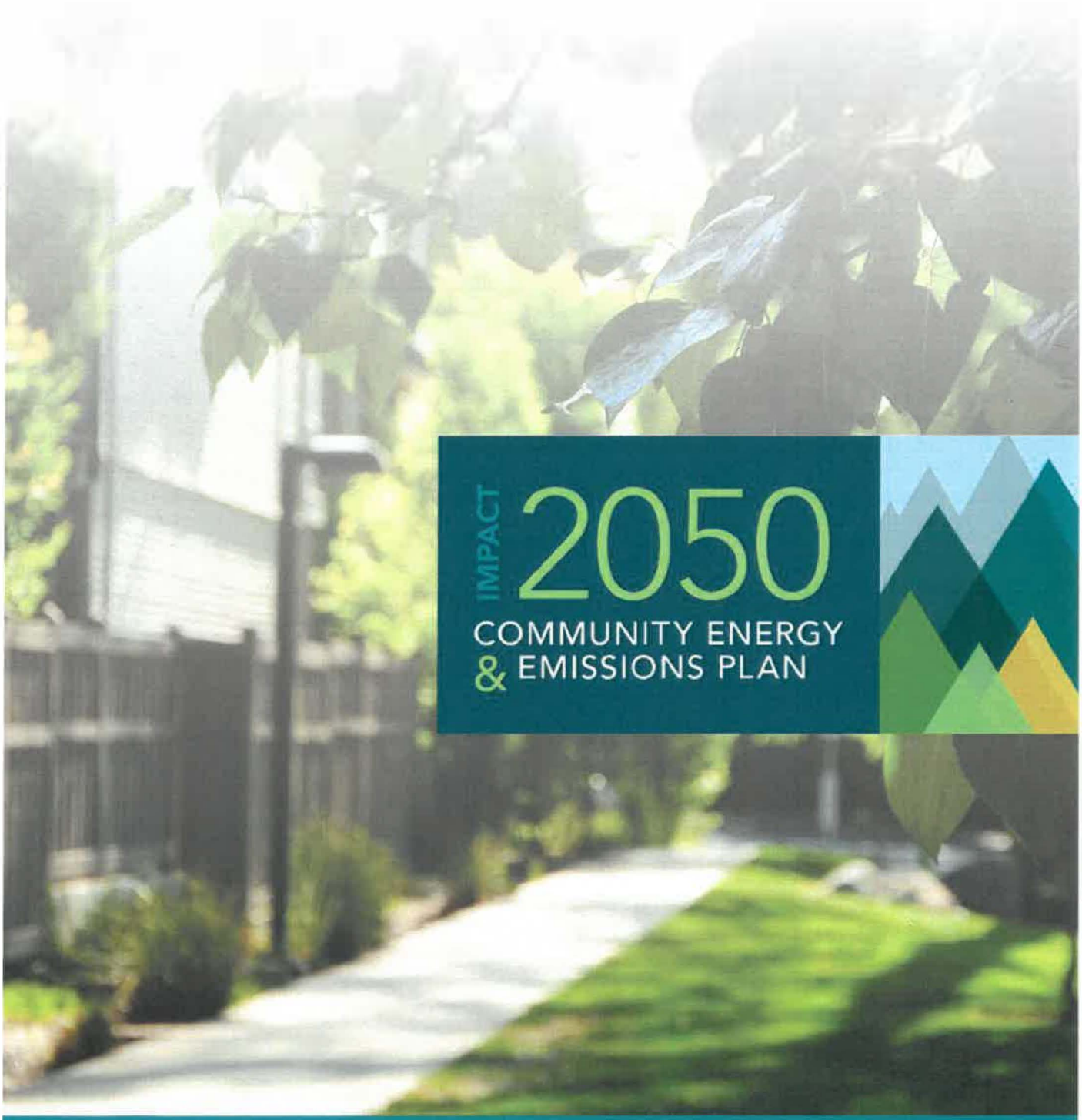
ATTACHMENT 1



IMPACT 2050
COMMUNITY ENERGY & EMISSIONS PLAN

DISTRICT OF NORTH VANCOUVER

Prepared by:
Integral Group LLC &
District of North Vancouver

CONTENTS

FIGURES

ACKNOWLEDGMENTS

IMPACT 2050: The District of North Vancouver's Community Energy and Emissions Plan is the outcome of a multi-year collaborative effort that provided a holistic approach to climate action from an environmental sustainability, health, and equity lens. It required continued effort and expertise from a wide range of residents, stakeholders, and staff and represents a multi-faceted approach to strategic decision-making in the near and long term.

Over 200 residents and external stakeholders provided feedback over the course of multiple stakeholder meetings, a public idea generation session, and an online survey. Your input into this process was invaluable and resulted in a plan that reflects the progressive values of the District's residents. Thank you for taking the time to inform policies that will create a better future for generations to come.

District of North Vancouver Interdepartmental Steering Committee:

- Shazeen Tejani
- Sarah Dal Santo
- Monica Samuda
- Julie Pavey
- Ingrid Weisenbach
- Steve Ono
- Brett Dwyer
- Paul Forsyth
- Bo Ocampo
- Guy Exley
- Richard Boase
- Andy Bell
- Stephen Bridger
- Kevin Zhang
- Andrew Zhou

Consultant Project Group

- Lisa Westerhoff and Kerry Shaw of Integral Group LLC
- Jeffrey Tumlin of Nelson Nygaard
- Charles Montgomery of Happy City
- Aaron Licker of Licker Geospatial
- James Glave of Glave Communications
- Sara Bailey of Mika Creative

The development of this plan was made possible by the generous contribution of the **Federation of Canadian Municipalities**, **BC Hydro**, and **Vancouver Coastal Health**, without whose financial assistance this project would not have been realized.

FCM FEDERATION OF CANADIAN MUNICIPALITIES FÉDÉRATION CANADIENNE DES MUNICIPALITÉS

BC Hydro

Vancouver Coastal Health

Special thanks to Maxwell Sykes and Dave Ramsley (formerly with Integral Group LLC), Susan Chalmers (Community Energy Association), and Amanda Vantol (District of North Vancouver) for your input and expertise into this process.

EXECUTIVE SUMMARY

In October 2018, the Intergovernmental Panel on Climate Change (IPCC) released a report outlining the need to limit global warming to 1.5 degrees Celsius above pre-industrial levels. Municipalities across the world have responded by declaring a climate emergency, acknowledging the need to escalate climate action and strive to achieve carbon neutrality by 2050. In this report, **carbon neutrality** is defined as achieving net-zero emissions by balancing the amount of human-caused carbon emissions in the atmosphere with an equivalent amount of human-caused carbon emission removals over a specific period of time.

Reducing Emissions

IMPACT2050 is a comprehensive **Community Energy and Emissions Plan (CEEP)** and is the District of North Vancouver's response to this global challenge. It has been designed to reflect the Climate Emergency declared by Council in July 2019, and help the District to meet its ambitious targets of:

Reductions	2030	2050
Carbon Emissions	45% below 2007 levels	100% below 2007 levels
Energy Consumption	15% below 2007 levels	45% below 2007 levels

IMPACT2050 identifies over 80 action items spanning four priority emissions reduction areas:

1. Transportation & Land Use

Actions designed to reduce energy and emissions by designing connected and efficient communities and reducing our reliance on vehicles powered by fossil fuels.

2. Buildings & Energy

Actions designed to reduce energy and emissions by improving new and existing building performance, and exploring opportunities for renewable energy and energy savings.

3. Solid Waste:

Actions designed to reduce energy and emissions by reducing waste sent to landfill and by lowering emissions generated from waste.

4. Urban Forestry:

Actions designed to reduce energy and emissions by preserving, enhancing and expanding the District's urban canopy, managing existing eco-assets, and planting more trees.

Aside from reducing emissions, each action is designed to help support the health and wellbeing of District residents, from improving the urban experience, to encouraging active mobility, promoting positive social interactions, and fostering resilient communities and ecosystems.

Reaching our Targets

Achieving the District's ambitious but important emissions reduction targets means big changes in the way we design our communities, buildings, and transportation networks. Implementing the actions to achieve the 2030 emissions reduction target of 45% is a crucial step to achieving our overall goal of carbon neutrality by 2050, as actions today will have far-reaching consequences into the future.

Implementing the actions that target our buildings and transportation systems will be particularly important, as these sectors account for nearly 95% of District emissions. In terms of transportation, the District's decision to focus development in compact Town and Village Centres supported by transit, cycling, and walking improvements is projected to have **a significant positive effect on energy and emissions**. By 2030, transportation emissions are projected to be 25% lower than in 2007, with reductions reaching nearly 28% by 2050.

Key Actions

While each and every action in IMPACT2050 is important, the most important actions the District must focus on in the short term to ensure it will meet its targets include the following:

Transportation & Land Use

- Design for complete, connected communities and town centres that rely heavily on active transportation and comfortable and efficient transit systems
- Use Transportation Demand Management strategies to complement good land use planning policy in order to further reduce the number of car trips in the District
- Support Metro Vancouver's efforts to reduce traffic congestion through the use of mobility pricing
- Support the federal and provincial government's zero-emission vehicle mandates and low carbon fuel standards
- Accelerate implementation of electric vehicle (EV) and electric bicycle charging infrastructure to support electrified mobility

Buildings & Energy

- Implement a widespread energy efficiency and fuel switching retrofit program for existing buildings
- Aggressively adopt the BC Energy Step Code to improve energy efficiency in new buildings
- Adopt greenhouse gas emissions targets to move towards zero emissions new construction projects

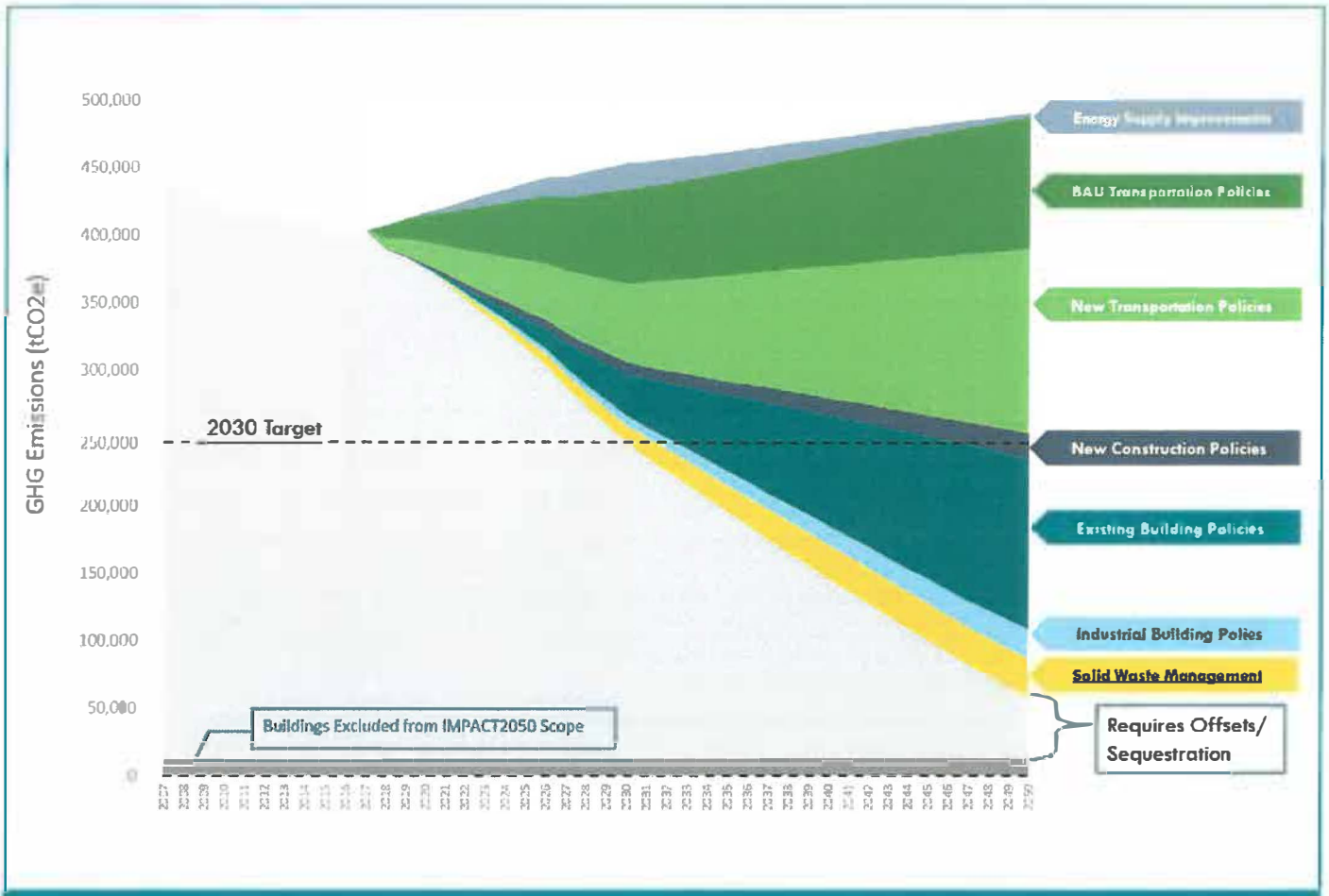


Figure 1: *A carbon neutral District by 2050*

While the full implementation of these and the other actions are already making tremendous emissions reductions, they still leave the District of North Vancouver short of achieving complete carbon neutrality by 2050. Additional actions will be necessary to offset any remaining emissions and move the District all the way to carbon neutrality. Options to offset any remaining emissions include biosequestration, carbon offsets, and renewable energy certificates (RECs). The District will continue to monitor progress and explore the most viable options as we move forward, updating IMPACT2050 actions bi-annually to incorporate the newest and best science and technology available.

Working Together

With IMPACT2050, Council has approved the direction the District will take towards a healthier and more sustainable community in the face of global climate change. Recognizing that the District is not acting alone, IMPACT2050 calls upon the Provincial and Federal Governments, partner agencies, local businesses and organizations, as well as individual citizens to work together to achieve and maintain energy and emissions reductions for decades to come.

1.0 TACKLING CLIMATE CHANGE

Climate change is one of the most important issues facing communities across the world today. The 2018 Intergovernmental Panel on Climate Change (IPCC) has urged that global warming must be limited to 1.5°C in order to avoid the worst impacts of climate change. Keeping global warming to this level requires fast and far-reaching changes to all aspects of society, including **significant changes to the way we interact with our land, energy systems, industries, buildings, transportation networks and cities.** Ultimately, these changes must result in a global reduction of human-caused GHG emissions by 45% relative to 2010 levels by 2030, with a state of **carbon neutrality** reached by 2050.

To be successful, actions to minimize the impacts of climate change will need to be taken across the world. As a signatory to the Paris Agreement, Canada joined 196 other countries in a commitment to combating climate change and is now required to demonstrate efforts to reduce and regularly report on national greenhouse gas (GHG) emissions. Canada has also committed to reducing national emissions by 30% by the year 2030 and 80% by 2050. Similarly, the Province of British Columbia has committed to reducing provincial emissions by at least 40% by 2030 and 80% by 2050.

However, federal and provincial action is not enough to meet these targets. Municipalities play a significant role in reducing our overall national emissions. They have jurisdiction over many decisions that affect the way we live, from the way we use our land, to the way buildings and transportation networks are designed. Reducing the District of North Vancouver's GHG emissions and supporting provincial and national targets will be needed to do the District's part and to avoid the worst impacts of climate change.

CARBON NEUTRAL DEFINED

Carbon neutrality is defined as achieving net-zero emissions by balancing the amount of human-caused carbon emissions in the atmosphere with an equivalent amount of human-caused carbon emission removals over a specific period of time.

WHAT IS CLIMATE CHANGE?

Greenhouse gas (GHG) emissions have both natural and human-caused (or anthropogenic) sources. While both contribute to climate change, anthropogenic GHG emissions have vastly accelerated the rate and potential severity of climate change. Anthropogenic GHG emissions are primarily derived from the combustion of fossil fuels such as coal, oil and natural gas. We burn fossil fuels in many aspects of our daily lives, including when we heat our homes and hot water and move around using fossil fuel-based vehicles. Anthropogenic GHG emissions also come from industrial processes, agricultural practices, land-use changes such as deforestation, and emissions from landfilled waste.

1.1 - Reducing Energy and Emissions in the District

A key step in limiting potential energy and emissions is the design of a Community Energy and Emissions Plan (CEEP). CEEPs are tools that municipalities can use to map out and achieve considerable reductions in energy consumption and GHG emissions. They help to guide the decisions and investments around our buildings, infrastructure and land-use that are made today to ensure that we can and will achieve and maintain energy and emissions reductions for decades to come.

The impacts of climate change are already being felt across the world, including in the District of North Vancouver. Hotter summers, wetter winters, higher risks of forest fires, extreme heat events, and flooding are all already occurring locally *(Source: District Climate Change Adaptation Strategy)*

PREDICTED CLIMATE CHANGES FOR 2050

- Increased temperatures
- Increased precipitation
- Increased extreme weather
- Sea level rise

CLIMATE RISKS FOR 2050

- Record-setting summer temperatures leading to heat-related deaths
- Extreme drought conditions
- Wildfires and prolonged air quality advisories
- Intense rainfall causing flooding
- Reduced snowfall impacting water reservoir and winter recreation activities

IMPACT2050 is the District of North Vancouver's CEEP. The actions listed in this document ensure that where we live, how we move around, and how we source our energy will work for North Vancouverites today and in the future. Because the District is not acting alone, IMPACT2050 calls upon the Provincial and Federal Governments, partner agencies, local businesses and organizations, as well as individual citizens to work together to address climate change.

IMPACT2050's primary functions are to:

- Organize and coordinate the District's existing efforts to establish and meet carbon emission and energy consumption reduction targets;
- Establish a monitoring framework to assess progress towards those targets;
- Direct actions to ensure reduction targets outlined in the Official Community Plan are met;
- Strengthen the integration of climate actions into municipal programs, decision making, and budgets (resource allocation);
- Communicate progress on carbon emissions and energy consumption reduction efforts;
- Educate residents about the climate crisis and the need to achieve carbon neutrality by 2050; and
- Increase community awareness and inspire innovation on climate action.

1.2 - One Piece of the Puzzle

IMPACT2050 is a framework that provides a foundation upon which we can develop more detailed policies and programs to support implementation. The actions outlined in IMPACT2050 are designed to contribute to the District's overall vision of a vibrant and sustainable community. They also complement and support other existing plans and policies.

The District's **Official Community Plan** is designed to guide municipal decisions and operations through 2030 by identifying key issues facing the District, and the strategic directions necessary to address them over time. It directs growth into compact, walkable **Town and Village Centres** and embeds sustainability into the core of the community as it evolves.

The **Strategic Energy Management Plan** outlines opportunities to reduce energy use and emissions for municipally-owned and operated buildings and key corporate assets, targeting 30% below 2012 levels by 2020. Analysis completed for IMPACT2050 will help inform Strategic Energy Management Plan targets to 2030 and 2050.

The Federation of Canadian Municipalities (FCM) defines two types of local-level GHG inventories in their Partners for Climate Protection (PCP) program: corporate and community[1]

CORPORATE GHG EMISSIONS

Targeted with Strategic Energy Management Plan

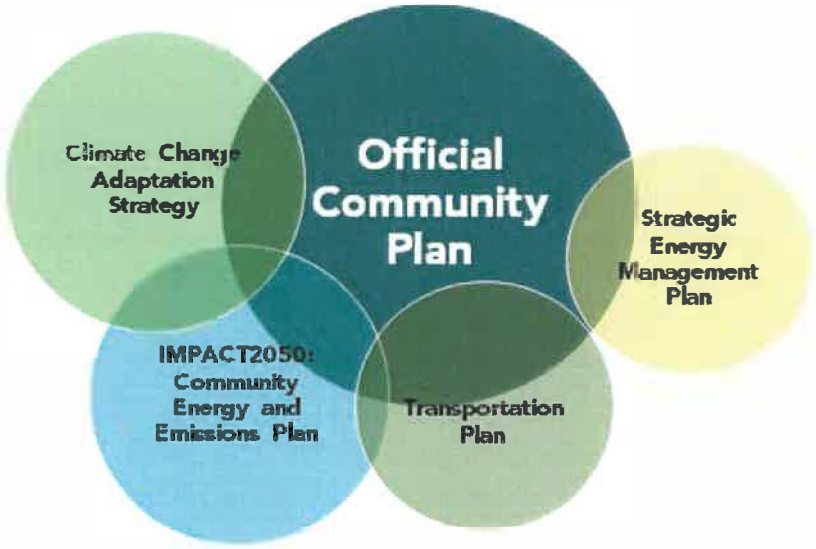
- Includes all items that the local government has operational control over (i.e. fully owns, or has full authority to implement operational health, safety, and environmental policies)

COMMUNITY GHG EMISSIONS

Targeted with IMPACT2050

- Emissions from activities within local jurisdiction
- Local government may have limited control or influence over some emissions sources

The **Transportation Plan** outlines the overarching strategies the District must take to move towards a more sustainable transportation network. The Plan outlines priority areas for each region of the District to increase access to sustainable transportation options such as transit, walking, and cycling with the key goal of reducing congestion and improving safety, liveability, and physical health.



Finally, the **Climate Change Adaptation Strategy (CCAS)** outlines the key adaptation measures that the District can employ to improve the community's resilience to inevitable changes in climate. The Strategy identifies, coordinates and integrates District initiatives that create a more **resilient** District that is better prepared for **extreme weather events**. IMPACT2050's focus on mitigation complements the CCAS's adaptation measures to ensure that that the District plays its part in preventing further damage to communities and ecosystems.

The District was recognized in 2016, 2017 & 2018 for its efforts to reduce emissions by the Climate Action Recognition Program.

1.3 – Mitigation vs. Adaptation

IMPACT2050 is a plan that targets the reduction of GHG emissions that contribute to climate change, or what is known as climate change **mitigation**. Mitigation actions can be retroactive, in that we can shift away from fossil fuel-based sources of energy, or proactive by planning for carbon neutrality.

Examples of mitigation actions include:

- Encouraging compact growth in new communities
- Fostering modes of transportation based on transit, cycling, or walking
- Facilitating the use of electric-vehicles
- Requiring higher levels of energy efficiency in new buildings
- Increasing methane capture from landfills to reduce emissions from waste

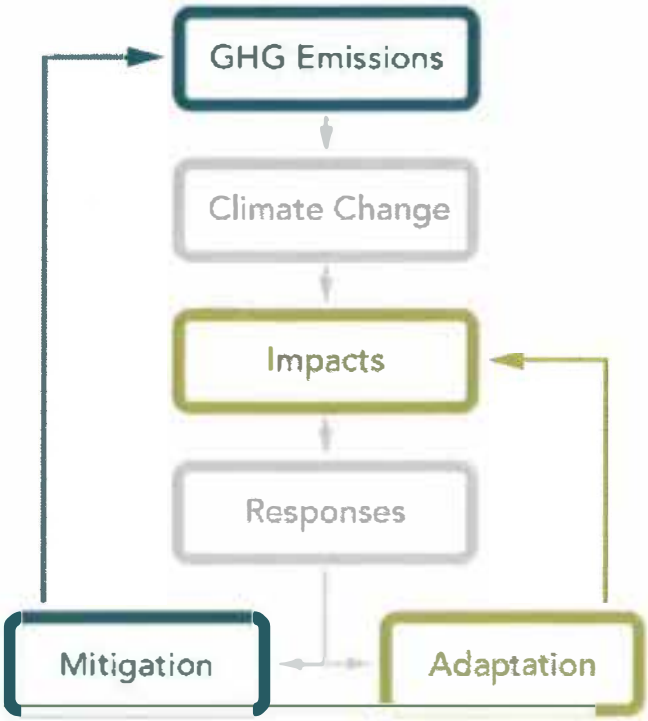
Conversely, climate change **adaptation** focuses on preparing for and responding to the impacts posed by climate change. This means preparing for potential harmful impacts, but also includes taking advantage of any potential positive impacts.

Examples of adaptation actions include:

- Constructing new buildings at higher levels to prevent damage from flooding events
- Expanding green spaces to help reduce the risk of flooding of extreme storm events
- Conserving water during periods of extended drought
- Protecting properties at risk of damage from severe weather events
- Providing heat refuges during heat waves

Both mitigation and adaptation approaches are necessary. Despite several efforts on the part of cities, districts and countries across the world, we cannot avoid some degree of climate change. While mitigation efforts are needed to reduce emissions and prevent the worst impacts of climate change, communities must still prepare for the consequences of our global inaction over the past several decades.

Luckily, some actions benefit both mitigation and adaptation objectives by reducing the vulnerability of infrastructure to the effects of climate change and by making them more efficient. Increasing the number of street trees, for example, helps to mitigate climate change because trees both **sequester** carbon dioxide and keep buildings cool, thereby reducing energy demand for cooling. Street trees also contribute to adaptation by intercepting and filtering stormwater runoff to prevent flooding and improve water quality.



1.4 - The Benefits of Energy and Emissions Reductions

IMPACT2050 goes beyond climate action by directly addressing potential impacts and co-benefits to community health and equity. This approach ensures identified actions do not disproportionately impact vulnerable populations while also addressing other important community needs, including physical, social and mental well-being. Some of the intended outcomes are listed below, with additional co-benefits explained in the section 5.1 on Building a Healthy, Happy Community.

DESIRED OUTCOME	COMMUNITY ACTIONS
Cleaner Air & Improved Community Health	Improve air quality by reducing carbon emissions and air contaminants
Increased Housing Affordability	Reduce heating costs and energy consumption by constructing and retrofitting buildings to be more energy efficient
Efficient Transportation Systems	Ease traffic congestion through improved walking and cycling infrastructure and public transportation networks
Sustainable Job Opportunities	Create jobs in the growing renewable energy and green jobs market by attracting these businesses to the District

2.0 - CREATING IMPACT2050

IMPACT2050 was developed in five key phases.

1 **Phase 1** identified the District's past and current state of energy and emissions using a mix of quantitative and qualitative analysis. This phase also developed forecasts of the District's energy use and emissions to 2030 and 2050.

2 **Phase 2** used this information to project the cumulative impact of potential mitigation strategies. Staff, stakeholder, and public consultation workshops were used to identify high-impact actions that could be implemented by the District.

3 **Phase 3** saw the creation of an implementation strategy for individual actions, including anticipated costs, timelines, and degree of impact on energy and emissions reduction. Potential internal and external resources and partners were identified to assist in executing the actions.

4 **Phase 4** combined technical analyses with input from District staff, stakeholders, and the community to develop a final plan that would both achieve energy and emissions reductions and provide broad community benefits to physical, social, and mental health.

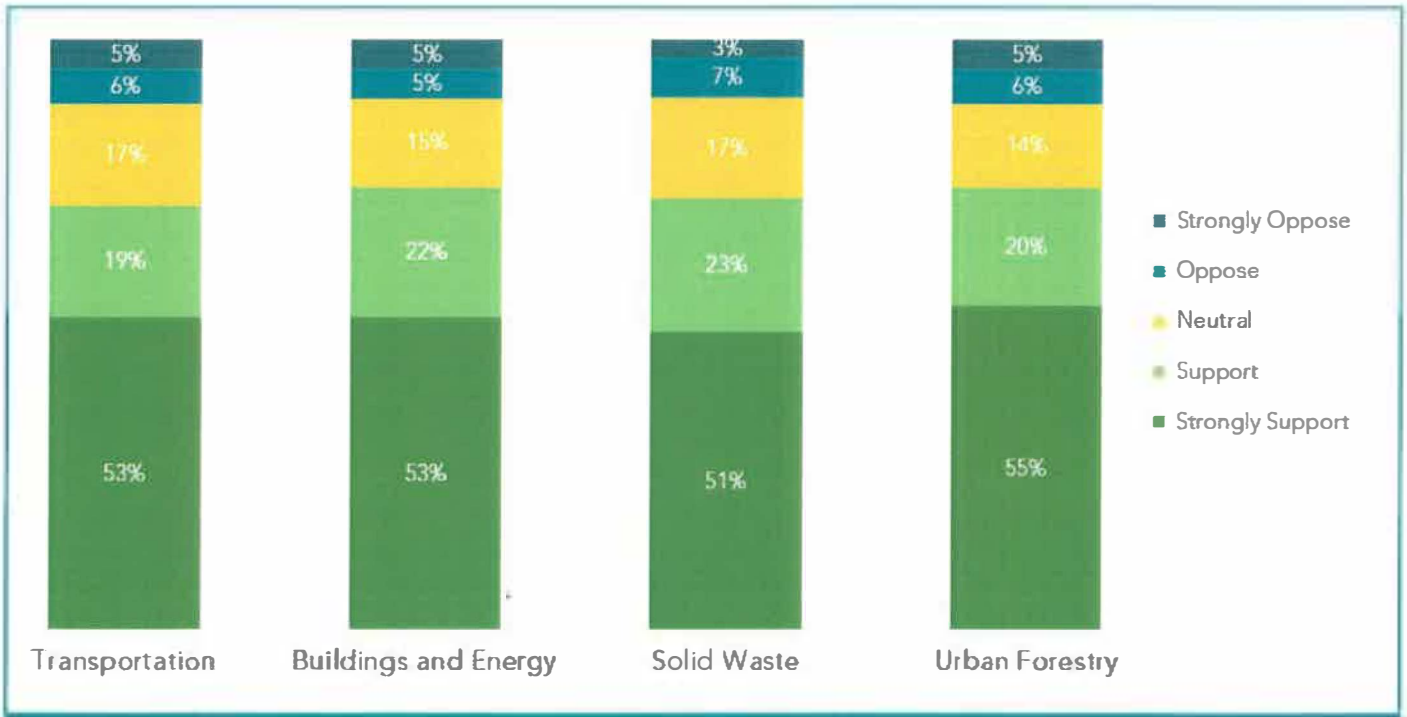
5 **Phase 5** revised and remodelled the original emissions reduction targets to 45% below 2007 levels by 2030 and 100% by 2050 and identified the additional measures required to reach 100% emissions reduction.

Community members and stakeholder groups helped shape IMPACT2050's action items through a series of workshops and surveys. This process helped create a plan that reflects the unique needs of the District and the people who live and work there. Workshops were used to identify key actions, while an online survey hosted in the fall of 2018 was used to assess public support for various high-level strategies in the areas of Transportation and Land use, Buildings and Energy, Solid Waste, and Urban Forestry.

The results, included below, showed overwhelming support for the majority of actions summarized in the survey.

WHAT WE HEARD – EXAMPLE FEEDBACK

- Ensure the creation of safe walking and cycling routes for children travelling to school
- Implement strategies to increase EV adoption
- Increase density in key single family residential zones close to transit and services to improve affordability and decrease reliance on personal vehicles in a way that does not impact neighbourhood character or livability in the District
- Reduce parking requirements/allowances in buildings, especially in areas close to transit, cycling, or pedestrian infrastructure
- Build bike paths on all major roads and bridges designed to All Ages and Abilities (AAA) standards
- Promote shorter work days to provide residents with more time
- Improve transit services
- Implement the BC Energy Step Code as quickly as possible while ensuring costs are not too high
- Prohibit bylaws banning line-drying laundry outdoors in multi-family buildings
- Incentivize building retrofits (e.g. through property tax reductions)
- Encourage energy efficiency by highlighting benefits to comfort, water, waste, health, and safety
- Require space for multi-stream waste sorting spaces in all new multi-family buildings
- Protect urban forestry canopy to help the District adapt to temperature increases as the climate warms
- Encourage active transportation infrastructure (e.g. bike or stroller parking) across the District



Summary of IMPACT2050 Public Survey Responses

Additional survey results can be found at **DNV.org/sites/default/files/edocs/CEEP-updated-20180727.pdf**

3.0 – ENERGY & EMISSIONS REDUCTION TARGETS

While the Canadian federal government has set emissions reduction targets nation-wide, several provinces, regions, and cities are setting even more ambitious targets in recognition of the scale and importance of the climate change challenge.

In the District of North Vancouver, the 2011 Official Community Plan established a target of reducing GHG emissions by 33% by 2030, relative to 2007 levels. In light of District Council's declaration of a Climate and Ecological Emergency in July 2019, IMPACT2050 has updated this target to:

- **45% reduction in GHG emissions below 2007 levels by 2030**
- **100% reduction in GHG emissions by 2050.**

Both the Official Community Plan and IMPACT2050 use a baseline year of 2007, as this was the year the District began tracking the community's emissions and energy use by way of the Provincial Community Energy and Emissions Inventory (CEEI). This baseline starts our emissions tracking 3 years before the 2010 baseline identified by IPCC for global emissions reductions.

Canada	British Columbia	metrovancouver	District of North Vancouver
30% reduction in emissions from **2005** levels by **2030**	**40%** reduction in emissions from **2007** levels by **2030**	**45%** reduction in emissions from **2010** levels by **2030**	**45%** reduction in emissions from **2007** levels by **2030**
80% reduction in emissions from **2005** levels by **2050**	**80%** reduction in emissions from **2007** levels by **2050**	**100%** reduction in emissions from **2007** levels by **2050**	**100%** reduction in emissions from **2007** levels by **2050**

Figure 2: *District of North Vancouver Emissions Targets in Context*

As the District's emissions primarily come from energy use, efforts to reduce energy consumption must be considered alongside efforts to reduce GHG emissions. To that end, the District has also developed 2030 and 2050 energy reduction targets:

- **15% reduction in energy from 2007 levels by 2030**
- **45% reduction in energy from 2007 levels by 2050**

These energy and emissions targets position the District among local climate action leaders and will require significant efforts to reduce building energy use, improve transportation networks, and connect to renewable sources of energy. The actions in IMPACT2050 will require a transformation of the District's energy system that must be both shaped and achieved by the whole community. By including key stakeholders and District community members in its unfolding, IMPACT2050 has the potential to create a healthier, more prosperous, and more fulfilling place to live, work and play.

4.0 - ENERGY AND EMISSIONS IN THE DISTRICT

To reduce energy consumption and GHG emissions, it is important to know how the District is already performing. The sections below describe how the District is consuming energy, where emissions are coming from, and how the District is already acting to reduce both energy consumption and the generation of GHG emissions.

4.1 - Where are we now?

IMPACT2050 compared CEEI energy and emissions data from 2007, 2010 and 2012 to energy and emissions for 2016, the most recent year that data is available. **Over this period, energy use decreased 4% and GHG emissions decreased 10%**.

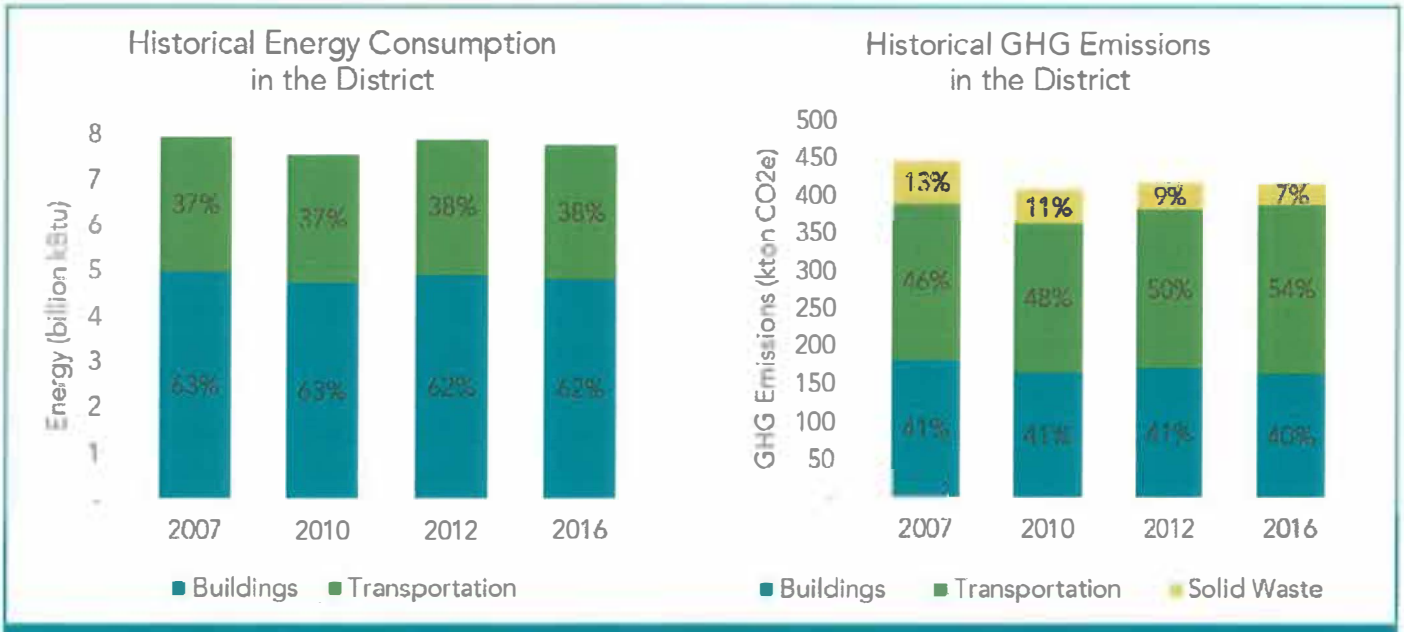


Figure 3: *District Historical Energy Consumption and GHG Emissions*

Reductions in energy use and emissions are not equal because of the different emissions intensities of our energy sources. Trends for the District indicate that the emissions per unit energy (intensity) have decreased faster than energy use. In British Columbia, most electricity comes from renewable sources, with almost 92% sourced from low-carbon hydropower. As a result, very few emissions are generated by using electricity. Instead, the District's emissions from energy use primarily come from the thermal energy we use in transportation, buildings, and industrial processes (**Figure 4**). This energy is derived from fossil fuels, including natural gas, gasoline, and diesel.

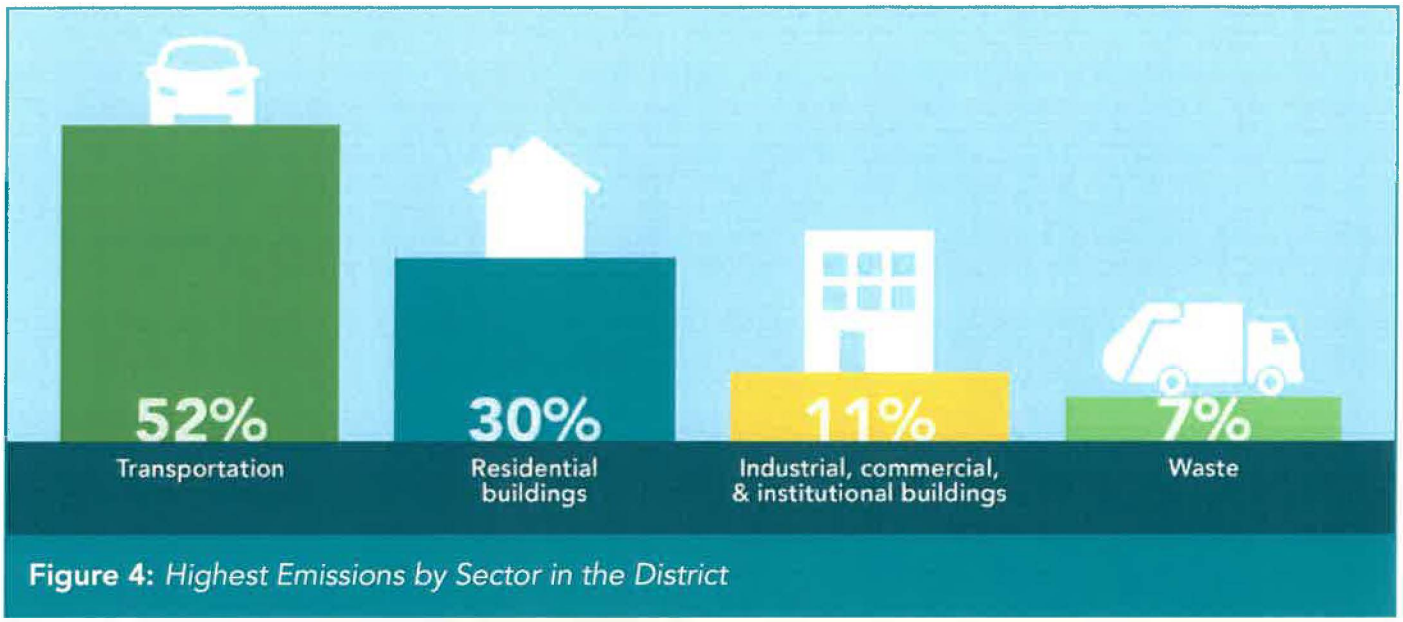


Figure 4: *Highest Emissions by Sector in the District*

ENERGY in 2016

In 2016, the majority of energy (64%) in the District was consumed by the building sector—43% by residential buildings and 21% by institutional, commercial and industrial (ICI) buildings. Energy consumed by passenger and commercial vehicles accounted for 35.5%, while the remaining 1.5% is attributable to transit. When exploring energy use by fuel type, most energy consumed in the District is derived from natural gas used in the building sector (41%), from gasoline consumed in the transportation section (30%), and from electricity (24%).

EMISSIONS in 2016

Shifting the focus to emissions, 84% of GHG emissions are attributed to the use of natural gas in buildings and gasoline consumed in vehicles. Since 2007, transportation emissions have become a proportionately higher contributor to overall District emissions. Of the District's transportation related emissions, approximately 96% comes from passenger vehicles, with only 4% derived from commercial vehicles, based on the total number of kilometres traveled. A significant opportunity exists to reduce emissions through increased EV adoption and by clustering land uses that reduce the frequency and length of vehicular trips.

COMMUNITY-BASED EMISSIONS AND CONSUMPTION-BASED EMISSIONS

IMPACT2050 is a community **sector-based** *emissions inventory that quantifies the District of North Vancouver's GHG emissions by key sectors. This approach focuses on emissions generated within the District's boundaries from transportation systems, buildings and energy consumption, and waste.*

Conversely, a **consumption-based** *emissions inventory accounts for the emissions associated with goods and services consumed within the community, regardless of where the emissions are generated. Under this methodology, responsibility for emissions resulting for the consumption of goods and services rests with consumers rather than producers.* **Figure 5** *below illustrates the relationship between these two accounting methodologies.*

While consumption-based emissions are not directly considered in IMPACT2050, reducing these emissions will play an important role in mitigating climate change. Residents of the District can reduce the emissions from their consumption of goods and services by taking actions such as reducing air travel, shopping locally, and choosing environmentally-friendly products.

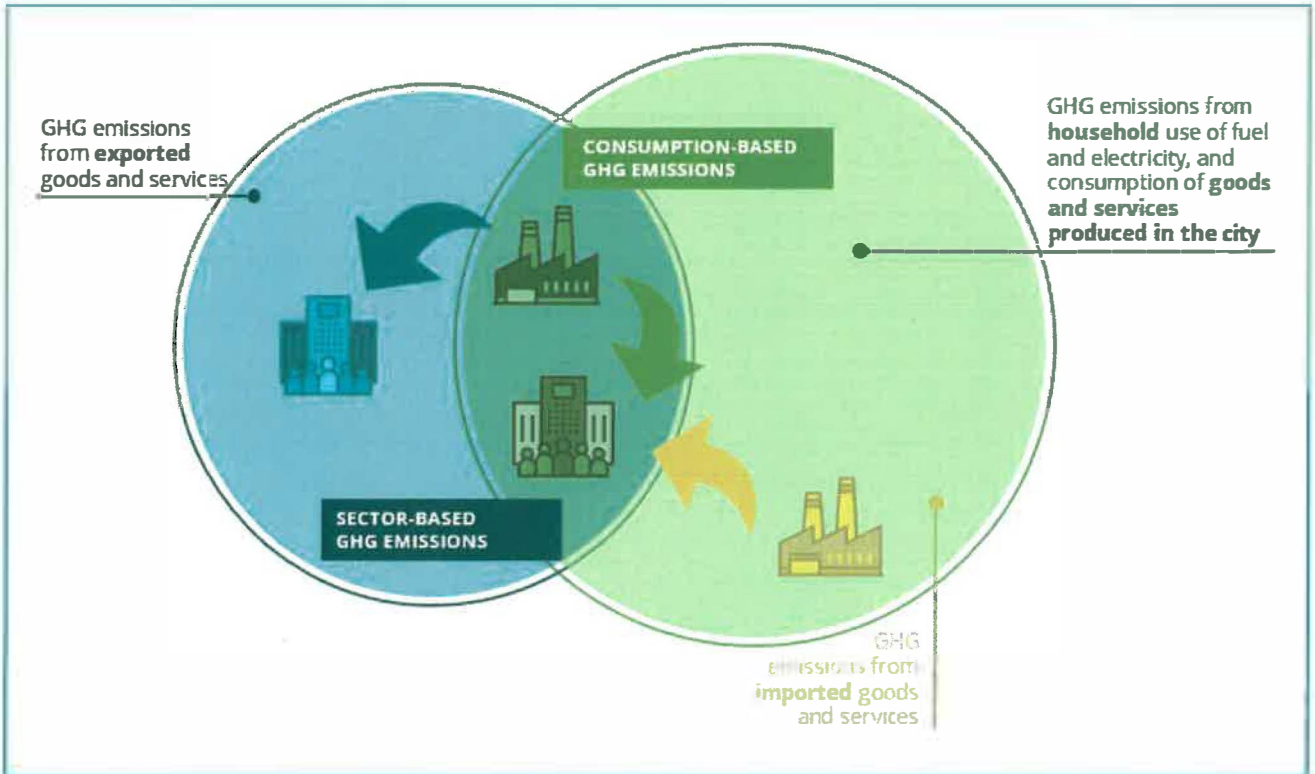


Figure 5: *Relationship Between Sector- and Consumption-based Emissions Inventories (adapted from C40 [2])*

4.2 - What have we done so far?

The District has taken several steps towards reducing its energy use and emissions. A few of these are noted below:

Current and Ongoing Climate Action in the District

Transportation & Land Use

- Completed Centres Plans for Lynn Creek, Lions Gate, Lynn Valley, Maplewood and Edgemont to establish the vision for complete, compact, and an energy-efficient network of centres in the community.
- Laid the groundwork for a RapidBus extension across the North Shore (Park Royal to Phibbs Exchange), representing an additional 14km of bus service every 10 minutes.
- Continued work on the North Shore Spirit Trail, a full accessible, multi-use pathway from Horseshoe Bay to Deep Cove.
- Continued detailed design work with TransLink and the Province on the Phibbs Exchange project to support additional transit ridership.
- Completed segments of a number of bike lanes, including but not limited to: Lynn Valley Road, Highland Boulevard, and E. 29th Street bike lanes.
- Completed a range of walking and biking safety and infrastructure improvements to encourage active transportation.

Buildings & Energy

- Adopted the BC Energy Step Code on December 11, 2017 (effective July 1, 2018), with requirements to build to Step 3 for Part 9 residential buildings.
- Continued support for BC Hydro's Appliance Rebate program, providing $50 per household to replace old washing machines with more energy efficient models.

Solid Waste:

- Participated in Metro Vancouver's North Shore Waste Water Treatment Plant Project, which will lead to an approximate reduction in 300 tonnes of GHG emissions annually for the District.
- Supplied standardized carts for waste collection with animal resistant lids and provided incentives for waste reduction, including reduced utility fees for those using smaller garbage containers.

Urban Forestry:

- Required restoration planting plans for both the Streamside and Protection of Natural Environment Development Permit Areas for private property.
- Required new street trees as part of Development Permits and subdivision applications.

Miscellaneous:

- Adopted a bylaw to allow residents to raise backyard chickens, promoting environmentally sustainable living practices and local food production.
- Provided financial support to the Cool It! Climate Leadership Training Program, enabling 274 students in the District to learn about energy conservation and emissions saving actions.

4.3 - Where are we going?

While the District has seen a slightly downward trend in emissions, this trend is not likely to continue. Without proactive and aggressive action, population and employment growth are predicted to increase overall District emissions 19% by 2050. These unchecked emissions represent a 'Business-as-Usual' (BAU) scenario and consider existing District actions, policies, and plans, including the Official Community Plan. This creates a significant 'emissions gap' of more than 490,000 tonnes of carbon dioxide equivalent (CO2e) between the District's projected BAU emissions[1] and targeted goal of achieving carbon neutrality in 2050 (**Figure 6**).

Current and Predicted GHG Emissions to 2050

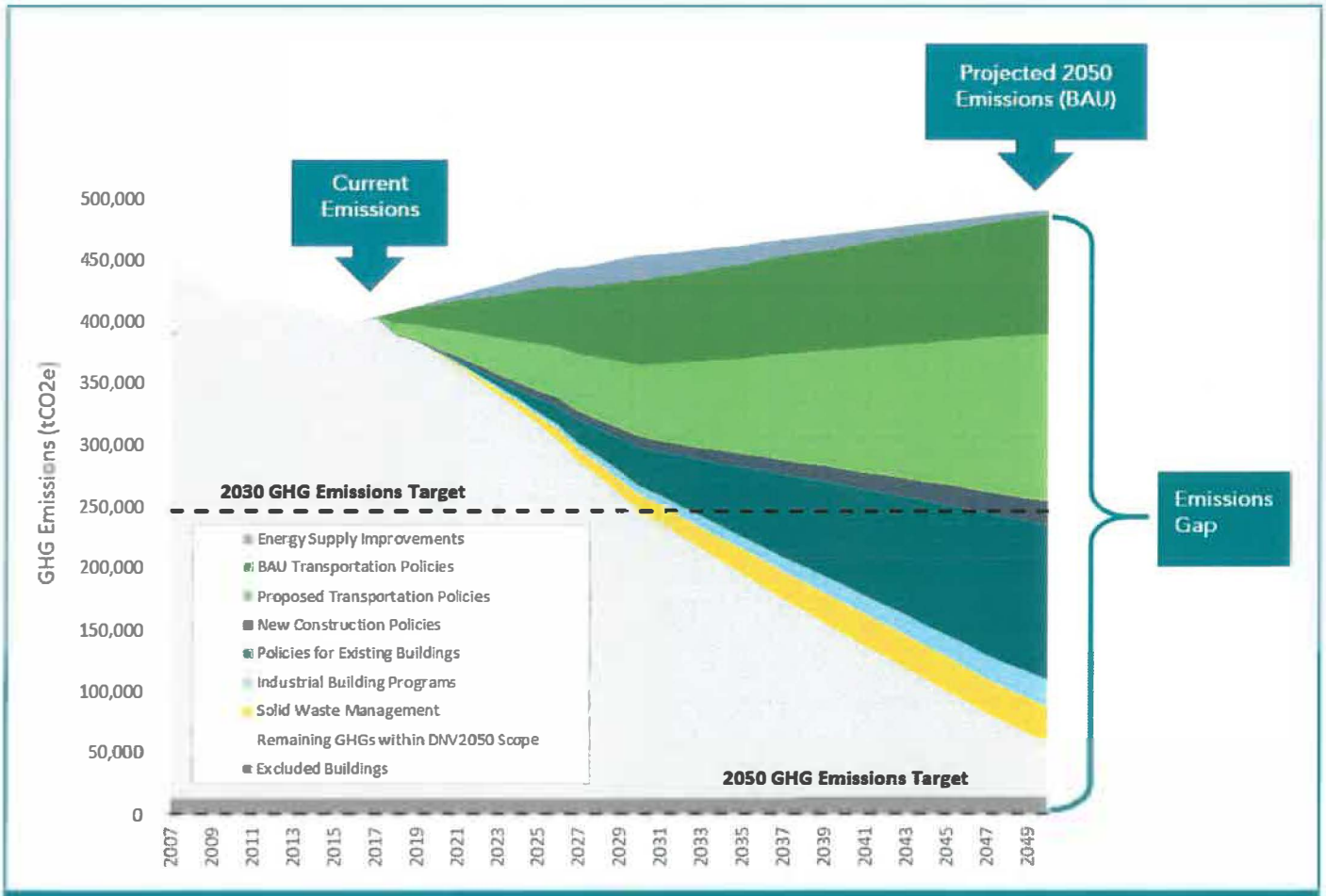


Figure 6: *GHG Emissions Predictions to 2050*

[1]Note: existing District transportation policies (e.g. compact Town and Village Centre development) are not included in the BAU scenario and their contribution to reducing the emissions gap is highlighted in the dark green wedges in **Figure 6** and **Figure 7**.

A similar story can be told when forecasting the District's future energy use. Left unchecked, the District's energy consumption is expected to increase 16% by the year 2050. As with emissions, the District's growing population and employment opportunities will drive these increases in energy consumption, primarily due to associated growth in the total building floor area, as well as transportation demands. The BAU scenario shows a significant gap of almost 5.2 million GJ between the District's projected BAU energy consumption and targeted 2050 energy consumption.

Current and Predicted Energy Consumption to 2050

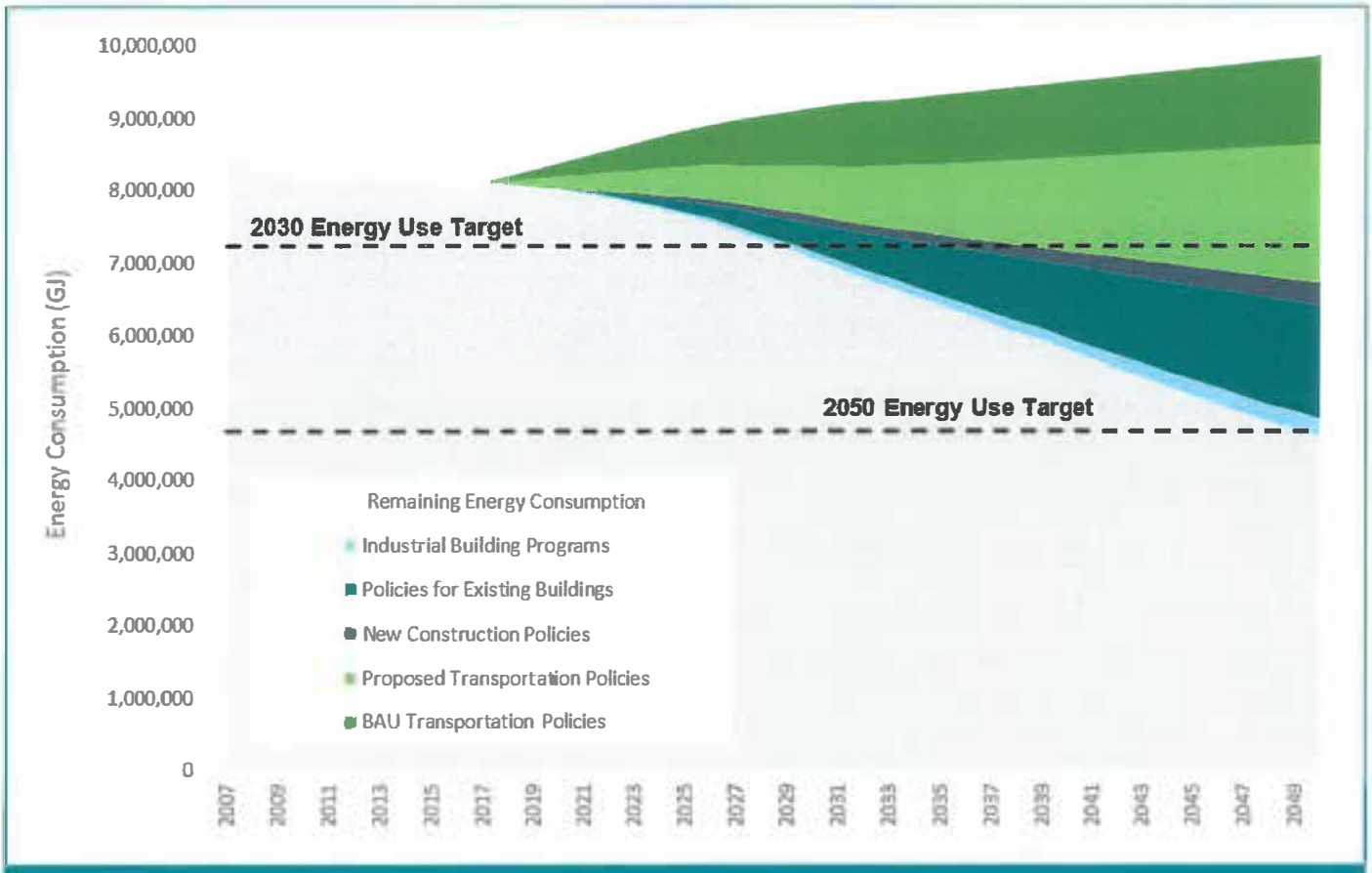


Figure 7: *Energy Predictions to 2050*

There are a few reasons for these gaps. While the BC Building Code reduces the energy use associated with newly constructed buildings, expected growth in the total building floor area across the community will outweigh these stricter energy requirements. Importantly, the BC Building Code also addresses new building construction, and not the significant energy use and emissions that come from existing buildings. Homes with large square footages and low densities are also a contributing factor to the increased energy use and emissions projected for the District. **As a result of these factors, emissions from buildings are projected to be 2% higher in 2030 than in 2007, increasing to 7% over 2007 levels by 2050.**

In terms of transportation, **the District's decision to focus development in compact Town and Village Centres supported by transit, cycling, and walking improvements is projected to have a significant positive effect on energy and emissions. By 2030, transportation emissions are projected to be 25% lower than in 2007, with reductions reaching nearly 28% by 2050.**

However, these existing District plans and policies will not be enough to achieve the District's targets. Action is needed today to help the District reach its climate goals, including a broad set of policies, programs, and partnerships that will impact all aspects of District life, including:

- Transportation and land-use
- New construction
- Existing buildings
- Industrial buildings
- Solid waste management (impacts emissions only)

The energy and emissions forecasts highlight a pathway for the District to achieve their 2050 targets. Energy efficiency will become the norm across building and transportation industries. There will also be a shift to low-carbon energy sources, with electricity consumption growing and natural gas and gasoline use dropping dramatically. IMPACT2050 provides the roadmap to guide the District community through this transition.

Current Energy Consumption to 2050 by Energy Source

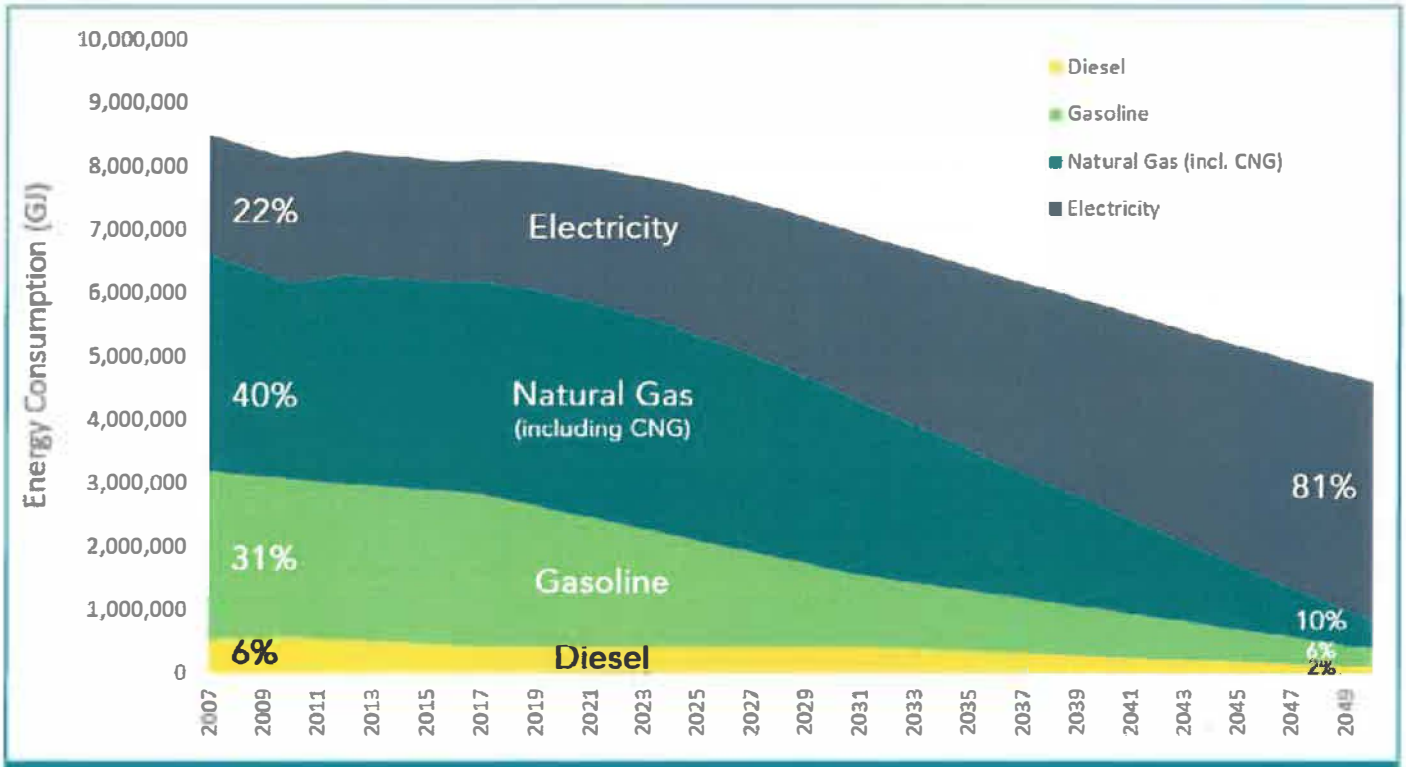


Figure 8: *IMPACT2050 – A District Transformed*

Looking at these changes in emissions across the different neighbourhoods of the District tells an interesting story.

Map of Emissions Per Capita in 2016

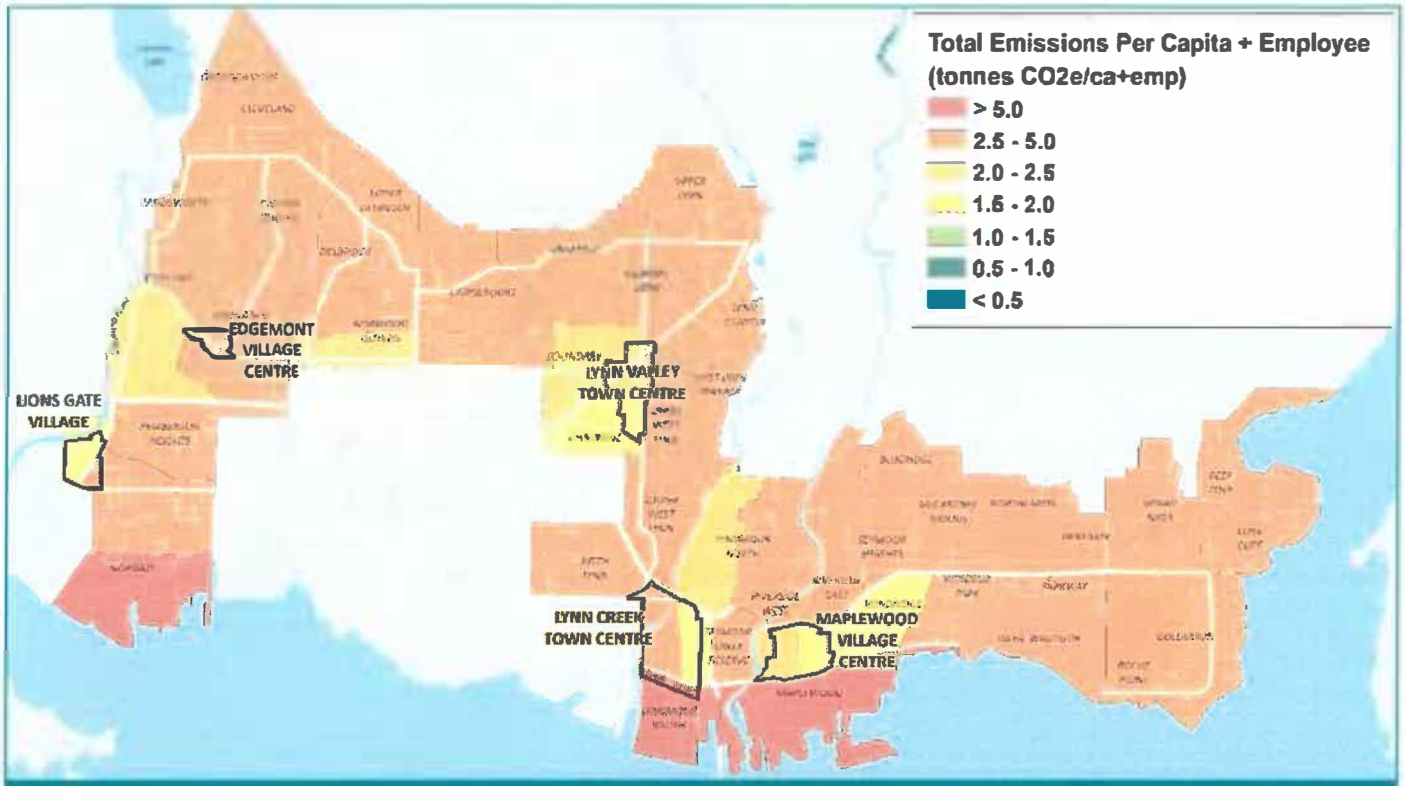


Figure 9: *The District's emissions profile in 2016 shows a community with relatively high emissions per capita. This reflects the District's historical focus on single-family homes and personal gas-powered vehicles for transportation.*

Map of Emissions Per Capita under a Business-As-Usual Scenario (OCP Build Out)

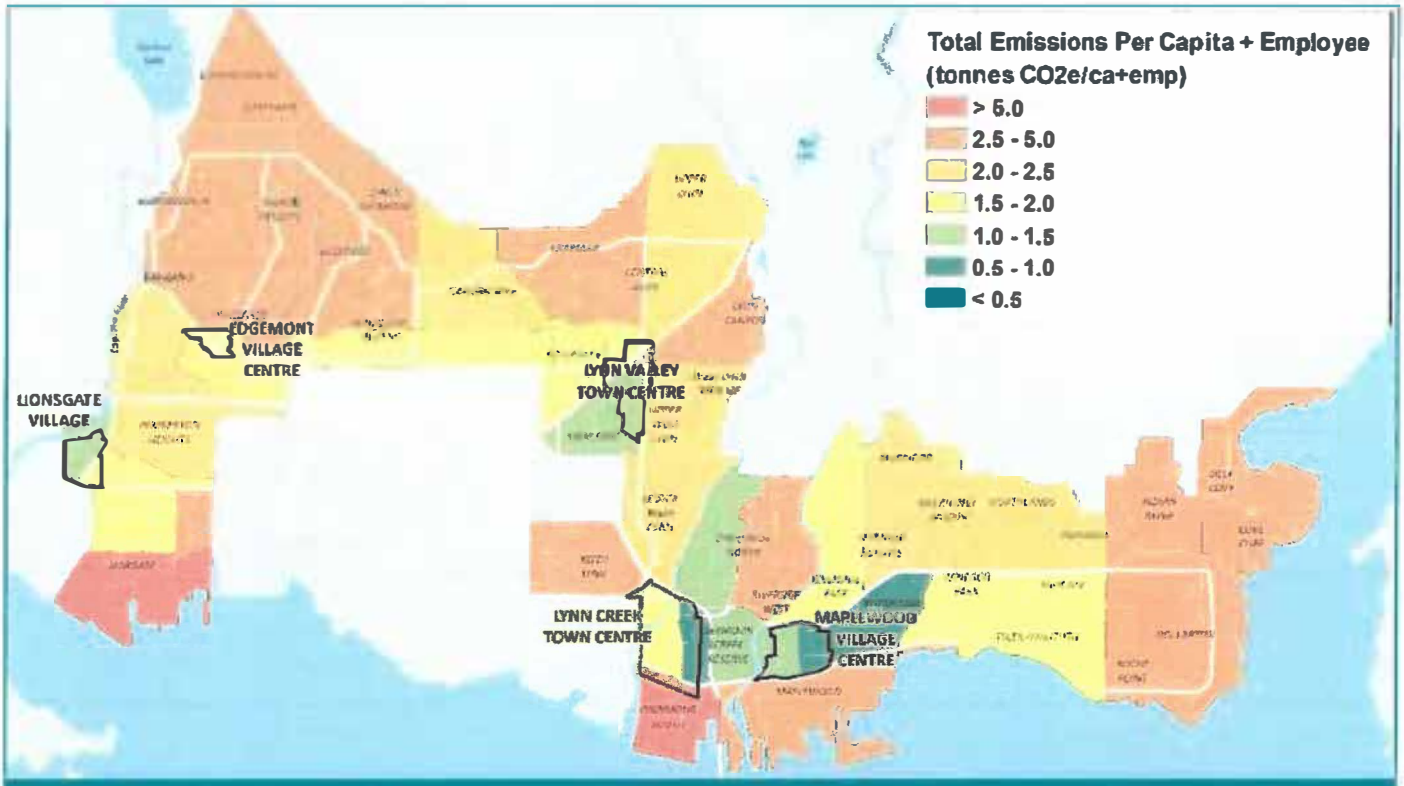


Figure 10: *The District's Business-As-Usual emissions scenario in 2050 shows the District's Official Community Plan (OCP) centre boundaries, and illustrates that emissions reductions will occur in these centre areas where growth is concentrated. This map assumes a build out of OCP Town Centres.*

Map of Emission Per Capita if IMPACT2050 Policies Implemented

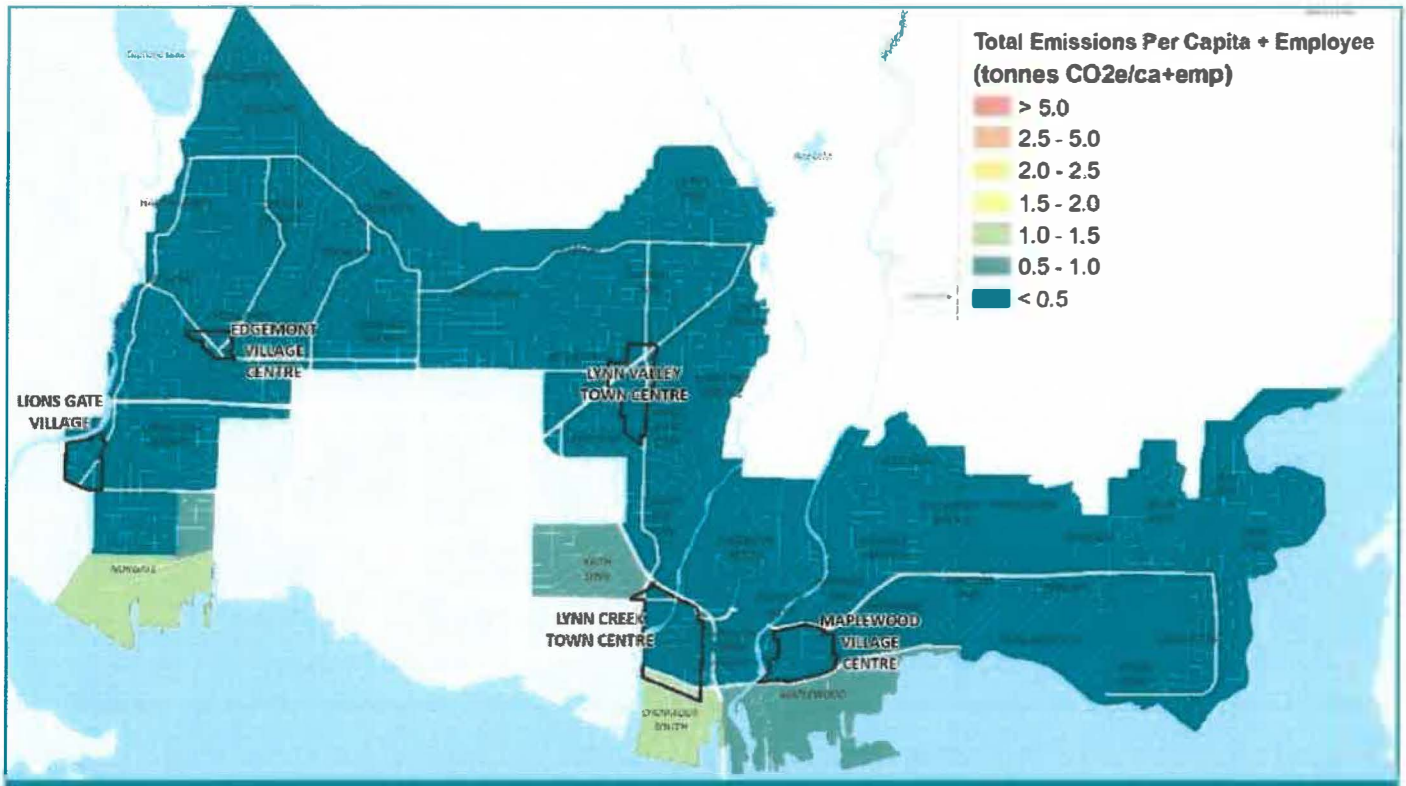


Figure 11: *Implementing IMPACT2050 strategies can result in a community that has transitioned away from fossil fuels.*

5.0 - LEADING AN ENERGY TRANSITION

Reaching the District's emissions reduction targets will require the decarbonization of the District's energy systems. Decarbonization is the process of removing carbon from our energy supply by shifting to efficient and renewable sources that emit zero carbon emissions.

The volume of emissions generated by a city or region is largely a function of the amount and kind of energy that is used. While much of the energy we use in the District is derived by hydro electricity (a relatively clean and low-carbon source of energy), other sources of energy have higher carbon intensities. These include the natural gas we burn to heat our homes and to produce hot water, as well as the gasoline or diesel used to fuel our vehicles. IMPACT2050 outlines the key actions that the District will take to reduce our reliance on these sources of energy by improving efficiencies and switching to low-carbon energy sources. As the District transitions toward a higher-energy performance standard, (i.e. the higher steps of the BC Energy Step Code), pursuit of a District Energy System may be reconsidered.

Strategic short-, medium- and long-term strategies and actions are outlined in four key areas, and encompass a wide range of approaches, from educational campaigns, to increases in regulations and standards over time, to new and existing sources of potential funding. These strategies will complement and extend existing initiatives to transform the District and meet its climate targets.

A summary of the key areas for action and critical strategies in each sector are outlined below.

Areas of Highest Impact in Reducing Energy and Emissions

Transportation & Land Use

Transportation accounts for more than 50% of the District's current GHG emissions and is therefore a critical area for climate action.

IMPACT2050 aims to reduce energy and emissions from transportation and land use by designing connected and efficient communities and reducing our reliance on vehicles powered by fossil fuels.

Strategies impacting Light Duty Passenger vehicles, like shifting toward electric vehicles, will reduce 2050 emissions by 23% and 2050 energy use by 26%.

Buildings & Energy

Buildings account for more than 40% of current GHG emissions and are a critical area for climate action.

IMPACT2050 aims to reduce energy and emissions from buildings by improving building energy performance and exploring opportunities for renewable energy. Retrofitting existing buildings to be more energy efficient is critical to achieving the biggest reduction in this category.

Replacing natural gas furnaces with high efficiency electric heat pumps in existing single-family homes will reduce 2050 emissions 18% and energy use over 16%.

Solid Waste:

Waste represents a small but still significant portion of our community's GHG emissions. Energy is spent collecting and dealing with waste, and decomposing waste in the landfill is a significant source of methane, a powerful greenhouse gas.

IMPACT2050 aims to reduce energy and emissions from solid waste by reducing waste sent to landfill and by lowering emissions generated from waste.

Increasing institutional, commercial and industrial waste diversion will reduce 2050 emissions 5%.

Urban Forestry:

Planting trees can help to sequester carbon out of the atmosphere, and can also help to reduce building energy consumption by providing shading in the hot summer months.

IMPACT2050 aims to reduce energy and emissions through urban forestry by expanding the District's urban canopy. Managing existing eco-assets and planting more trees are considered priority action items for this category.

Increasing the community-wide urban tree canopy with careful consideration of tree size and species will help maximize carbon sequestration.

KNOW YOUR POLICY TOOLS

REGULATION / STANDARD	**Legally binding requirement for a specific action** *E.g. Adopt BC Energy Step Code for all new construction*
INCENTIVE	**Government spending to reduce cost of action** *E.g. Implement a program that encourages employers to create commute trip reduction programs (e.g. bicycle facilities, parking cash out)*
ADVOCACY	**Active support for a particular policy beyond the control of the District government** *E.g. Support regional efforts to establish mobility pricing*
CAPACITY BUILDING / EDUCATION PROGRAM	**Provide information and resources to build awareness and understanding surrounding an action** *E.g. Improve waste diversion rates at drop-off locations through education campaign and supporting operational changes*
DEMONSTRATION PROJECT	**Small-scale project to test viability of wide-spread action** *E.g. Pilot use of driverless, electric shuttles for transportation between homes and transit stations*
FUNDING	**District and external funding (Provincial and Federal Government, as well as various organizations) to implement an action** *E.g. Fund area Transportation Management Associations to promote multimodal transportation programs (e.g. transit pass subsidies for employees of major local employers) using proceeds from parking benefit districts*

5.1 - Building a Healthy, Happy Community

IMPACT2050 strategies achieve much more than energy and emissions reductions. In fact, research has shown that many emissions reduction actions have a direct, positive influence on our overall social, mental, and physical health. There are many strategies to reduce energy use and emissions in the way we live, work, and move around that can directly contribute to the District's efforts to improve the quality of life of its citizens.

For example, the *My Health My Community* report has found strong links between the use of active modes of transportation, such as cycling and walking, and lower body mass index, higher rates of community belonging and connectedness, and better overall health.[3] People who live in walkable neighbourhoods where housing is mixed with shops, services and places to work also report having much more positive local relationships compared to people in single-use, car-dependent neighbourhoods.

Adding green spaces also contributes to overall community health. Along with the carbon sequestration benefits that urban forests provide, evidence has shown that people are happier and more satisfied with their homes when they have views of trees from their windows. Urban forests also help combat the urban heat island effect, which is caused by the heat generated by dark surfaces like roads, sidewalks, and roofs in dense cities. Trees decrease air temperatures and reduce the number of pollutants in the atmosphere through evapotranspiration and particulate matter filtration. To that end, IMPACT2050 prioritizes protecting and growing the District's urban forest, improving land use and transportation systems, and promoting the construction or retrofit of energy efficient buildings.

5.2 - Saving Costs, Boosting Equity

Strategies to reduce emissions can also help to strengthen the economic well-being of the community. Single occupancy vehicle transportation infrastructure in low-density environments represents both a high source of GHG emissions and one of the costliest systems to build and maintain per trip. They are also a major contributor to poor population health, obesity and stress, which in turn incurs hundreds of billions of dollars of healthcare costs around the world each year over and above the costs of traffic accidents and emergency services.[4] Operating costs for cars are also higher than transit or active transportation modes.

Conversely, residents in walkable, mixed-use neighbourhoods typically enjoy shorter commutes, shorter distances to errands, and greater access to transit. This in turn reduces housing and transportation expenses for individual households. However, it is important to ensure that walkable, mixed-use neighbourhoods include non-market housing to ensure that residents of all incomes can benefit from emissions reductions strategies.[5] Disadvantaged social groups – including the elderly, Indigenous groups, people with mobility challenges, new Canadians, and people living on low incomes – are often the most likely to live further away from work.[6] **IMPACT2050's focus on developing a diverse housing mix including affordable multi-family housing near employment and services allows District residents to walk, cycle and transit to work, helping to reduce social inequity**.

5.3 - Improving Comfort and Resilience

Finally, emissions reduction strategies can positively impact our comfort and resilience. Buildings constructed or retrofitted to high levels of energy efficiency are more comfortable for residents, as better building envelopes (e.g. improved insulation, air sealing, and high-performance windows) maintain more consistent temperatures within the building. Increasing green spaces and strategically planting deciduous trees can also help cool indoor building temperatures, while providing shade and protection for walkers and cyclists[7][8]. Likewise, green roofs can mitigate the urban heat island effect, reduce air pollution, and conserve energy. Energy efficient buildings in turn help save home heating costs for District residents, aiding those residents most impacted by rising energy costs.

Higher efficiency buildings can also significantly reduce the risks of temperature-related health threats (e.g. extreme heat or cold) during power outages[9]. Similarly, shifting towards local renewable energy generation (e.g. solar panels) helps to decentralize the District's electricity supply, offering protection from rising energy costs[10].

INCREASING BUILDING EFFICIENCY

Constructing buildings to increasingly higher levels of energy efficiency can be done affordably. Care and consideration at the conceptual design phase can minimize cost premiums and provide opportunities for innovative, resilient building design. **Within the District, cost premiums are expected to be less than 2% for most steps and most building types (e.g. multi-unit residential, office, row house)**[11]*. Additionally, cost premiums will only reduce over time as industry gains experience and energy efficient products become more readily available.*

Investing in energy efficiency not only directly reduces energy costs and improves resiliency, but also has the potential to be a major driver of economic growth. **Every dollar spent on energy efficiency returns a net increase of $3-$4 to GDP**[12]*. This economic growth is spurred by several factors including high efficiency equipment purchases, reduced energy costs, and increased industrial competitiveness. Similarly, energy efficiency spending drives local job growth by increasing demand for community labour (e.g. heating and refrigeration equipment technicians or insulation installation contractors).*

RENEWABLE ENERGY GENERATION

On-site renewable energy can help a building to meet its power needs, reduce its reliance on fossil fuels, minimize its greenhouse gas emissions, and lower its energy costs overall. These systems can also serve to protect the project from energy price volatility and reliance on the utility grid, while offering a source of backup power during a potential blackout. There are a variety of renewable energy sources that can be used, depending on the site, such as solar photovoltaic (PV), solar hot water, small-scale wind turbines, and biomass combustion, among others. A highly-visible renewable energy system can even signal to the community that the project is truly committed to sustainability.

5.4 - Maximizing Health and Well-Being

Each strategy and action has been carefully selected to ensure that the many co-benefits to energy and emissions reduction are harnessed. Specific co-benefits were identified using Happy City's Urban Happiness framework, which draws on leading research in the field of health and well-being to help local governments create urban environments that foster happier, healthier, more fulfilling lives for their residents.

IMPACT2050's actions have been grouped into broad sets of strategies that target the different sectors of Transportation & Land Use, Buildings & Energy, Solid Waste, and Urban Forestry. Happy City icons are used to indicate the positive outcomes for health and wellbeing of each strategy, with notes on how those benefits can be realized. A full assessment of happiness indicators is included in Appendix II of this report.

Joy
Maximize the pleasure and minimize the pain of urban experience.

Health
Enable, encourage, and reward healthy choices and active mobility.

Equity
Offer access and opportunity across the spectrum of human diversity.

Ease
Help the people who use or move through spaces experience a greater sense of control, comfort, and agency.

Resilience
Encourage the ecological, economic, and cultural diversities that help communities and ecosystems stay strong over the long term.

Meaning
Support community efforts to build lives of collective higher purpose.

Belonging
Instil people with a greater sense of attachment, ownership, and pride of place

Sociability
Promote positive relationships, enable social time, and facilitate trust-building encounters.

Happy City

5.5 – Well-Being Co-Benefits By Sector

Transportation & Land Use

Transit-oriented, compact communities offer:

- Increased physical health from cycling, walking, or transit trips
- Reduced air pollution, which lowers the risk of cardiovascular disease, stroke, and diabetes
- More vibrant, livelier communities
- Safer infrastructure and improved conditions for people walking and cycling

Buildings & Energy

Low-carbon, energy efficient buildings offer:

- Improved indoor air quality, improving building occupant health
- Quieter, more comfortable buildings
- Reduced risk of heat related health issues from better designed buildings
- Reduced heating costs, diminishing rates of energy poverty

Happy City

Solid Waste:

Initatives to reduce waste sent to landfill offer:

- Reduced time and effort spent sorting waste through increased access to multi-stream disposal options
- Increased sense of purpose as community members become more active stewards of the environment
- Increased sense of pride and community associated with a clean and environmentally friendly district

Happy City

Urban Forestry:

Expanding the urban canopy offers:

- Improved overall mental health from seeing trees and other natural elements from windows and on commutes
- Reduced risk of flooding during storms, reducing potential costs to residents
- Cooler spaces in the summer provided by vegetation and trees, helping to combat the urban heat island effect.

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6.0 – CRITICAL ACTIONS FOR REACHING 100% REDUCTION

Legend

STRATEGY IMPACT

**Regular impact** towards the District's energy and emissions goals.

**GOLD = Biggest impact** towards the District's energy and emissions goals.

IMPLEMENTATION TIMELINE:

Short – Start before 2022

Medium – Start between 2022 and 2027

Long – Start after 2027

MAGNITUDE COSTS TO DNV:

$ = <$50,000;

$$ = $50,000 to $100,000;

$$$ = >$100,000

Transportation & Land Use

56%
Impact towards 2050 Emissions Reduction Target

60%
Impact towards 2050 Energy Reduction Target

The District Today:

- Walk, Bike or Transit - 20% of trips (2030 OCP Target 35%)
- 86% of homes built between 2011 and 2016 are close to Frequent Transportation Networks

What We Heard:

- Densify to improve affordability and community without impacting the District's liveability or beauty
- Improve transit services
- Create safe walking and cycling routes for school children

Transportation & Land Use Strategies

GOLD = Biggest impact towards the District's energy and emissions goals.

1. Reduce the number and length of single-occupancy car trips in the District using Transportation Demand Management (TDM) strategies (e.g. parking fees, bicycle facilities, transit subsidies).

2. Ensure new developments are designed to contribute to 'complete communities' that allow residents to live, work, and play in the same place.

3. Improve walking and cycling safety through the addition of new infrastructure (e.g. separated bike lanes, and traffic calming infrastructure, such as intersection diverters).

4. Improve residents' access to non-automotive transportation systems (e.g. allocate more curb space to transit stops and bicycle facilities).

5. Support regional efforts to manage congestion using mobility pricing (e.g. parking fees, transit fares, level of service, road usage charges, etc.).

6. Improve the transit network's efficiency and accessibility to enhance residents' transit experience.

7. Support electric vehicle adoption by increasing the availability of electric vehicle charging infrastructure and electric bike charging infrastructure.

8. Lobby federal and provincial government for improvements in fuel efficiency standards for gasoline powered vehicles and zero-emission vehicle (ZEV) standards.

9. Encourage efforts to electrify Port operations.

Transportation & Land Use Strategy Details

Strategy	Co-Benefits	Key Actions	2050 Impact	Magnitude Cost	Timeline
1		**Implement programs to reduce single-occupancy commuter trips in gas-powered vehicles using TDM strategies.**	**High**	$-$$$	Short to Long
		Implement parking regulations (short-term reduce minimums; long-term set maximums, residential permits).	**Low to High**	$-$$$	Short to Long
		Develop regulations for ride-hail services and driverless vehicles to ensure they are connected, shared, and electric.	**Moderate to High**	$$-$$$	Short
2		**Implement Town and Village Centre plans (parking & mixed-use space).**	**High**	$	Short
		Encourage/support job creation, Village Centre amenities, and compact development.	**Low to High**	$	Short to Medium
3		Improve roadway design at key junctions and high-injury intersections.	Low	$-$$$	Short
		Establish transit priority lanes on Marine Drive.	Low	$$$	Short
		Establish neighbourhood greenway network.	Low	$$$	Medium
4		Prioritize curb space to improve access for bikes and transit.	-	$	Short
		Support e-bike adoption (purchases, bike share, & charging infrastructure)	Low	$-$$$	Short to Medium
5		**Implement parking pricing and parking benefit districts.**	**High**	$$-$$$	Short to Medium
		Support mobility pricing.	**High**	$$	Short to Medium
6		Implement measures to improve transit accessibility and efficiency.	Low to Moderate	$$$	Short to Medium
		Pilot use of shared, electric, driverless shuttles for first mile/last mile.	Moderate	$$	Long
7		Establish programs and collaborations supporting EV uptake.	High	$-$$	Short to Medium
		Adopt EV-ready requirements (parking lots, residential buildings and office buildings).	High	$-$$	Short
8		Support/advocate for fuel efficiency and ZEV standards.	High	$	Short
		Support efforts to electrify the transit fleet.	High	$	Medium
9		Advocate for Port to continue electrifying operations.	Low	$-$$$	Medium

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Buildings & Energy

37%
Impact towards 2050 Emissions Reduction Target

40%
Impact towards 2050 Energy Reduction Target

The District Today:

- BC Energy Step Code was adopted effective July 1, 2018
- Single family homes are responsible for 43% of all of the District's energy consumption.

What We Heard:

- Incentivize building retrofits (e.g. through property tax reductions).
- Prohibit bylaws banning line-drying laundry outdoors in multifamily buildings.

Building & Energy Strategies

GOLD = Biggest impact towards the District's energy and emissions goals.

1 Improve building energy efficiency in new residential construction projects by accelerating to higher steps in the BC Energy Step Code, including:

- Single family homes
- Townhouses
- Duplexes, quadplexes, etc.
- Multi-unit residential buildings (high/low rise)

2 Improve building energy efficiency in new institutional, commercial and industrial construction projects, as introduced in the BC Energy Step Code, including:

- Commercial buildings (e.g. offices)
- Retail and service stores
- Restaurants
- Accommodations (e.g. hotels)
- Schools
- Religious buildings
- Institutional buildings (e.g. hospitals, libraries)
- Light industrial buildings (e.g. warehouse)

3 Implement a Building Retrofit program to gradually improve the energy efficiency and comfort of the existing building stock in the District (including both publicly and privately-owned residential and non-residential buildings).

4 Reduce or eliminate our dependence on fossil fuels by switching away from fossil fuel-based sources of energy (e.g. natural gas), towards the use of electricity in all buildings. Use heat pumps to electrify existing natural gas furnaces and hot water heaters to reduce overall energy use and limit increased utility costs.*

5 Transform select Town Centres into energy leaders by targeting net-zero ready levels of energy performance in all new buildings.

6 Explore opportunities to diversify the District's energy portfolio with renewable energy systems.

* Implementing B&E Strategies 3 & 4 together is cost-effective for both capital investment and ongoing cost control.

Building & Energy Strategy Details

Strategy	Co-Benefits	Key Actions	2050 Impact	Magnitude Cost	Timeline
1		Implement BC Energy Step Code for all new construction (residential), targeting top step ahead of Provincial adoption and phase in requirement for zero fossil fuels using GHG intensity (GHGI) targets.	Moderate	$$-$$$*	Short
2		Implement BC Energy Step Code for all new construction (non-residential), targeting top step ahead of Provincial adoption (when these targets are established by the Province) and phase in requirements for zero fossil fuels using GHG intensity (GHGI) targets.	Moderate	$$-$$$*	Short
3		Implement building energy performance and retrofit program.	Moderate	$$$**	Short to Long
		Support and advocate for a Provincial building energy benchmarking program.	**High**	$-$$	Short
4		**Implement fuel switching & electrification retrofits in all buildings including industrial usage. Encourage heat pumps to electrify existing natural gas furnaces and hot water heaters.**	**High**	$$$**	Short to Long
		Accelerate the development of engagement, education and capacity building programs for building fuel switching.	-	$-$$	Short
5		Target net-zero ready and zero fossil fuels in all new buildings in key Town and Village Centres.	Moderate	$$	Short
6		Support and encourage the installation of decentralized renewable energy (e.g. solar PV) throughout the District.	Low	$-$$	Short

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* Magnitude long-term costs for all BC Energy Step Code adoption actions
** Magnitude costs for all retrofit and fuel switching actions

Solid Waste

7%
Impact towards 2050 Emissions Reduction Target

Does not address

The District Today:

- Each household diverted 455 kg of organics from landfill in 2018[13]
- 66% of curbside recyclables and organics were diverted from garbage in 2018[14]

What We Heard:

- Require multi-stream waste sorting spaces in all new multi-family buildings
- Find ways to better manage and enforce waste reduction in the Demolition, Land Clearing, and Construction (DLC) sector

Solid Waste Strategies

1 Reduce the amount of organics and recyclables sent to landfill by setting higher Municipal Solid Waste Diversion Targets. Includes higher diversion targets for:
- Residential waste
- Streetscape waste
- Institutional, Commercial and Industrial waste

2 Expand organics and recycling collection programs (e.g. to multi-unit residential buildings, commercial buildings). Explore opportunities to divert organics locally on the North Shore, shift to a bi-weekly garbage collection schedule, or explore other options to reduce residential waste at its source.

3 Install multi-stream waste containers (e.g. organics, recyclables, and garbage) at all streetscape waste locations.

4 Reduce the amount of organics and recyclables sent to landfill from construction, land clearing and demolition companies by requiring a site waste diversion plan and audit system.

5 Advocate for an increase in methane capture from landfills to reduce emissions from waste.

6 Continue to encourage Metro Vancouver's wood waste bans to reduce landfill methane.

Solid Waste Strategy Details

Strategy	Co-Benefits	Key Actions	2050 Impact	Magnitude Cost	Timeline
1		Improve residential waste diversion by shifting to a bi-weekly garbage collection schedule, or identify other options for reducing residential waste.	Moderate	$	Short
		Improve streetscape and parks waste diversion.	Low	$	Short to Medium
		Improve institutional, commercial, and industrial waste diversion.	Moderate	$	Short to Medium
		Improve waste diversion rates at drop-off facilities.	Low	$$-$$$	Short to Medium
2		Push for multi-stream waste disposal options in all multifamily buildings and businesses with high organics use and waste potential.	Moderate	$$-$$$	Short to Medium
3		Roll out multi-stream waste receptacles at all streetscape waste locations.	Low	$$-$$$	Short to Medium
4		Support/encourage construction, land clearing, and demolition companies to reduce organics sent to landfill.	Moderate	$$	Short to Medium
5		Advocate for increased methane capture at the Vancouver Landfill.	Moderate	$-$$$	Short to Long
6		Evaluate requiring recycling/salvage plans at point of building/demolition permit application/approval.	Moderate	$$	Short to Long

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Urban Forestry

Increase Carbon Sequestration

The District Today:

- **995** trees planted between 2016 and 2019

What We Heard:

- Protect and enhance urban canopy to help the District adapt to a changing climate

Urban Forestry Strategies

1 Plant large tree species to provide shading for buildings, which helps keep buildings cool during summers and warm during winters, improving occupant comfort and reducing energy use.

2 Plant large tree species to provide shading along active transportation routes, which will help keep pedestrians and cyclists cooler during summer months.

3 Establish an Urban Forestry Management Strategy that protects and enhances the District's urban forest for years to come.

Urban Forestry Strategy Details

Strategy	Co-Benefits	Key Actions	2050 Impact	Magnitude Cost	Timeline
1		Encourage the use of trees to shade buildings in summer to reduce cooling needs in centres implementation plans.	Low	$	Short
2		Where needed, augment Town and Village Centre Plans and Development Permit Area Guidelines to include requirements to provide strategic shading for buildings and pedestrians.	Low	$$	Short
3		Update existing tree policies and requirements to maximize and maintain GHG sequestration.	Low	$	Short

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7.0 - ACHIEVING CARBON NEUTRALITY BY 2050

IMPACT2050 lays out a set of strategies and actions that implemented together, will reduce the District's emissions by more than 430,000 tonnes of CO2e from the BAU scenario. This is an 87% reduction versus 2007 levels. These actions are within the District's current power to implement, and take into consideration the current information, capacity, and technologies at our disposal.

However, a significant emissions gap of nearly 60,000 tonnes of CO2e still remains that must be addressed before the District can achieve carbon neutrality. Almost 14,000 tonnes of the remaining emissions are for buildings excluded from the IMPACT2050 scope.[1] Here partnerships will be vital to define the pathway to carbon neutrality. For the nearly 45,000 tonnes CO2e remaining within IMPACT2050 scope, there are mechanisms that can be employed to support the District's net-zero emissions targets. The District will continue to monitor the feasibility of these mechanisms and explore the potential for new pathways to carbon neutrality as low-carbon technologies and markets emerge.

7.1 - Carbon Sequestration

Biosequestration refers to the process of capturing and storing carbon by living organisms through the process of photosynthesis used by trees, plants and even algae. Strategies that increase biosequestration help to support the removal of carbon emissions from the atmosphere while helping to expand local wildlife habitat and improve urban spaces for their inhabitants. While IMPACT2050 does include actions to increase tree canopy cover across the District, they have not been quantified in the same way that other strategies have been, due to the fact that the standard approach used in modelling the District's baseline emissions does not include existing forest cover. In the future, the District can expand its baseline to include the role that preserving or expanding its green spaces will have on achieving its carbon neutral target.

CARBON OFFSETS

The Cheakamus Community Forest Offset Project near Whistler, BC protected important cultural and wildlife areas, and provided local economic opportunities. Similarly, the Great Bear Forest Carbon Project's revenue sharing agreement allocates 80% of revenue to Coastal First Nations, protecting ecological and environmental values, and providing funds for job creation in local First Nations Communities.

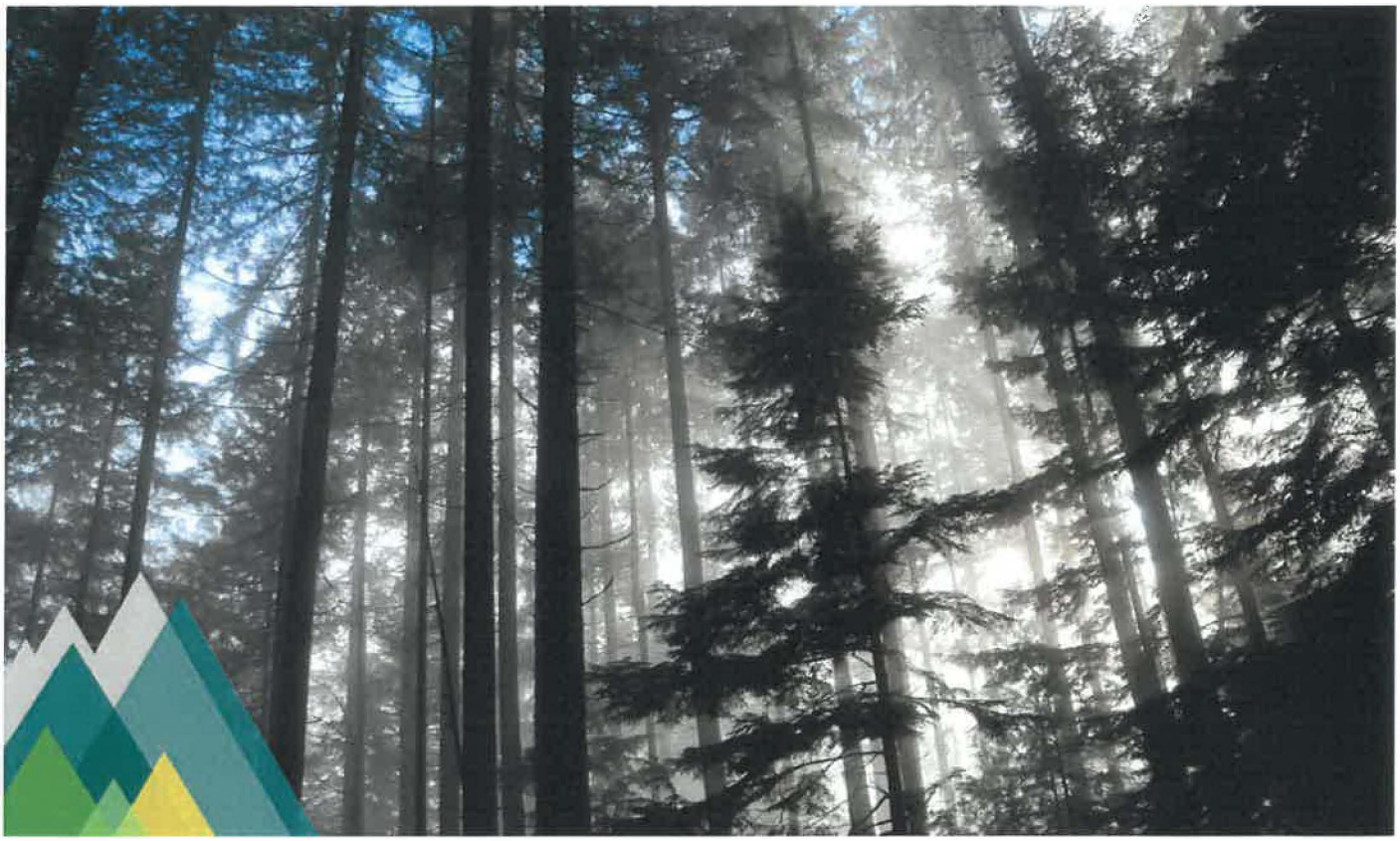
1 Buildings outside of the CEEP's scope include those owned by: First Nations groups, Port of Vancouver, District of North Vancouver corporate buildings and buildings with partial ownership, District of West Vancouver, Federal Government, Metro Vancouver Regional Government, houseboats, and miscellaneous auxiliary buildings (ex. Carports and sheds)

7.2 - Carbon Offsets

Carbon offsets are credits for GHG reductions achieved in one location that can be purchased to counterbalance (or offset) emissions generated in another[15]. Measured in tonnes of CO2e and typically costing in the realm of $20 to $30 apiece, carbon offsets can be generated by a number of activities, including solar, wind, biogas, and geothermal energy projects. Other activities, including planting trees and reducing deforestation, can also generate carbon offsets. Procuring carbon offsets locally can provide a number of benefits to residents of BC, such as enhanced biodiversity and green employment.

Carbon offsets could be used by the District to achieve carbon neutrality by 2050, but should only be purchased in cases where reducing emissions by other means are unfeasible, as they must be purchased annually at substantial cost to the District. They also fail to bring any of the benefits of local emissions reduction efforts to District residents, including improved health, reduced energy costs, and others. If and when carbon offsets are considered by the District, a number of key criteria will be established to ensure offsets are:

- **Local:** bringing benefits to local communities across BC and Canada
- **Additional:** prioritizing those that promote additional renewable energy generation
- **Measurable:** prioritizing those that can be clearly quantified
- **Enforceable:** prioritizing those that are verified by reputable, third party organizations



7.3 - Renewable Energy Credits

Other ways to offset emissions are through the use of Renewable Energy Certificates (RECs), which represent the environmental, economic, and social benefits associated with a renewable energy project. Each REC represents one megawatt hour (MWh) of renewable energy generated, and typically cost between $10 to $20. Purchasing RECs supports the low-carbon energy market and are used by many municipalities to offset the emissions associated with municipal services and facilities. While the District already has access to the low-carbon hydroelectricity of the BC electrical grid, the purchase of RECs could help to offset any remaining emissions in 2050. Where RECs are explored, The District will apply similar criteria as those applied to carbon offsets, and will only consider the procurement of Green-e-certified (or equivalent) RECs, as these certificates are verified and legitimate.

Howe Sound Pulp and Paper Corporation in Port Mellon, BC, provides biomass RECs to Green Alberta Energy[16], reducing atmospheric GHGs and providing economic benefits to local residents.

7.4 - Negative Emissions Technologies

Finally, there are several technologies under development that may provide additional mechanisms to sequester carbon. Known as negative emissions technologies (NETs), these technologies remove carbon from the atmosphere. Some examples include, carbon capture and storage technologies where systems applied to point source industrial emissions or biofuel facilities to reduce or remove carbon emissions that are emitted into the atmosphere. These are effective in reducing localized sources of carbon pollution. Another example under development is the use of direct air capture and sequestration systems, which directly remove carbon dioxide from the air for long-term carbon storage.

While promising, most of these solutions are still largely unproven and will need to be proven effective and safe before implementing them on a large scale. Additionally, as with all sequestration, net emissions are vital to evaluating a solutions effectiveness. The energy and resources required to deploy the NET needs to be considered to ensure it truly provides net negative emissions.[17]

REDUCING OTHER EMISSIONS

While they are not directly addressed in IMPACT2050, the carbon emissions associated with the products we buy, the food we eat, and the materials we use to construct our homes and buildings are a key part of reducing community emissions. Research is growing on the ways that municipalities can work to reduce these sources of carbon, and some cities are starting to explore requirements for new and existing buildings that reduce the emissions embodied in select materials. The District will work to expand the scope of its emissions reduction efforts as it implements the important actions already contained in IMPACT2050.

8.0 - IMPLEMENTING THE PLAN

To achieve carbon neutrality by mid-century, IMPACT2050 must be implemented in a manner that balances bold action and leadership with responsiveness to stakeholder needs, market conditions, and innovations in technology. To that end, this plan is intended to be an iterative, living document that will continuously incorporate new insights and information based on ongoing stakeholder collaboration, new research and studies, emerging technologies, and changes to the political and economic landscape. This plan's strategies include educational, advocacy, and capacity building components to ensure all community residents and stakeholders can participate in reaching carbon neutrality by 2050. IMPACT2050 is just one piece of the District's overall sustainability roadmap, the actions that it contains are aligned with existing District policies and strategies to harness efficiencies and work within existing District budgets. It is anticipated that implementation of key actions in this plan will include additional public and stakeholder consultation. Municipal spending is not expected to significantly increase as a result of implementing the plan.

Coordinated and strategic implementation is also essential to the success of IMPACT2050. Certain actions need to be achieved before others can be initiated – for example, gathering information prior to developing and implementing a particular policy. Some actions help to support the achievement of many other actions, such as the development of industry capacity to understand new technologies and approaches. The actions provided in this plan have therefore been crafted within an integrated implementation plan to equip the District with the full roster of programs, policies, tools, data, information, and capabilities necessary to achieve the targets. To ensure IMPACT2050 reflects the needs and context of the community, a high level of engagement and participation from community groups and individuals will be maintained throughout its implementation.

8.1 - Working Together

IMPACT2050 requires the participation of all three levels of government (federal, provincial, and regional), as well as the support and contributions of its external partners. These partnerships include the school districts, businesses, developers, community groups, and other organizations working in and across the District. The District will also continue to work with external organizations such as TransLink, Metro Vancouver, BC Hydro, Fortis BC, Vancouver Coastal Health, and the Tsleil-Waututh and Squamish First Nations to both provide support and to harness the action necessary to help the District realize its emissions reduction goals in a way that benefits the community.

KEY IMPACT2050 PARTNERS & STAKEHOLDERS

- British Columbia provincial government
- Metro Vancouver Regional District
- TransLink
- FortisBC
- City of North Vancouver
- District of West Vancouver
- North Vancouver Economic Partnership
- Urban Development Institute
- Capilano University
- Cool North Shore
- ICBC
- BC Non-Profit Housing Association
- Government of Canada
- BC Hydro
- Port of Vancouver
- Vancouver Coastal Health
- Tsleil-Waututh and Squamish First Nations
- North Vancouver School District
- VanCity Credit Union
- Community Energy Association
- North Vancouver District Staff
- Major local employers (e.g. Seaspan, local resorts)
- Other NGOs, industry associations, stakeholder groups, consultants, and subject-matter experts

In order to make IMPACT2050 actions viable and impactful, the District will also work to support the community in achieving emissions reductions and the many benefits that these actions can provide. As achieving emissions reductions at the household level can sometimes come with upfront costs, the District will help to connect residents with available incentives from key providers such as the Province of British Columbia, BC Hydro, and Fortis BC. As tools and technologies become more commonplace, the costs of upgrading our household energy and transportation systems will become more affordable and accessible to the public.

Finally, while the District will continue to put systems in place that reduce barriers and encourage change, there are many actions that individual residents can take. Opting to take transit to work twice a week or carpooling with co-workers or neighbours reduces transportation emissions and improves social connectivity. Making energy efficient upgrades can reduce costs and improve indoor comfort. Avoiding or minimizing overall consumption, especially that of single-use plastics, can help reduce the volume of waste processed through our municipal and regional systems. **These actions may seem negligible at an individual scale, but cumulatively can have an impact on the emissions we generate as a community.** A select number of these actions are included on the following page.

WORKING TOGETHER ON EXISTING BUILDING RETROFITS

An example of an energy and emissions reduction challenge that requires team work and collaboration is existing building retrofits. The BC Energy Step Code provides a pathway towards significant energy and emissions reductions for new buildings; however, ***a retrofit program for existing residential and non-residential buildings will be a key component of the District reaching carbon neutrality by 2050.*** *In addition to decreasing the District's energy consumption and emissions, existing buildings retrofits can provide positive health and social outcomes for residents.*

CLIMATE ACTION FOR RESIDENTS

LIFESTYLE

Choose to live in more compact forms of housing*	Take shorter showers*
Plant trees in your backyard	Grow your own vegetables
Choose reusable products over disposable ones*	Turn off the tap when not in use
Fix it, don't throw it	Shift to a plant-based diet*
Donate used goods or resell items	Install low-flow showerheads, taps and toilets
Borrow, buy used items, or choose to purchase sustainably sourced items	Landscape with native plants that require minimal watering
Let your lawn brown in the summertime	Pay your bills electronically

TRANSPORTATION & LAND USE

Walk or cycle for short trips and take transit when possible*	Consider purchasing a fuel-efficient, hybrid, or electric vehicle or electric bicycle*
Shop, eat and play at walkable destinations	Organize car pools with coworkers or fellow parents*
Arrange a walking school bus with other parents	Take junk out of your car – heavier cars use more gas
Encourage your children to walk, cycle, take transit, or use the school bus to school*	Shop in local stores instead of buying online to reduce associated waste and delivery truck emissions*
Combine your trips	Avoid idling

BUILDINGS & ENERGY

Replace furnace with heat pump*	Turn down the heat and wear a sweater
Turn off the A/C and open your windows	Open blinds to let in natural light
Use LED lightbulbs	Purchase energy-efficient appliances
Unplug appliances that are not being used	Use a clothesline instead of a dryer*
Turn off lights when not in use	Do a home energy audit
Fix leaky faucets	Insulate home and weather strip doors and windows*

SOLID WASTE

Use fewer single-use items (i.e. diapers, plastic utensils, disposable razors)*	Consume less and use tools like http://myfridgefood.com/ for recipes using ingredients in your fridge or refer to https://lovefoodhatewaste.ca/ for more information on how to cut down on food waste
Compost food, if you don't already	Freeze food before it goes bad

* indicates highest impact actions

8.2 - Monitoring Progress

The District will continue to monitor progress throughout the implementation of IMPACT2050 to gauge the success of its actions in meeting the District's emissions reduction targets. Below, a suite of primary (i.e. community-level) and secondary (i.e. program-level) indicators and key milestones outside the District's jurisdiction are presented.

Primary indicators directly track community greenhouse gas emissions and energy consumption, and measure the overall impact of the combined actions. The District will review and report on these measures in alignment with provincial release of the Community Energy and Emissions Inventory (CEEI). However, initial insights from the provincial CEEI will be limited, as the inventory takes several years to prepare and short-term reductions will be small.

PRIMARY INDICATOR	DATA SOURCE
Total Community GHG Emissions (tonnes CO2e)*	BC CEEI
Total GHG Emissions from Buildings (tonnes CO2e)	BC CEEI
Total GHG Emissions from Transportation (tonnes CO2e)	BC CEEI
Total GHG Emissions from Solid Waste (tonnes CO2e)	BC CEEI
Total Energy Consumption (GJ)	BC CEEI
Total Electricity Consumption (GWh)	BC CEEI or BC Hydro

*Tracked in OCP Progress Monitoring Report

Secondary indicators have also been identified that will provide additional feedback on progress by focussing on results from specific actions. Progress on this secondary level indicates advancement in meeting the District's overall emissions and energy targets. In addition to the secondary indicators, the District's annual Climate Action Revenue Incentive Program (CARIP) report will provide insights into initiatives and accomplishments achieved each year. Secondary indicators for IMPACT2050 are listed in Appendix III.

Lastly, there are some key actions that lie beyond the District's jurisdictional powers. Here, the District's role is to support partners and advocate for these changes. The status of these actions will also be monitored to determine when actions are achieved, and their overall impact in the District's goals.

Actions outside of District's juristiction

MILESTONE ACTIONS	KEY PARTNERS / JURISDICTIONAL AUTHORITY
Continue to electrify Port operations and encourage expansion of Shore Power use	Port of Vancouver
Decongestion pricing	Province of British Columbia, TransLink, Metro Vancouver Regional District
Improved fuel efficiency / Low-carbon fuel standards (CleanBC signalled intent for further improvements to Low Carbon Fuel Standard)	Province of British Columbia Government of Canada
Electrify transit fleet (Achieved – on October 4, 2018 TransLink approved plans to shift operations to 100% renewable by 2050[18])	TransLink
BC ZEV mandate (Achieved – Mandate announced November 20, 2018[19])	Province of British Columbia
Building energy benchmarking	Province of British Columbia
Clean BC Heat Pump Implementation Program	Province of British Columbia

APPENDIX I: GLOSSARY OF TERMS

This glossary defines terms as they are intended to be interpreted in the context of climate change. Underlined words are terms that are defined elsewhere in the glossary.

Biomass: organic matter used as a fuel, especially in a power station for the generation of electricity.

Business-as-Usual (Unchecked Scenario): where no measures are taken to reduce carbon footprint, to shift to sustainable practices, and to mitigate cumulative greenhouse gas emissions.

Carbon Neutral: the achievement of net-zero emissions by balancing the amount of carbon emitted into the atmosphere with an equivalent amount sequestered or offset.

Carbon Offset: a carbon offset is a credit for GHG reductions achieved in one location that can be purchased to counterbalance emissions generated in another location.

Climate: the average weather in a given region over a long period of time, typically 30 years or longer.

Climate Change: statistically significant variations in the climate that can be caused by natural Earth processes (e.g., volcanic eruptions and ocean currents), external factors (e.g., changes in solar intensity), or by human activity (e.g., greenhouse gas emissions and changes in land use).[20]

Climate Change Adaptation Strategy: a Council adopted strategy to coordinate and integrated District initiatives that support climate change adaptation (i.e. adapting infrastructure to withstand extreme weather events associated with climate change) and to incorporate adaptation considerations and longer-term thinking throughout all District activities.

Co-benefits: the benefits of policies implemented for various reasons at the same time, acknowledging that most policies designed to address greenhouse gas mitigation have other, often at least equally important, rationales (e.g. related to objectives of development, sustainability, and equity).[21]

CO_2e: carbon dioxide equivalent. Universal measurement for GHG emissions reporting. All individual GHG emitting gases are converted to an equivalent amount of carbon dioxide using their respective global warming potential.

Decarbonization: removing carbon from our energy supply by shifting to efficient and renewable sources that emit zero carbon emissions.

Energy Retrofit: the process of upgrading a building's energy-consuming systems. It may involve improving or replacing lighting fixtures, ventilation systems or windows and doors, or adding insulation where it makes economic sense. It also means including energy efficiency measures in all your renovation and repair activities.[22]

Extreme Weather Event: a meteorological event that is rare for a particular time of year and/or place and is beyond the normal range of activity.[23] Examples include: windstorms, heat waves, and droughts.

Geo-exchange System: an electrically powered heating and cooling system for interior spaces that utilizes the earth (or pond or lake) for both a heat source and a heat sink.[24]

Greenhouse Gas (GHG): gases that trap heat in the atmosphere.[25]

Greenhouse Gas Intensity (GHGI) Targets: a performance-based tool for measuring the total amount of GHG produced as a result of a building's energy use.[26]

Gigajoule (GJ): a unit of energy equivalent to one billion joules. For context, one gigajoule of electricity could make 1,000 pots of coffee or keep a 60-watt light bulb continuously lit for six months.[27]

Hydroelectricity (or Hydropower): electricity that is generated by hydropower; the production of electrical power through the use of the gravitational force of falling or flowing water.

Hydronic Ready: having the capacity to connect to a system which generating heat or cooling through the transfer of heat by a circulating fluid (such as water or vapour) in a closed system of pipes.

Low Carbon Energy Sources: a shift away from coal and gas as a source of energy and using instead, lower carbon-emitting energy sources like electricity (specifically, in BC) renewables (solar, wind, and tidal), nuclear and biomass, to name a few.

Mandate: an official order or commission to do something.

Mitigation: Reducing greenhouse gas emissions using policy, regulatory, and project-based measures. Also refers to measures that enable natural systems to naturally sequester greenhouse gases (e.g., preventing forested areas from being developed into to urban cities). These actions prevent future climate change from happening so that fewer adaptation measures are needed by local municipalities. Examples include: renewable energy programs, energy efficiency frameworks, and land-use policies.

Net-Zero Ready: a building built to high energy-efficiency standards such that it could (with additional measures) generate enough onsite energy to meet its own energy needs.

Official Community Plan: sets the direction for future growth and change in the District through 2030, as guided by the community's vision. It works together with more detailed strategic action and implementation plans, such as corporate and financial plans, town centre implementation plans and others.

Renewable Energy Certificates (RECs): are market-based instruments created through statute or regulatory action that enable the tracking, trade, and sale of renewable energy. Usually sold by the megawatt hour (MWh), RECs represent the environmental, social, and health benefits of renewable energy.

Resilience: the capacity of a system, community, or society exposed to hazards to adapt, by resisting or changing, in order to reach and maintain an acceptable level of functioning and structure.

Risk: a measure of the expected outcome of an uncertain event, which is estimated by combining an event's likelihood with the expected consequences. The concept of risk helps to grapple with uncertainty and allows for the comparison of potential impacts.

Sequestration (Carbon): a natural or artificial process by which carbon dioxide is removed from the atmosphere and held in solid or liquid form. It is one method of reducing the amount of carbon dioxide in the atmosphere with the goal of reducing global climate change.

Solar Energy: radiant energy generated by the sun that is converted to electricity, hot air, or hot water.

Strategic Energy Management Plan (SEMP): a long-term plan for the District to manage the energy generated by operating municipal services and facilities. The strategy is built on a framework of efficiency, integrated planning, and in the short-term, focuses on the District's four most energy intensive buildings.

Thermal Energy (Buildings): Thermal Energy generally refers to the energy possessed by an object or system due to the movement of particles within that object or system. The faster these particles move, the higher the temperature that is recorded. Thermal Energy in buildings, specifically involves the temporary storage of high- or low-temperature energy for later use.

Town and Village Centres: areas identified to absorb growth expected in the District of North Vancouver, as established by the Official Community Plan. Each centre supports effective transit, walking, and cycling, promotes healthier living and social interaction, and protects our surrounding green space.

Transportation Demand Management (TDM): a program of social marketing and incentives developed by local governments for residents, businesses, schools and organizations to provide information and help for using all available transportation options – and to counterbalance the incentives to drive, especially during peak periods. Traditional and technology-based TDM services can encourage and provide individuals with incentives to use transit, ridesharing, walking, biking, bike-share and telework more often, and so reduce the demand to continually expand the road network and subsidize parking.

Transportation Plan: a District policy which aims to deliver a sustainable transportation network supporting the Official Community Plan. It endeavours to address residents' desire to make the District an even-better place to live with plentiful options for walking, cycling, taking transit and safe driving.

Uncertainty: a state of incomplete knowledge that can result from a lack of information or from disagreement about what is known or even knowable. It may have many types of sources, from imprecision in the data to ambiguously defined concepts or terminology or uncertain projections of human behaviour.

Unchecked Scenario (Business-as-Usual): where no measures are taken to reduce carbon footprint, to shift to sustainable practices, and to mitigate cumulative greenhouse gas emissions.

Vulnerability: the degree to which a system is susceptible to, or unable to cope with, the adverse effects of climate change. Vulnerability is a function of both the sensitivity and the adaptive capacity of a given system.

Vulnerable population: community members that experience greater impacts compared to the general population. This can result from the inability to move to avoid risks or to afford adaptation measures. Examples include: people who are homeless, those with low-incomes, youth, the elderly, and outdoor workers.

Weather: the short-term (i.e., minutes to weeks), day-to-day variability in atmospheric conditions (e.g., temperature, precipitation, and wind) in a given region.

APPENDIX II: IMPROVING HEALTH AND WELLBEING THROUGH CLIMATE ACTION

Benefits to physical and mental health and wellbeing abound when climate and energy actions are designed and implemented with individuals' and communities' best interests in mind. There are many strategies to reduce energy use and emissions in the way we live, work, and move around that can directly contribute to the District's efforts to improve the quality of life of its citizens.

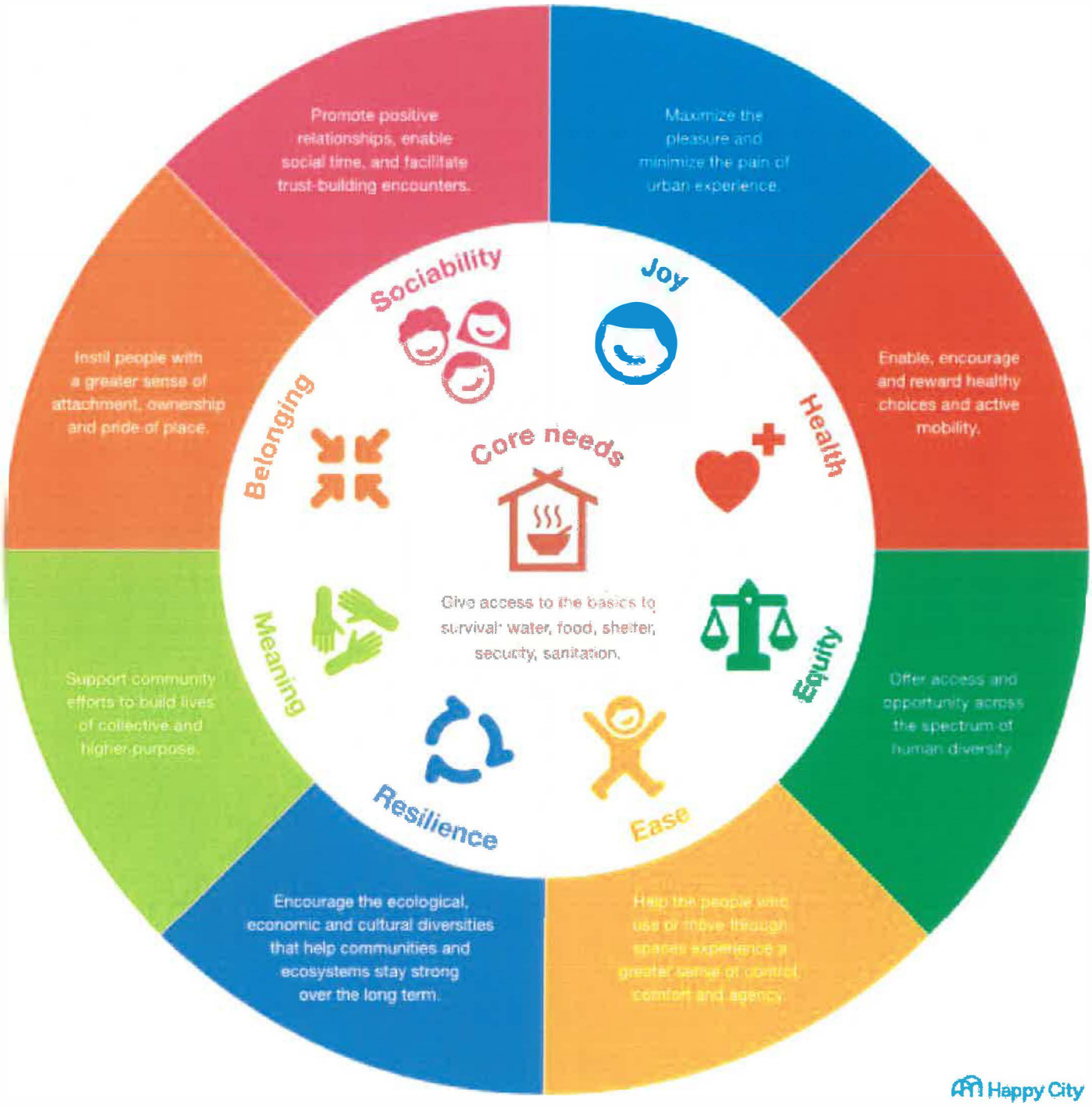
This Plan was crafted to harness these benefits and address the concerns and desires of the community. If implemented carefully, the Plan's actions will yield meaningful health and wellbeing benefits for individuals, businesses, neighbourhoods, and the community as a whole. Many of these actions build on the work the District is already undertaking to improve the health and wellbeing of its citizens through its Official Community Plan.

Evaluating Health and Wellbeing

While at first glance it may seem that many elements of health and wellbeing are subjective in nature, there is a large and growing body of evidence that has shown that elements such as connectedness, joy, and happiness and can be strongly influenced by specific factors in our environment. For example, the My Health My Community report has found strong links between the use of low-carbon active modes of transportation (e.g. cycling, walking) and lower body mass index, higher rates of community belonging and connectedness, and better overall health[1]. Conversely, research has shown links between car-oriented environments with lower levels of physical activity, higher levels of air pollution, and higher levels of both mental and physical health issues. People who live in walkable neighbourhoods where housing is mixed with shops, services and places to work also report having much more positive local relationships compared to people in single-use, car-dependent neighbourhoods outside of urban centres[2]. Offering a range of housing and tenure types helps keep the District more affordable, helping people to live and work in the same place and spend less time commuting[3].

1 Vancouver Coastal Health, Fraser Health, and UBC's eHealth Strategy Office. My Health My Community: Transportation and Health in Metro Vancouver. March 2015. Retrieved from http://www.myhealthmycommunity.org/Portals/0/Documents/MHMC%20Transportation%20and%20Health%20vPUBLIC%2012MAR2015.pdf
2 Williamson, Thad. Sprawl, Justice, and Citizenship: The Civic Costs of the American Way of Life. New York: Oxford University Press, 2010.
3 Savonnerie Heymans / MDW Architecture, Archdaily, Mar. 27, 2012. Retrieved from https://www.archdaily.

To make sure the Plan will positively contribute to the community's health and wellbeing, each action was evaluated using Happy City's Urban Happiness framework. The framework draws on leading research in the field of health and wellbeing, and has been used to help cities and districts create urban environments that foster happier, healthier, more fulfilling lives for their communities. The framework consists of eight core elements, each of which are defined below.



Harnessing Benefits and Mitigating Risks

In the sections below, the actions contained within the Plan have been grouped into broad sets of strategies that target the different sectors of Transportation & Land Use, Buildings & Energy, Solid Waste, and Urban Forestry. Happy City icons are used to indicate the positive outcomes for health and wellbeing of each strategy, with notes on how those benefits can be realized.

Of course, the positive impact of any action depends largely on how it is designed and implemented. While the Plan lays out a path to achieving 80% GHG reductions, the District is now tasked with the ongoing refinement and implementation of each of the actions to make sure that both emissions reductions and community benefits are realized. The right way forward will depend on changing community needs and resources, build off lessons learned both within the District and by other leading jurisdictions, and evolve as new technologies, markets, and policy instruments become available.

Aside from means of harnessing their benefits, the implementation of each action will also require an evaluation of each action's potential risks. If not implemented carefully and equitably, the Plan's actions can present risks to health and wellbeing to all or some of the community.

Some of the issues that the District will need to address in implementation include:

- Equitably distributing the benefits and minimizing the risks of different actions to low-income or vulnerable populations;
- Ensuring the costs of new transportation or energy infrastructure do not pose threats to affordability;
- Supporting young families, low-income households and aging populations by providing a mix of housing types and tenures;
- Designing transportation infrastructure to protect passenger, cyclist and pedestrian safety;
- Exploring ride sharing alternatives that support collective trips to avoid added traffic congestion;
- Investing in green spaces in all new and existing neighbourhoods and communities; and
- Supporting new Canadians by ensuring relevant materials and support services are provided in multiple languages.

The District will work with its many partners and stakeholders to ensure these risks are mitigated, and that the benefits of the Plan are enjoyed across the community.

Tracking Progress

The District will monitor the impacts of the Plan on the community's health and wellbeing as it unfolds to ensure that the benefits outlined above are being realized. The health and wellbeing of the District of North Vancouver currently tracked using the My Community My Health survey, jointly produced by the University of British Columbia, Fraser Health, and Vancouver Coastal Health.[4] While direct correlations between the Plan and physical and mental health may be difficult to identify, updates to the survey will show if the District is on the right track.

Some indicators that the My Community My Health project is already tracking include:

- Mode of commuting
- Commute time
- Amenities within walking or cycling distance
- Sidewalk maintenance
- Sense of community belonging
- Self-rated general and mental health
- Self-reported chronic conditions

The North Shore Community Wellness Survey, prepared by the Public Health Surveillance Unit and Vancouver Coastal Health in 2013[5], includes some additional indicators for the District to follow as the Plan is implemented.

These include:

- Stress levels
- Causes of stress
- Neighbourhood safety indicators

Air quality measures are also already tracked in Metro Vancouver's Integrated Air Quality and Greenhouse Gas Management Plan Progress Report[6].

This report tracks the following items:

- Air contaminants (NO2, SO2, O3, VOC, PM2.5, DPM, PM10, TRS, CO, NH3)
- HIGH or LOW Air Quality Health Index ratings
- Air quality advisories
- Visual air quality events
- WORST or BEST Visual Air Quality Index ratings

4 www.myhealthmycommunity.org
5 http://www.vch.ca/Documents/North-Shore-Community-Wellness-Survey-Report-OCT-2013.pdf
6 http://www.metrovancouver.org/services/air-quality/AirQualityPublications/2014IAQGGMPProgressReport.pdf

TRANSPORTATION & LAND USE

Strategies	Associated Actions	Wellbeing Benefits	Details
Reduce vehicle trips and shift to transit, cycling, walking, ridesharing, and ride-hailing through transportation demand management	T&LU 1-5		• Increased physical activity in shifting away from passenger vehicles, including for people taking transit • Improved muscle and joint strength, as well as relief from symptoms of depression and anxiety, from greater use of active transportation • Reduced risk of cardiovascular disease, respiratory diseases, stroke, and diabetes from lower air pollution • Improved safety and sense of safety for cyclists and pedestrians of all ages • Walking and biking to and from public transportation can help promote and maintain active lifestyles
			• Increased and improved set of more affordable transportation options • Greater priority given to more efficient transportation options (e.g. buses) • Reduced negative physical and mental health impacts that disproportionately impact low-income and minority populations
			• Greater ease in transportation from having more varied, efficient, and convenient transportation options • Improved settings for people of all ages to undertake active mobility with ease
			• More opportunities for trust-building encounters from increased transit, cycling, and walking as primary mode or as part of journey
			• Greater joy and less pain experienced by cyclists and pedestrians than from taking other transportation modes • More opportunity for personal free time while taking transit • Reduced contributions to mental stress and hypertension from less time spent driving in traffic
			• Greater sense of community and belonging when people commute by bike or on foot, due in part to higher quality interactions with others
Establish a network of denser, complete communities across the District	T&LU 6-9		• Improved sense of joy from having a more vibrant and lively community • Greater opportunity for free time with less travel time required to meet daily needs • Positive mental health impacts of spending more time outside because able to meet more needs in the neighbourhood • Lower levels of pain and frustration produced by long car or bus commutes

Happy City

Strategies	Associated Actions	Wellbeing Benefits	Details
			• Greater feeling of belonging from having a stronger sense of community produced by more encounters on foot with other residents and businesses • Greater sense of community and belonging when people have access to a variety of housing types and are able to age-in-place
			• Positive physical health impacts for seniors associated with the ability to meet daily needs in the neighbourhood (seniors age faster when they can't meet their needs on foot) • Increased safety in neighbourhoods that meet more daily needs within walking and cycling distances • Improved health outcomes for all residents, who are able to complete more daily tasks on foot or by bike
			• Greater sense of ease associated with being able to meet daily needs close to home
			• More opportunities for trust-building encounters within a more vibrant, complete community • Greater neighbourhood cohesion from improved ability to age in place and opportunity to meet more daily needs within the neighbourhood
			• Walkable neighbourhoods are more resilient to environmental and economic shocks because residents are more likely to know one another • Increased community resilience from reduced utility infrastructure construction and maintenance costs
Revise transportation and parking metrics used in planning and evaluation to expand focus from passenger vehicles to individuals' transportation needs	T&LU 10, 19-23		• Broader focus on meeting transportation needs increases attention on meeting individuals' needs rather than vehicles' needs
			• More equitable outcomes from more holistically considering transportation needs • Transport systems become more fair and equitable when more efficient transportation modes (e.g. transit) are prioritized above less efficient modes (e.g. single occupancy vehicle) • Greater potential to efficiently meet mobility needs in a cost-effective manner
Establish electric bike share as a new transportation option	T&LU 11-12		• Increased cycling by reducing barriers to cycling associated with hills and long within-District travel distances
			• Improved access to convenient, efficient, and affordable transportation for long distance trips, particularly off of major transit routes • Greater active mobility access for the elderly and those with mild mobility limitations

Happy City

Strategies	Associated Actions	Wellbeing Benefits	Details
			• Potential for greater sense of pride from seeing locally-specific transportation barriers addressed in an innovative way • Potential for greater sense of cooperation amongst community members stemming from sharing community assets
			• Increased activity mobility options to cover greater distances with less effort and expense
			• Greater sense of joy associated with cycling and electric cycling
Improve multimodal transportation network and pedestrian and cyclist safety through neighbourhood and site enhancements	T&LU 13-17, 27		• Safer transportation routes for pedestrians and cyclists produce healthier travel habits
			• Increased planning, design, and infrastructure focus on all transportation modes produces more equitable outcomes for individuals regardless of transportation choice and accessibility requirements • Multimodal transportation networks create greater access for seniors, children and people who cannot or choose not to drive • Greater focus given to lower cost transportation options
			• Opportunity for more joy stemming from greater flexibility and more sense of control in transportation options • Parents enjoy more spare time when youth can travel safely and independently to extracurricular activities
			• Increased multimodal focus yields more diverse and efficient transportation networks that offer greater travel ease regardless of transportation choice • Improved pedestrian and cycling infrastructure reduces safety concerns, a major barrier to active mobility
Electrify Port operations	T&LU 18		• Reduced risk of cardiovascular disease, respiratory diseases, stroke, and diabetes from lower air pollution
Use economic instruments to manage congestion and parking	T&LU 24-26		• Reduced congestion leads to less local air pollution and associated physical health impacts • Lower stress levels resulting from less time spent in traffic jams
			• Costs of addressing the air quality health impacts derived from single occupancy vehicles are internalized (as opposed to borne by health care providers) • Shifts towards pricing that better account for cost burden of personal vehicles on the local economy, infrastructure maintenance, and valuable public and private lands required for personal vehicles
Develop regulatory framework for ride-hailing	T&LU 28, 34		• Increases transportation ease by efficiently filling gaps in overall transportation network

Happy City

Strategies	Associated Actions	Wellbeing Benefits	Details
			• Ride-hailing regulations that favour pooled or collective trips can increase joy by providing more convenient transportation options without adding to traffic congestion
			• Regulatory framework that requires a shift to zero-emission vehicles reduces local air pollution and associated health impacts
Improve transit network efficiency, service level, and accessibility	T&LU 29-32		• More efficient and accessible transportation networks improve ease of commuting and other travel
			• Improves the efficiency and attractiveness of lower cost and lower impact transportation options
Advocate for / Support senior government vehicle emissions regulations	T&LU 33, 35		• Reduced risk of cardiovascular disease, respiratory diseases, stroke, and diabetes from lower air pollution
Promote EV adoption	T&LU 38, 41-43		• Reduced risk of cardiovascular disease, respiratory diseases, stroke, and diabetes from lower air pollution
			• Quieter vehicles reduce traffic noise associated with higher blood pressure, hypertension, and coronary artery disease
			• Electric vehicles are associated with a sense of action on climate change and sustainability
Ensure EV readiness for diverse housing types and offices	T&LU 39-40		• Focus on diverse housing types and offices lowers barriers to EV adoption for people unable to afford a single family home with a garage

BUILDINGS & ENERGY

Strategies	Associated Actions	Wellbeing Benefits	Details
Phase in the BC Energy Step Code to reach higher steps in the mid-2020s and phase out fossil fuel dependency by 2032	B&E 1-7, 15		• Improved health from buildings with better interior air quality due to the reduced use of fossil fuels
			• Reduced risk of heat related health issues from better thermally designed buildings with cooling options
			• Greater building resilience in buildings with lower energy needs, particularly thermal energy
			• Increased community and provincial energy resilience from lower electricity needs
			• Possibility of reducing long-term energy costs produces more affordable options for households

Happy City

Strategies	Associated Actions	Wellbeing Benefits	Details
Implement a multi-decade retrofit program seeking to eliminate natural gas and achieve deep energy efficiency improvements	B&E 8-12, 16		• Improved occupant health from buildings with better interior air quality due to the reduced use of fossil fuels • Greater building resilience in buildings with lower energy needs, particularly thermal energy • Increased community and provincial energy resilience from lower electricity needs • Possibility of reducing long-term energy costs produces more affordable options for households • Energy efficiency improvements can reduce heating costs, diminishing rates of energy poverty
Collaborate with BC Hydro and local industry to continuously reduce GHG emissions from industrial buildings and equipment	B&E 13-14		• Improved employee health from buildings with better interior air quality and lower air concentration of localized particulate matter
Work to establish building energy benchmarking in BC	B&E 17		• Increases opportunity for more cost-effective energy and emissions reductions • Provides opportunity to develop more targeted solutions and better offerings for lower income residents (both homeowners and renters) • Boosts fairness in climate action, by ensuring more entities contribute to GHG reduction
Make Maplewood Village a model for efficient, low-emission neighbourhood development	B&E 18-19		• Transparent and holistic focus on neighbourhood sustainability can instill a sense of ownership and pride in residents and businesses • Efficient, low-emission neighbourhoods are necessarily compact and developed to meet residents complete daily needs, leading to more pedestrian activity and opportunity for socialization • A Walkable Maplewood Village will boost resident health through increased physical activity and through the stronger social relations and support that come from face-to-face contact with neighbours • More efficient buildings and closer access to daily needs improves community resilience by lowering transportation costs and boosting potential for positive social contact • Clear focus on neighbourhood development that serves individual and community needs within global ecological limits can help imbue residents, businesses, and visitors with a sense of meaning and purpose, especially when they are involved in planning

Happy City

Strategies	Associated Actions	Wellbeing Benefits	Details
Provide education and capacity building to support the BC Energy Step Code and decarbonization of most of the DNV building stock	B&E 20-23		• Education and capacity building events and materials provided by local governments, the Province, and utilities help ensure all relevant stakeholders and industry members receive equitable access to information and resources to support industry transition
Ensure any future district energy is zero emissions	B&E 24		• Reduced risk of cardiovascular disease, respiratory diseases, stroke, and diabetes from lower air pollution

SOLID WASTE

Strategies	Associated Actions	Wellbeing Benefits	Contributions to Health, Happiness, Wellbeing, and Connectedness
Work to achieve residential and streetscape municipal solid waste diversion targets	SW 1-2, 8		• Reducing waste that is sent to the landfill in the community can provide meaning and purpose as community members may see themselves more as stewards of the environment
			• Providing multi-waste stations as a streetscape amenity in new developments increases opportunities for casual interaction between neighbours (particularly when co-located with other community assets e.g. community gardens)
Target multifamily buildings and commercial buildings with high organic waste amounts	SW 3, 9-10		• Increased access to multi-stream waste disposal will improve the ease of diverting waste
			• Increased sense of pride and community associated with the entire community acting as stewards of the environment
Improve drop-off station waste stream infrastructure, operations, and communications to increase diversion rate	SW 4		• Improving drop-off station infrastructure will increase the ease and convenience of dropping off waste
Establish a wood waste ban and support companies to achieve DLC waste reduction	SW 5, 11		• Increasing the diversion of wood waste from landfills can lead to greater conservation of natural resources, improving community resilience

Happy City

URBAN FORESTRY

Strategies	Associated Actions	Wellbeing Benefits	Contributions to Health, Happiness, Wellbeing, and Connectedness
Use urban forestry to increase seasonal shading of buildings and active transportation routes	UF 1, 3		• Increased presence of trees reduces noise in dense urban settings, reducing blood pressure, hypertension, and coronary artery disease • Positive mental health impacts associated with increased views of trees and other natural elements from windows and on commutes
			• Increased community and building resilience from lower electricity needs
			• Greater sense of joy and optimism is associated with views of trees from windows
			• Increased comfort for pedestrians and active transportation users by reducing temperatures experienced in warm weather • Easier access to green space
			• More opportunities for trust-building encounters when people feel more comfortable outside due to reduced temperatures in warm weather • Access to nature is associated with altruistic feelings and behaviour among residents, including friendliness, helpfulness and generosity
			• Greater sense of place associated with healthy urban trees is particularly powerful considering DNV's association with temperate rainforest ecosystems
Establish urban forestry management bylaws to maximize sustained GHG sequestration	UF 2		• Reduced risk of cardiovascular disease, respiratory diseases, stroke, and diabetes from lower air pollution
			• Greater sense of place associated with healthy urban trees
			• Ensuring a robust tree canopy can help to reduce the negative effects of storm water

Happy City

APPENDIX III: PROGRESS MONITORING – SECONDARY INDICATORS

TRANSPORTATION & LAND USE

Secondary Indicator	Data Source
Mode Share (%)*	TransLink
Transit customer satisfaction levels	
Transit trips (on-time) (%)	
Accessible bus stops (%)	
Commuting mode	Community Health Profile (myHealth my Community)
Commute time (min)	
Amenities with Walking / Cycling Distance (% Agree)	
Walk / cycle for errands (%)	
Sidewalks well maintained (% agree)	
Sense of community belonging (% agree)	
Self-reported general and mental health	
Self-reported chronic conditions	
Air contaminants (NO2, SO2, O3, VOC, PM2.5, DPM, PM10, TRS, CO, NH3)	Metro Vancouver's Integrated Air Quality and Greenhouse Gas Management Plan Progress Report
HIGH or LOW Air Quality Health Index ratings	
Air quality advisories	
Visual air quality events	
WORST or BEST Visual Air Quality Index ratings	
Pedestrian and Bicycle network length (km)*	District of North Vancouver - OCP Progress Monitoring Report
Net-new Residential Units in 4 key centres (%)*	
Net-new units within 400m of Frequent Transit Network (FTN) (%)*	
Population within 4 key centres and FTN*	
Jobs in District*	
District workforce that work in District (%)*	
Number of Electric Bike Share Trips	Electric Bike Share Companies
Distance Travelled per Electric Bike Share trip (average km)	
Revenue from parking fees ($)	District Parking Meter Data
Parking occupancy rate (average)	

Secondary Indicator	Data Source
New developments with unbundled parking (%)	District Building Permit Data
Residences and commercial operations with EV Charging Stations	
Number of total ride hail trips	Ride Hailing Companies
Distance travelled per trip (average km)	
Passengers per trip (average)	
Trips using EVs (%)	
EVs owned by residents and commercial operations in the District (%)	ICBC
Number of public EV Charging Stations	Plug In BC

*Tracked in OCP Progress Monitoring Report

BUILDINGS & ENERGY

Secondary Indicator	Data Source
New residential buildings built to BC Energy Step Code (m2)	District Building Permit Data
New commercial and institutional buildings built to BC Energy Step Code (m2)	
Residential buildings retrofitted to improve energy performance (m2)	
Commercial and institutional buildings retrofitted to improve energy performance (m2)	
Industrial buildings retrofitted to improve energy performance (m2)	
New residential buildings in targeted centres with Passive House levels of energy performance (m2)	
New non-residential buildings in targeted centres with Passive House levels of energy performance (m2)	
Self-reported general and mental health	Community Health Profile (myHealth my Community)
Self-reported chronic conditions	
Sense of community belonging (% agree)	
Neighbourhood Safety Indicators (% agree)	North Shore Community Wellness Survey
Air contaminants (NO2, SO2, O3, VOC, PM2.5, DPM, PM10, TRS, CO, NH3)	Metro Vancouver's Integrated Air Quality and Greenhouse Gas Management Plan Progress Report
HIGH or LOW Air Quality Health Index ratings	
Air quality advisories	
Visual air quality events	
WORST or BEST Visual Air Quality Index ratings	

SOLID WASTE

Secondary Indicator	Data Source
Residential MSW diversion rate (%)	Metro Vancouver Waste Composition Studies
Streetscape waste diversion rate (%)	
ICI waste reduction (%)	
Residential MSW diversion rate (%)	
Drop-off facility waste diversion rate (%)	
Landfilled organic waste from demolition, land clearing and construction companies (%)	
Streetscape multi-stream waste receptacles	RecycleBC

URBAN FORESTRY

Secondary Indicator	Data Source
Tree canopy coverage (%)	Energov
Self-reported general and mental health	Community Health Profile (myHealth my Community)
Self-reported chronic conditions	
Sense of community belonging (% agree)	
Air contaminants (NO2, SO2, O3, VOC, PM2.5, DPM, PM10, TRS, CO, NH3)	Metro Vancouver's Integrated Air Quality and Greenhouse Gas Management Plan Progress Report
HIGH or LOW Air Quality Health Index ratings	
Air quality advisories	
Visual air quality events	
WORST or BEST Visual Air Quality Index ratings	

APPENDIX IV: REFERENCES CITED

1 *Federation of Canadian Municipalities.* (2014). *PCP Protocol: Canadian Supplement to the International Emissions Analysis Protocol.* Retrieved from: https://data.fcm.ca/Documents/reports/PCP/PCP_Protocol_Canadian_Supplement_EN.pdf

2 C40 Cities. (2018). *Consumption-based GHG Emissions of C40 Cities.* Retrieved from https://www.c40.org/researches/consumption-based-emissions

3 Vancouver Coastal Health, Fraser Health, & UBC's eHealth Strategy Office. (2015). *My Health My Community: Transportation and Health in Metro Vancouver.* Retrieved from https://www.myhealthmycomunity.org/Portals/0/Documents/MHMC%20Transportation%20and%20Health%20PUBLIC%2012MAR2015.pdf

4 Montgomery, C. (2013). *Happy City.* Toronto: Doubleday.

5 ArchDaily. (2012). *Savonnerie Heymans / MDW Architecture.* Retrieved from https://www.archdaily.com/220116/savonnerie-heymans-mdw-architecture

6 Cision PR Newswire. (2015). *Citi ThankYou Premier Commuter Index Reveals U.S. Consumers Spend An Average Of $2,600 Per Year On Their Commute.* Retrieved from https://www.prnewswire.com/news-releases/citi-thankyou-premier-commuter-index-reveals-us-consumers-spend-an-average-of-2600-per-year-on-their-commute-300095179.html

7 Matulka, R. (2014). *Energy Saver 101 Infographic: Landscaping.* Retrieved from https://www.energy.gov/articles/energy-saver-101-infographic-landscaping

8 ibid.

9 Leigh, R., Kleinberg, J., Scheib, C., Unger, R., Kienzl, N., Esposito, M., Hagen, E. & Tillou, M. (2014). *Leaks and Lives: How Better Building Envelopes Make Blackouts Less Dangerous.* Retrieved from https://aceee.org/files/proceedings/2014/data/papers/1-439.pdf

10 McAllister, T. (2013). *Developing Guidelines and Standards for Disaster Resilience of the Built Environment: A Research Needs Assessment (NIST Technical Note 1795).* Retrieved from https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.1795.pdf

11 https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/construction-industry/building-codes-and-standards/reports/bc_energy_step_code_metrics_research_report_full.pdf

12 Acadia Center. (2014). *Energy Efficiency: Engine of Economic Growth in Canada.* Retrieved from https://acadiacenter.org/wp-content/uploads/2014/11/ENEAcadiaCenter_EnergyEfficiencyEngineofEconomicGrowthinCanada_EN_FINAL_2014_1114.pdf

13 District of North Vancouver. (2019). *2018 Annual Report.* Retrieved from: https://www.dnv.org/sites/default/files/edocs/annual-report-2019.pdf

14 ibid.

15 David Suzuki Foundation. (2019). *Carbon Offsets.* Retrieved from https://davidsuzuki.org/what-you-can-do/carbon-offsets/

16 Green Alberta Energy. (n.d.). *Renewable Energy Certificate.* Retrieved from https://www.greenalbertaenergy.ca/renewable-energy-certificate.html

17 C40 Cities. (2019). *Defining Carbon Neutrality for Cities & Managing Residual Emissions.* Retrieved from: https://cdn.locomotive.works/sites/5ab410c8a2f42204838f797e/content_entry5ae2f900a2f4220ae645f016/5d00f8c85725540080fc93cf/files/Carbon_neutrality_guidance_for_cities_20190422.pdf?1560344893

18 Boston, A. (2018). *TransLink's renewable energy leadership a model for bus fleets throughout B.C.* Retrieved from: https://www.straight.com/news/1149321/alex-boston-translinks-renewable-energy-leadership-model-bus-fleets-throughout-bc

19 Province of British Columbia. (2018). *Provincial government puts B.C. on path to 100% zero-emission vehicle sales by 2040.* Retrieved from: https://news.gov.bc.ca/releases/2018PREM0082-002226

20 Intergovernmental Panel on Climate Change (IPCC). (2013). *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* Retrieved from: http://www.climatechange2013.org/

21 IPCC. (2018). *Annex I: Glossary.* Retrieved from https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg3-annex1-1.pdf

22 Natural Resources Canada. (2019). *Retrofitting.* Retrieved from https://www.nrcan.gc.ca/energy/efficiency/buildings/20707

23 ICLEI Canada. (2012). *Changing Climate, Changing Communities: Guide and Workbook for Municipal Climate Change Adaptation.* Retrieved from: www.icleicanada.org/resources/item/3-changingclimate-changing-communities

24 French, R. L. (2019). *Ground Source Heat Exchange.* Retrieved from http://geoexchange.sustainablesources.com

25 United States Environmental Protection Agency. (2019). *Overview of Greenhouse Gases.* Retrieved from https://www.epa.gov/ghgemissions/overview-greenhouse-gases

26 French, R. L. (2019). *Ground Source Heat Exchange.* Retrieved from http://geoexchange.sustainablesources.com

27 BC Hydro. (2019). *Cost Calculator.* Retrieved from https://www.bchydro.com/powersmart/residential/tools-and-calculators/cost-calculator.html

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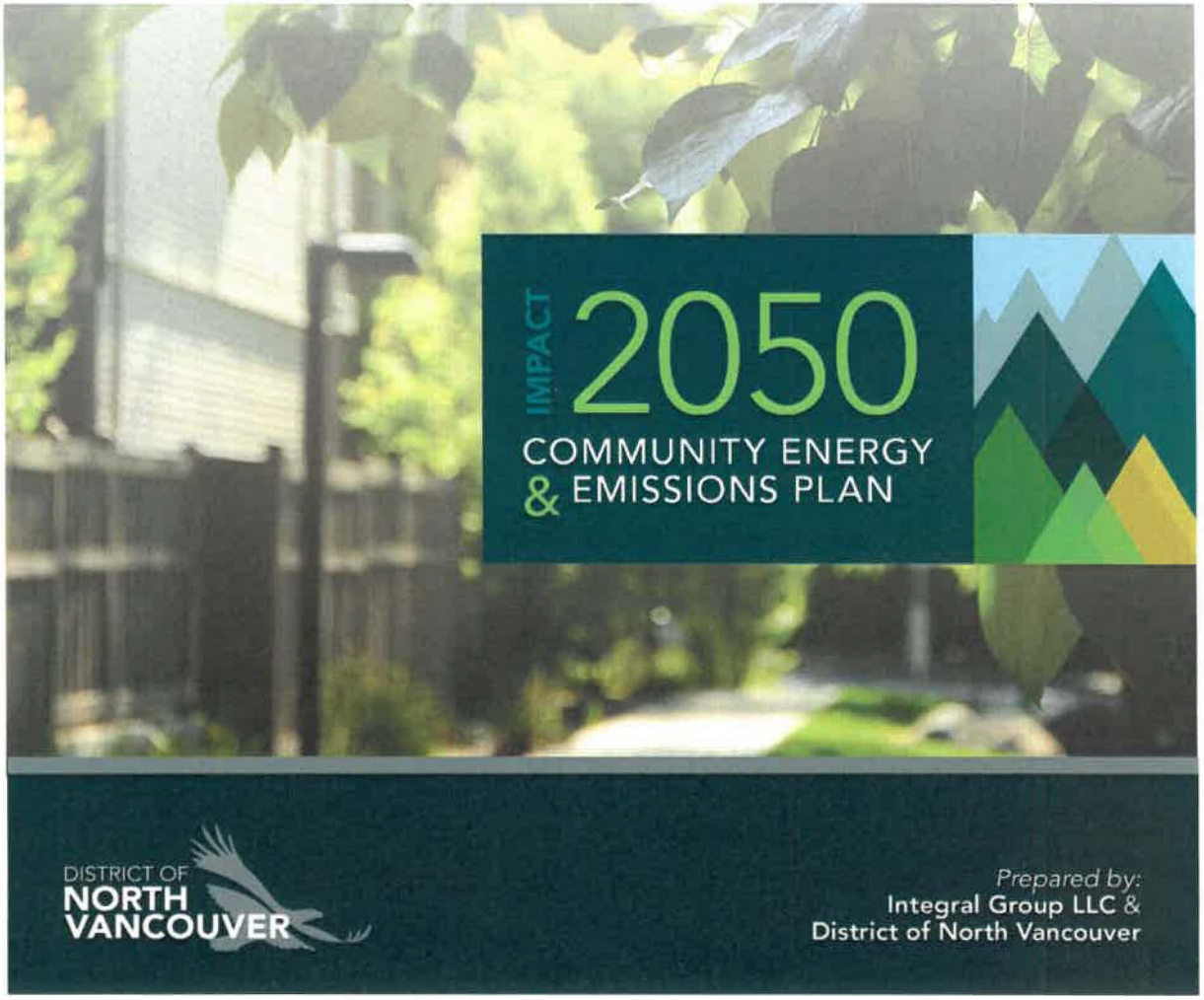
DISTRICT OF
NORTH
VANCOUVER

ATTACHMENT 2

IMPACT2050

List of Actions to Achieve Targets



TRANSPORTATION & LAND USE ACTIONS

No.	Category	Action	Action Type	Key Points	General Timeframe	Estimated 2030 Impact	Estimated 2050 Impact	Critical for Meeting 2030 Target?[1]	Builds Foundation for Meeting 2050 Target?[1]
1	Commute Trip Reduction	Transportation Demand Management (TDM) Ordinance	Regulation / Standard	• Develop measures to reduce single-occupancy-vehicle (SOV) travel; • Allow for clear monitoring and reporting requirements, and robust accountability	Short	High	High	X	X
2	Commute Trip Reduction	TDM for Major Trip Generators	Regulation / Standard Advocacy	• Work with large employers to establish TDM programs	Short	High	High	X	X
3	Commute Trip Reduction	Commute Trip Reduction (CTR) Law	Incentive	• Encourage employers over a certain size to implement CTR programs (transit subsidies, parking cash out, bicycle facilities, bicycle incentives, tele-commuting)	Short	Low	Moderate		
4	Commute Trip Reduction	Multimodal Infrastructure Requirements	Regulation / Standard	• Review requirements for on-street bicycle parking, end-of-trip facilities, car share and curbside loading zones	Short	Low	Low	X	
5	Commute Trip Reduction	Town & Village Centre TDM Programs	Funding	• Establish Town & Village Centre parking pricing and Parking Benefit Districts (PBD) and use proceeds for transit incentives	Short	High	Moderate	X	
6	Land Use/ Location	Town & Village Centre Density	Regulation / Standard	• Reduce parking minimums and establish parking maximums • Consider aligning density/height limits with significant trip reduction, housing affordability, and/or other community benefits	Short	Moderate	Moderate	X	X
7	Land Use/ Location	Town & Village Centre Essential Retail	Incentive	• Encourage developments to include a mix of stores and services so that vehicle use for daily needs can be reduced • Diversify uses in the periphery of Town & Village Centres and connect these areas to frequent transit and bicycle infrastructure	Short	Moderate	Low	X	
8	Land Use /Location	North Shore Job Creation	Advocacy	• Support efforts to create jobs on the North Shore (either inside or near DNV) and near transit • Support the role of large North Shore job generators • Prioritize affordable housing located on frequent transit	Short	Low	Moderate		
9	Land Use/ Location	Major Landholder Land Use/ Transportation Coordination	Advocacy	• Encourage increased compact/transit-oriented development in areas outside of the District's boundaries that have a major impact on travel behavior in DNV (e.g. Capilano University, Port)	Medium	Low	Low		

Timeframes: Short Term – 2020-2030 | Medium Term – 2030-2040 | Long Term – 2040-2050

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No.	Category	Action	Action Type	Key Points	General Timeframe	Estimated 2030 Impact	Estimated 2050 Impact	Critical for Meeting 2030 Target?[1]	Builds Foundation for Meeting 2050 Target?[1]
10	Land Use/ Location	Change Transportation Performance Metrics	Regulation / Standard Education Program	• Expand the current level of service analysis to ensure that reviews of performance metrics explore the extent to which developments include other road users (e.g. pedestrians, cyclists, transit users) in their transportation planning; ensuring that all transportation needs are addressed while still encouraging appropriate levels of density	Short	Supportive	Supportive		
11	Neighbourhood / Site Enhancements	Electric Assist Bicycle Promotion	Education Program	• Engage in a public awareness campaign on the utility of electric assist bicycles in a hilly community, partnering with local bicycle retailers • Explore establishing an electric-assist bicycle subsidy program	Short	Low	Low		X
12	Neighbourhood / Site Enhancements	Electric Assist Bike Share	Capacity Building	• Establish a bicycle share partnership on the North Shore that includes (or exclusively offers) electric-assist bicycles • Concentrate in Town & Village Centres and major transit exchanges	Short	Low	Low		
13	Neighbourhood / Site Enhancements	Improve Roadway Design at TransCanada Highway	Advocacy	• Partner with the BC Ministry of Transportation and Infrastructure (MOTI) to consider safety/comfort challenges at TransCanada Highway on/off-ramps for non-motorized travelers • Partner with others to consider revisions to MOTI or Transport Canada design guidelines for interfaces between limited-access highways and city streets	Short	Low	Low		X
14	Neighbourhood / Site Enhancements	Complete Marine Drive Improvements	Regulation / Standard	• Move forward on efforts to incorporate RapidBus on Marine Drive. Establish clear priority for transit and non-motorized travelers by distributing right-of-way space in accordance with priorities • Plan for and acquire right-of-way space opportunistically through re-development with the long term goal of Bus Rapid Transit Lite in mind	Short	Low	Low	X	
15	Neighbourhood / Site Enhancements	Neighbourhood Urban Trail Network	Regulation / Standard	• Establish safe and comfortable active transportation trail networks that provides provide links between major trip generators and especially between the Town & Village Centres/transit corridors and residential neighborhoods. • Implement infrastructure improvements that help calm or divert vehicle traffic on key non-arterial routes to prioritize safe and comfortable bicycle and pedestrian movement	Short	Moderate	Low	X	

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16	Neighbourhood / Site Enhancements	Safety Interventions at High-Injury Intersections	Funding	• Map high-injury corridors and intersections using collision data from the last five to 10 years. • Allocate annual funding for sidewalk and crosswalk improvements and/or traffic calming measures for high-risk intersections • Work with school board to continue safe routes to school program.	Short	Low	Low	X	
17	Neighbourhood / Site Enhancements	Develop Strategic Curb-Use Prioritization Framework	Incentive	• Better allocate curb spaces, especially in Town & Village Centres, to accommodate multi-modal travel and sharing of private vehicle rides (e.g. transit stops, vehicle loading, bicycle facilities, etc.)	Short	Supportive	Supportive		
18	Neighbourhood / Site Enhancements	Electrify Port Operations	Capacity Building	• Support the Port in its existing efforts to establish landside ship charging facilities that enable major cargo ships to turn off engines when berthed. • Establish truck recharging facilities for electric trucks.	Medium	Low	Low		
19	Parking	Development: TDM Parking Reductions	Regulation / Standard	• Increase the reductions in parking requirements for developers that invest in TDM, and have rates that vary based on proximity to transit/Town & Village Centres and other criteria	Short	High	High	X	
20	Parking	Development: Reduce Parking Minimums	Regulation / Standard	• ***Should follow establishment of a Residential Parking Permit (RPP) program to avoid spillover issues/address potential opposition*** • Reduce parking minimums District-wide	Short	High	Low		
21	Parking	Development: Implement Parking Maximums and Eliminate Minimums	Regulation / Standard	• Consider establishing maximum allowable parking ratios to steadily contain/reduce off-street parking supplies and incentivize the use of other modes.	Short	High	High	X	X
22	Parking	Unbundle Parking	Regulation / Standard	• Remove the cost of parking from the price of units or commercial spaces to highlight actual cost of parking reduce incentives to drive or own personal vehicles. • Unbundling parking decouples the price of the active space (the residential unit or commercial space) from the parking space, which allows tenants/owners to opt out of purchasing parking as an optional amenity.	Short	Moderate	Low	X	X

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23	Parking	Implement Residential Permit Parking (RPP) Program	Regulation / Standard	• Establish an RPP program for on-street parking, prioritizing areas around Town & Village Centres and new multi-family developments (where spillover parking might be a concern for nearby residents). • Enforce RPP program through bylaw services.	Short	Supportive	Supportive		X
24	Parking	Parking Management and Pricing	Regulation / Standard	• Establish parking pricing for all public parking resources in Town & Village Centres (on-street parking plus any publicly owned off-street lots) • Eliminate parking time limits and instead use pricing to encourage turnover and availability at peak times throughout the centres. • Establish parking benefit districts that directs proceeds toward street improvements and/or TDM programs in the centres.	Short	High	High	X	X
25	Road Pricing/ Management	Cross-Harbor Bridge Mobility Pricing	Advocacy	• Support regional efforts to establish mobility pricing • Support efforts to establish a mechanism to regularly adjust tolls to meet desired targets. • Support efforts to establish real-time information systems to communicate mobility pricing to test effectiveness of pricing system	Short	High	High	X	X
26	Road Pricing/ Management	Regional Mobility Pricing	Advocacy	• Support findings of Mobility Pricing Independent Commission to establish broader regional mobility pricing scheme to ensure consistency across municipalities.	Medium	Moderate	High		
27	Transit Network	Improve Capilano Road/Marine Drive Exchange	Funding	• Improve Capilano Road/Marine Drive Transit Exchange to make transfers from North Shore buses to regional buses as easy as possible.	Short	Low	Low	X	
28	Transit Network	Develop Regulations for Ride-Hail Services	Regulation / Standard Incentive	• Encourage ample loading and pick/up-drop/off curb spaces around transit exchanges • Allow and encourage both ride-hail and bike share companies in the DNV • Support efforts to ensure ride-hail vehicles are electric • Ensure ride hail and bike share companies share data with the municipality and/or region	Short	Low	Moderate	X	

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29	Transit Network	Transit Priority Measures	Regulation / Standard	• Identify where transit travel times are widest and implement measures that reduce wait times (e.g. transit-only lanes, queue jumps, transit-priority signals, etc.) • Implement southbound transit priority measures on Capilano Road and south of Highway 1 • Develop east/west frequent transit service along Marine Drive/3rd Street/Main Street to link the City with adjacent North Shore communities and surrounding region.	Short	Low	Low	X	
30	Transit Network	Facilitate Transit Priority Network	Regulation / Standard Education Program	• Communicate the trade-offs required to implement TransLink's Transit Priority Network with residents and BIAs • Trade-offs may include removing parking, reprioritizing roadway space, upgrading signals, etc.	Short	Moderate	Moderate		
31	Transit Network	Improve Transit Center Accessibility	Regulation / Standard Incentive	• Encourage increased use of transit and improve ease of access to non-automotive modes (e.g. bicycle, transit, drop-off, on foot) for first/last mile between home and transit • Allocate budget for or acquire funding for bicycle parking, bicycle share, and bicycle-tune-up stations at transit centers/exchanges • Ensure there is ample curb space to facilitate pickup/drop-off and support efforts to transition parking around exchanges into transit-oriented development	Short	Low	Low	X	
32	Transit Network	Pilot use of Driverless Shuttles for First Mile/Last Mile	Demonstration Project	• Consider using small, electric, shared driverless shuttles as a first-mile/last-mile gap between homes and transit stations once the technology is operating safely and efficiently. • Short-Term: Pilot the use of driverless shuttles along key routes for which there is currently not a high-frequency transit connection • Long-Term: Expand the use of driverless shuttles to serve larger low-density areas.	Short to Long	Low	Moderate		

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No.	Category	Action	Action Type	Key Points	General Timeframe	Estimated 2030 Impact	Estimated 2050 Impact	Critical for Meeting 2030 Target?[1]	Builds Foundation for Meeting 2050 Target?[1]
33	Vehicles	Support Robust Fuel Efficiency Requirements at Provincial/ National Level for Passenger and Commercial Vehicles	Advocacy	• Support provincial/federal efforts to extend and strengthen federal fuel efficiency and GHG (CAFE) standards; these standards are critical to meeting long-term targets. • Support provincial/federal efforts to extend and strengthen provincial low-carbon fuel standards; these standards are critical to meeting long-term targets	Short	Moderate	High	X	
34	Vehicles	Driverless Vehicle Policy-Making: Ensure Regulatory Action Encourages/ Requires Electrified, Shared Fleets	Regulation / Standard Advocacy	• Support provincial/federal efforts to implement electric vehicle subsidies and other purchase incentives. • In legislation authorizing autonomous vehicle operation in District of North Vancouver rights-of-way, encourage requirements that gradually require zero-emission vehicles for all ride-hailing services • Establish public-private partnerships with ride hailing service providers to utilize vacant and underused DNV land for interim or extended electric vehicle supply/charging stations and maintenance facilities.	Short	High	High		X
35	Vehicles	Transit: Support Efforts to Electrify the Transit Fleet	Advocacy	• Support regional efforts to explore funding sources to subsidize the procurement of electric buses and electric vehicle charging infrastructure by TransLink; push for use on routes serving the DNV. • Support TransLink in their efforts to create a long-term subsidy program for electric transit buses and electric vehicle charging infrastructure by 2020.	Medium	High	High		X
36	Data	Collect and analyze more detailed vehicle fleet data from ICBC	Capacity Building	• Request detailed vehicle fleet data from ICBC to obtain consumer preferences on vehicle types.This data can help the District staff make decisions that align with residents' needs (e.g. increasing EV adoption, developing vehicle sharing programs).	Short	Supportive	Supportive		X
37	Data	Monitor any changes in protocol methodologies	Capacity Building	• Continue to monitor changes to CEEI and other followed GHG protocol methodologies to account for new emissions sources and new assumptions around current emissions sources covered by the protocols.	Short	Supportive	Supportive		

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38	EV Adoption & Readiness	Establish an EV bulk buying program for local citizens and businesses	Advocacy	• Collaborate with auto dealerships and/or manufacturers to negotiate a bulk purchase price for electric vehicles • Seek opportunities to bundle EVs with other energy efficiency and zero-emissions energy equipment (e.g. ASHPs, solar panels, batteries)	Short	Low	Moderate		
39	EV Adoption & Readiness	Adopt EV-ready requirements for residential buildings and Office buildings	Regulation / Standard	• Require a minimum number of EV charging stations per number of parking spots for MURBs and Office buildings. • Require a minimum number of parking spots in MURBs and Office buildings to be EV charge-ready (e.g. installed conduits) • Require all garages to be level 2 EV charge-ready in SFDs and MURB units with private-access, unit-specific parking spaces	Short	Moderate	High		X
40	EV Adoption & Readiness	Adopt an EV-ready requirement for public parking lots	Regulation / Standard	• Require a minimum number of EV charging stations per number of parking spots for all public parking locations (pay and free)	Short	Moderate	High		X
41	EV Adoption & Readiness	Collaborate on EV actions with BC Hydro, other North Shore municipalities, and local university EV research groups	Capacity Building	• Maintain and develop partnerships to coordinate, plan, and implement actions to increase EV adoption and ensure community readiness • Work with BC Hydro's EV tool to identify available and high priority steps the District can take to promote adoption • Work with partners to understand EV adoption barriers and policy tools required to overcome those barriers • Coordinate with the other North Shore municipalities on promoting adoption and ensuring readiness for EV vehicles to ensure seamless provision of services.	Short	Moderate	High		X

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42	EV Adoption & Readiness	Establish a relationship with the North Shore Auto Mall and other new vehicle dealerships to collaborate in addressing adoption barriers	Capacity Building	• Work with North Shore Auto Mall and other vehicle dealerships to facilitate the transition to EVs, by targeting the source of where vehicle-purchase decisions are made • Communicate the importance of EV's in achieving GHG reduction targets to dealerships and identify opportunities to overcome barriers for EV sales • Work to develop and implement shared projects, including pilot projects, to address demand and some supply barriers	Short	Moderate	High		X
43	EV Adoption & Readiness	Advocate for the Provincial Government to implement a ZEV Mandate	Advocacy	• Advocate for the Provincial Government to implement a Zero Emission Vehicle (ZEV) Mandate similar to California's • California's mandate requires that a certain percentage of vehicles sold each year are classified as ZEV, and is the cornerstone of the state's ZEV (including EV) strategy • The Province previously enacted fuel efficiency legislation that includes a ZEV Mandate, but the legislation was superseded by Federal fuel efficiency and GHG regulations and the ZEV Mandate was never implemented	Short	Moderate	High		X

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BUILDINGS & ENERGY

No.	Category	Action	Action Type	Key Points	General Timeframe	Estimated 2030 Impact	Estimated 2050 Impact	Critical for Meeting 2030 Target? [1]	Builds Foundation for Meeting 2050 Target? [1]
44	New Construction	Adopt a phased approach from Step 3 to Step 5 + Zero Fossil Fuel for Part 9 residential buildings	Regulation / Standard	Adopt using the following schedule: • Step 3 in 2018 • Step 4 in 2020 • Step 5 + Zero Fossil Fuel in 2026* Amend the zoning bylaw to include GHG intensity (GHGI, kgCO2e/m2) requirements, either via Step Code relaxations or additional targets. Use the following schedule of GHGIs as a guide: • Step 3 <6.0 • Step 4 <3.0 • Step 5 =0.0	Short	Moderate	Moderate		X
45	New Construction	Adopt a phased approach from Step 2 to Step 4 + Zero Fossil Fuel for Part 3 residential buildings	Regulation / Standard	Adopt using the following schedule: • Step 2 in 2018 • Step 3 in 2020 • Step 4 in 2022 • Step 4 + Zero Fossil Fuel in 2026* Amend the zoning bylaw to include GHG intensity (GHGI, kgCO2e/m2) requirements, either via Step Code relaxations or additional targets. Use the following schedule of GHGIs as a guide: • Step 3 <6.0 • Step 4 <3.0 • Step 4 + Zero Fossil Fuel ≈0.0* **May be small amount of remnant natural gas required.*	Short	Moderate	Moderate		X

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46	New Construction	Adopt a phased approach from Step 2 to Step 3 + Zero Fossil Fuel for Part 3 commercial buildings	Regulation / Standard	Adopt using the following schedule: • Step 2 in 2020 • Step 3 in 2022 • Step 3 + Zero Fossil Fuel in 2026* Amend the zoning bylaw to include GHG intensity (GHGI, kgCO2e/m2) requirements, either via Step Code relaxations or additional targets. Use the following schedule of GHGIs as a guide: • Step 2 <6.0 • Step 3 <3.0, then ≈0.0* **May be small amount of remnant natural gas required.*	Short	Moderate	Moderate		X
47	New Construction	Apply a phased approach from Step 1 to Step 3 + Zero Fossil Fuel for small Retail, Service, and Restaurant buildings	Regulation / Standard	Apply this to all new construction and any substantial renovations of small retail, service, restaurant, and other commercial buildings. Use the following schedule: • Step 1 in 2020 • Step 2 in 2022 • Step 3 + Zero Fossil Fuel in 2026* Amend the zoning bylaw to include GHG intensity (GHGI, kgCO2e/m2) requirements, either via Step Code relaxations or additional targets. Use the following schedule of GHGIs as a guide: • Step 2 <6.0 • Step 3 ≈0.0* **May be small amount of remnant natural gas required.*	Short	Moderate	Moderate		X
48	New Construction	Apply a phased approach from Step 3 to Step 4 + Zero Fossil Fuel for Accommodation buildings	Regulation / Standard	Apply this to all new construction and any substantial renovations of accommodation (e.g. hotel) buildings. Use the following schedule: • Step 3 in 2020 • Step 4 in 2022 • Step 4 + Zero Fossil Fuel in 2026* **May be small amount of remnant natural gas required.*	Short	Low	Low		X

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49	New Construction	Apply Step 3 then Step 4 + Zero Fossil Fuel to new Education buildings	Regulation / Standard	Apply this to all new construction and any substantial renovations of K-12 school facilities. Use the following schedule: • Step 3 in 2020 • Step 4 + Zero Fossil Fuel in 2022 **May be small amount of remnant natural gas required.*	Short	Low	Low		X
50	New Construction	Apply Step 3 then Step 4 + Zero Fossil Fuel to new Institutional and Religious buildings	Regulation / Standard	Apply this to all new construction and any substantial renovations of institutional and religious buildings. • Step 3 in 2020 • Step 4 in 2024 Step 4 + Zero Fossil Fuel in 2026	Short	Low	Low		X
51	Existing Building Energy Performance	Implement a multi-decade building energy performance and retrofit program	Capacity Building Regulation / Standard Incentive	• Develop and resource permanent (until at least 2050) building energy performance and retrofit programs in partnership with private and non-government organizations • Launch program in 2020 targeting at least 1% of buildings (by building area) and achieving an average 20% energy use reduction. Maintain these rates for 5 years, then increase them according to the following schedule: o 2% of building area with average 25% energy use reductions starting in 2025 o 2% area at 30% reductions starting in 2030 o 2% area at 35% reductions starting in 2035 o 2.5% area at 40% reductions starting in 2040	Short to Long	Moderate	Moderate	X	X

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52	Existing Building Fuel Switching	Eliminate 95% of natural gas in education, institutional, and religious buildings through an ongoing third-party partnership program	Capacity Building Incentive	• Pursue a partnership with a private entity to develop, implement, and scale up fuel switching and electrification retrofits. • Explore bulk buy program and low-cost financing opportunities (alongside EVs) to reduce the first cost barrier • Beginning in 2020 and completing by 2040, systematically electrify HVAC, DHW, and cooking systems in existing buildings that rely on natural gas. • Switch to highly efficient heat pumps to reduce overall energy use and limit or avoid any increases in annual fuel costs from switching to more expensive electricity. • Align these retrofits with any other planned or required building work to reduce costs. As part of selling the program, focus on the opportunity to have summer cooling.	Short to Long	Moderate	High	X	X
53	Existing Building Fuel Switching	Eliminate 95% of natural gas consumed in Single Family Detached buildings through an ongoing third-party partnership program by 2050	Capacity Building Incentive	• Pursue a partnership organizations focused on providing low-cost financing for building energy projects, and organizations willing to provide discounts for bulk purchases. • Implement, refine, and scale up an ongoing fuel switching program developed to electrify HVAC, DHW, and cooking systems across detached single family buildings. • Get local energy and construction experts to conduct technical (for fuel switching), operational (for on-the-ground implementation), and financial analyses (for business model) to determine the most cost-effective, long-term approach to design, implement, and ramp up this program. • As part of selling the program, focus on the opportunity to have summer cooling.	Short to Long	Moderate	High	X	X

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54	Existing Building Fuel Switching	Eliminate 95% of natural gas consumed in other Part 3 and Part 9 Residential buildings by 2050	Capacity Building Incentive	• Use the same fuel switching retrofit model as outlined for single family detached buildings, and account for strata or corporate ownership of HVAC and DHW systems, plus shared infrastructure for cooking. Include any commercial spaces within mixed use residential buildings. • As part of selling the program, focus on the opportunity to have summer cooling.	Short to Long	Moderate	High	X	X
55	Existing Building Fuel Switching	Eliminate 80% of natural gas consumed in Part 3 and Part 9 Non-Residential buildings by 2050	Capacity Building Incentive	• Use the same fuel switching retrofit model as outlined for multifamily residential buildings, but focus on commercial buildings, including commercial buildings nested within mixed use residential buildings.	Short to Long	Moderate	High	X	X
56	Industrial Energy Performance	Actively and continuously collaborate with and support BC Hydro's ongoing industrial energy and emissions performance program	Capacity Building	• Build partnerships to establish an ongoing industrial energy performance program that reduces annual energy costs for local industrial businesses. • Work with local businesses to align retrofits with planned capital and maintenance programs to reduce overall net costs and operation disturbance. • Seek to achieve the equivalent of 20% average energy use reductions from 2.5% of existing industrial and light industrial buildings annually between 2020 and 2050.	Short to Long	Low	Moderate		
57	Industrial Fuel Switching	Establish a collaborative and ongoing industrial fuel switching performance program	Capacity Building	• Develop an ongoing fuel switching program to switch natural gas to electricity in existing industrial and light industrial buildings. • Work with local businesses to insert fuel switching actions into planned capital and maintenance programs to reduce overall net costs and operation disturbance. • Target the equivalent of 2.5% of existing industrial and light industrial building area each year.	Short to Long	Low	Moderate		X

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58	New Construction	Adopt Step 3 + Zero Fossil Fuel for all Non-Residential buildings classified as Light Industrial by 2030	Regulation / Standard	• Apply Step 3 + Zero Fossil Fuel to all new construction and any substantial renovations of light industrial buildings (subset of Part 3 Non-Residential) by 2030.	Medium to Long	Low	Low		X
59	Existing Building Fuel Switching	Monitor developments/innovations in existing building fuel switching programs in other jurisdictions	Capacity Building	• Fuel switching in existing buildings will be critical to achieving deep GHG reductions. • Monitor emerging practices on how to achieve the scale of retrofits needed, bring ideas to District for consideration, and participate in research and pilot projects for fuel switching.	Short to Medium	Moderate	High	X	X
60	Existing Building Energy Performance	Support and advocate for the development of building energy benchmarking	Advocacy	• Provincial building energy benchmarking provides valuable data for targeting and improving energy performance and fuel switching programs and helps reduce overall costs. • Support the enactment of a Provincial building energy benchmarking requirement.	Short	Low	High		X
61	New Construction	Target net-zero levels of energy performance and zero fossil fuels in all residential buildings in all Town & Village Centres	Regulation / Standard	• Use bylaws to push for all residential developments in the Town & Village Centres to target net-zero levels of energy performance, with zero dependence on natural gas and other fossil fuels for regular HVAC, DHW, or cooking needs.	Short	Low	Moderate		X

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62	New Construction	Target independence from fossil fuels, as well as net-zero energy performance where feasible, in all non-residential buildings in all Town & Village Centres	Regulation / Standard	• For non-residential buildings, apply the same strategy as used for residential buildings where feasible. • Focus more heavily on eliminating fossil fuel dependence and applying net-zero ready strategies to all non-residential developments to achieve best feasible energy performance. • Look for opportunities to pursue net-zero energy ready demonstration opportunities	Short	Low	Moderate		X
63	Capacity Building	Engage stakeholders and the public around a proposed strategic phase-in of the Step Code, with GHGI and zero fossil fuel requirements.	Capacity Building	• Engage stakeholders and the public about the District's planned/proposed/considered approach to phasing in the Energy Step (e.g. Part 9, Part 3 Residential) and specific building types (e.g. difference between commercial office and small retail). • Communicate importance of this work in achieving GHG reductions and meeting climate action targets. • Consult with local government and industry professionals closely involved in Provincial Step Code processes • Lean on tools and resources (existing and forthcoming) provided on the Energy Step Code website.	Short	Moderate	Moderate		X
64	Capacity Building	Develop an internal education and capacity building program around the need for fuel switching in existing buildings.	Capacity Building Education Program	• Educate staff and internal stakeholders regarding the scale of building decarbonization required to achieve the District's (prospective) climate targets. • Use best practice research on ongoing fuel switch retrofit programs to inform potential and existing programs. • Identify and assign 1-2 internal champions to driving and shaping the District's prospective approach, including specific actions and tools..	Short	Moderate	High	X	X

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65	Capacity Building	Engage internal stakeholders around the need to eliminate fossil fuels from new construction.	Capacity Building	• Collaborate with internal stakeholders working with the Step Code to ensure participation in any change management process through its adoption. • Educate staff and internal stakeholders regarding the need to include a GHG focus and shift to zero fossil fuel buildings to achieve the reductions needed to achieve the District's (prospective) climate targets. • Gather input on the phasing strategy being considered, potential opportunities and challenges, and needs to ensure a smooth implementation. • Use best practices to ensure a smooth transition through each level of the Step Code • Lean on tools and resources (existing and forthcoming) provided on the Energy Step Code website.	Short	Moderate	High		X
66	Capacity Building	Develop an external education and engagement series around the need for fuel switching in existing buildings.	Education Program	• Engage local industry and other stakeholders to communicate the importance of significant fuel switching retrofits and collaborate on potential opportunities, challenges, strategies, barriers, and needs. • Keep up with emerging technologies in other cities and apply in the DNV, where appropriate • Share best practices of large-scale, ongoing fuel switch retrofit programs to ground this need in potential and existing programs.	Short	Moderate	High	X	X
67	Energy Supply	Remove any district energy-ready requirements for new construction to instead allow for on-site low-carbon energy systems	Regulation / Standard	• Remove all reference to district energy and district energy-ready requirements from District bylaws to reduce confusion and encourage innovation in new construction projects • Allow and encourage the use of building-scale low-carbon energy systems to achieve zero emissions buildings	Short to medium	Low	Low		X

[1]- Items critical to meeting 2030 target but do not build the foundation for the 2050 target assumes actions can be completed in the short or medium term.

No.	Category	Action	Action Type	Key Points	General Timeframe	Estimated 2030 Impact	Estimated 2050 Impact	Critical for Meeting 2030 Target? [1]	Builds Foundation for Meeting 2050 Target? [1]
68	Energy Supply	Target increasing percentages of local renewable electricity generation	Regulation / Standard	• Consider removing permitting costs and other barriers to the installation on on-site renewable energy generation (e.g. solar PV) • Provide education, incentives and support for new and existing building owners and staff members to support the installation of on-site solar PV • Target a 5% penetration of local renewable electricity generation by 2030 • Target a 10% penetration of local renewable electricity generation by 2050	Medium to Long	Low	Low		
69	New Construction	Remove barriers and add incentives to constructing to higher levels of performance	Regulation / Standard	• Explore the use of floor area exclusions and other incentives to reduce the barrier/incentivize thicker building envelopes. • Consider allowing protrusions into the streetscape where necessary	Short	Low	Low		

[1]- Items critical to meeting 2030 target but do not build the foundation for the 2050 target assumes actions can be completed in the short or medium term.

Solid Waste

No.	Category	Acti	Acti Type	Key Points	General Timeframe	Estimated '2030	Estimated 2050	Critical for Meeting 2030 Target?[1]	B Foundation for Meeting 2050 Target?[1]
70	Waste Diversion	Achieve current MSW diversion target by 2025 and pursue new target by 2050		• Continue work to achieve 80% diversion rate for residential municipal solid waste (MSW) by 2025. • Establish and pursue a 95% diversion rate by 2050. • Use available data on waste stream composition to determine program targeting, with a primary focus on organics. • Conduct waste composition audits on MF and ICI buildings to determine priority areas of focus	Short	Low	Moderate		X
71	Waste Diversion	Pursue 2030 and 2050 streetscape diversion targets		• Establish two new streetscape waste diversion targets: min. 60% by 2030 and min. 75% by 2050. • Explore a streetscape pilot for multi-stream recycling containers and solar-powered compacting containers (RFP has been awarded for a baseline audit of District streetscapes) • Currently, the estimated diversion rate for streetscape waste in Metro Vancouver is around 40%, while a Metro Vancouver waste composition study estimates a total diversion potential of around 75%.	Short to Medium	Low	Low		
72	Waste Reduction and Diversion	Target an 80% ICI waste reduction target for 2040.		• Conduct waste composition audits on ICI to determine priority areas of focus • Work with Metro Vancouver to raise awareness on importance of waste reduction and diversion in the ICI sector • Set a target of reducing ICI waste disposed in landfills and the waste-to-energy facility by 80% by 2040.	Short to Medium	Low	Moderate		X
73	Waste Diversion	Improve waste diversion rates at drop-off locations	Education Program Capacity Building	• Set a target to reduce landfilled and incinerated waste by 40% by 2040 through diversion activities. • Develop education campaign on waste streams targeted at all drop-off location visitors. • Support setup and operational changes at drop-off locations to make diversion convenient.	Short to Medium	Low	Low		

[1]- Items critical to meeting 2030 target but do not build the foundation for the 2050 target assumes actions can be completed in the short or medium term.

No.	Category	Action	Action Type	Key Points	General Timeframe	Estimated 2030 Impact	Estimated 2050 Impact	Critical for Meeting 2030 Target? [1]	Builds Foundation for Meeting 2050 Target? [1]
74	Waste Reduction and Diversion	Push construction, land clearing, and demolition companies to cut waste disposal in half	Capacity Building	• Work with these companies to reduce landfilled organic waste by 50% by 2050 through changes in material selection and on-site waste diversion practices. Note that this only includes organics - there is already a wood waste ban in effect	Short to Medium	Low	Moderate		X
75	Landfill Methane Emissions	Increase methane capture at the Vancouver Landfill	Advocacy	• Support the continued expansion and refinement of the Vancouver Landfill methane gas capture infrastructure to reduce the GHG intensity by at least 20% by mid-century, preferably higher.	Short to Long	Low	Moderate		X
76	Monitoring and Data	Establish program to more accurately track ICI solid waste data	Capacity Building	• Work with Metro Vancouver to establish a new way to more accurately track institutional, commercial, and industrial solid waste disposal data for the District. • Decide on a proxy approach to estimating GHG emissions from ICI in the meantime.	Short	Low	Low		
77	Waste Diversion	Roll out multi-stream waste receptacles at all streetscape waste locations	Capacity Building	• Implement plan to roll out multi-stream waste receptacles (organics, multiple recycling, waste) at all streetscape waste locations. • Consider requiring multi-waste stations as a streetscape amenity provided by new developments. • Pilot multi-stream receptacles in busy business areas and transit corridors.	Short to Medium	Low	Low		
78	Waste Diversion	Push for multi-stream waste disposal options in all businesses with high organics use and waste potential	Advocacy	• Work with business (e.g. restaurants, grocery stores, malls, etc) that have high organics use but do not yet practice multi-stream waste disposal with organics. • For larger buildings (e.g. malls), promote the acquisition of on-site organics treatment to reduce hauling costs. • Investigate business license options (i.e. requiring waste management plans as part of business license applications)	Short to Medium	Low	Moderate		X
79	Waste Diversion	Push all multifamily buildings to offer multi-stream waste disposal	Advocacy	• Connect with building owners and managers of MF buildings to identify which buildings do not yet offer multi-stream waste disposal including organics. • Promote multi-stream diversion to these buildings and offer information and tools to support the implementation of a modern waste diversion system.	Short to Medium	Low	Moderate		X

[1]- Items critical to meeting 2030 target but do not build the foundation for the 2050 target assumes actions can be completed in the short or medium term.

No.	Category	Action	Action Type	Key Points	General Timeframe	Estimated 2030 Impact	Estimated 2050 Impact	Critical for Meeting 2030 Target? [1]	Builds Foundation for Meeting 2050 Target? [1]
80	Waste Reduction and Diversion	Adopt a green demolition bylaw for DLC waste	Regulation / Standard	• Clean wood is already banned from entering into the landfill through the current clean wood waste ban. Adopting a green demolition bylaw for of DLC waste will further reduce this waste stream in landfills. • The green demolition bylaw will require a minimum percentages of demolition waste to be recycled.	Short to Long	Low	Moderate		X

[1]- Items critical to meeting 2030 target but do not build the foundation for the 2050 target assumes actions can be completed in the short or medium term.

Urban Forestry

No.	Category	Action	Action Type	Key Points	General Timeframe	Estimated 2030 Impact	Estimated 2050 Impact	Critical for Meeting 2030 Target? [1]	Builds Foundation for Meeting 2050 Target? [1]
81	Building Shading	Ensure final Town & Village Centre development plans use trees to shade buildings in summer to reduce cooling needs.	Regulation / Standard	• Trees provide shading to buildings, which in turn reduces energy required for summer cooling. • Develop a tree planting strategy for all Town & Village Centres that shades buildings to support neighbourhood-specific building energy performance targets. • Align this with work to reduce urban heat island effect and other climate change adaptation activities.	Short	Low	Low		
82	Urban Forest/Tree Policies/Bylaws	Update existing tree policies and requirements to maximize and maintain GHG sequestration.	Regulation / Standard	• Establish rules related to tree diameters, species, maintenance, and replacement to establish a significant urban tree canopy. • Select local species based on their rate of sequestration during growth and at maturity, managing existing trees over a certain diameter, and establishing a process to cost-effectively replace trees when needed	Short	Low	Low		
83	Building Shading	Where needed, augment all Town & Village Centre Plans to include requirements to strategically provide shading for buildings and pedestrians.	Regulation / Standard	• Augment Town & Village Centre Plans to require that new developments include tree canopy/tree siting plans to passively shade buildings in the summer and reduce the temperatures experienced by pedestrians. • Align this with other climate change adaptation activities.	Short	Low	Low		

[1]- Items critical to meeting 2030 target but do not build the foundation for the 2050 target assumes actions can be completed in the short or medium term.

Governance & Execution

No.	Category	Action	Action Type	Key Points	General Timeframe	Estimated 2030 Impact	Estimated 2050 Impact	Critical for Meeting 2030 Target? [1]	Builds Foundation for Meeting 2050 Target? [1]
84	Community/ Political Support	Establish an approach to support Mayor and Council with information and data to support CEEP implementation	Capacity Building	• Ensure that Mayor and Council receive factual data and information regarding strategy and action costs, benefits, roles, and fit in the overall CEEP, OCP, and vision of a sustainable DNV • Support District leadership in understanding trade-offs and responding to community and stakeholder concerns that may delay or derail short term decisions required for medium and long term success and goal achievement • Help provide District leadership a clear understanding of the overall strategic focus and benefits, along with the types of changes and transitions required to realize those benefits	Short	High	High	X	X
85	Community/ Political Support	Develop a repository of messages to support District leadership communicating benefits associated with CEEP implementation	Capacity Building	• Develop data points on non-climate benefits (e.g. social, ecological, health) that will emerge from CEEP strategies and actions, supported by financial and climate benefits and costs • Update and adjust the info and data annually, as needed • Develop a communication strategy to better package the information and data arising from CEEP. • Ensure communication strategy addresses messages the most critical community and stakeholder issues (e.g. congestion, densification) • Use this to support individuals in District leadership positions to communicate about, defend, and generate support for CEEP strategies and actions	Short	Moderate	Moderate	X	X

[1]- Items critical to meeting 2030 target but do not build the foundation for the 2050 target assumes actions can be completed in the short or medium term.

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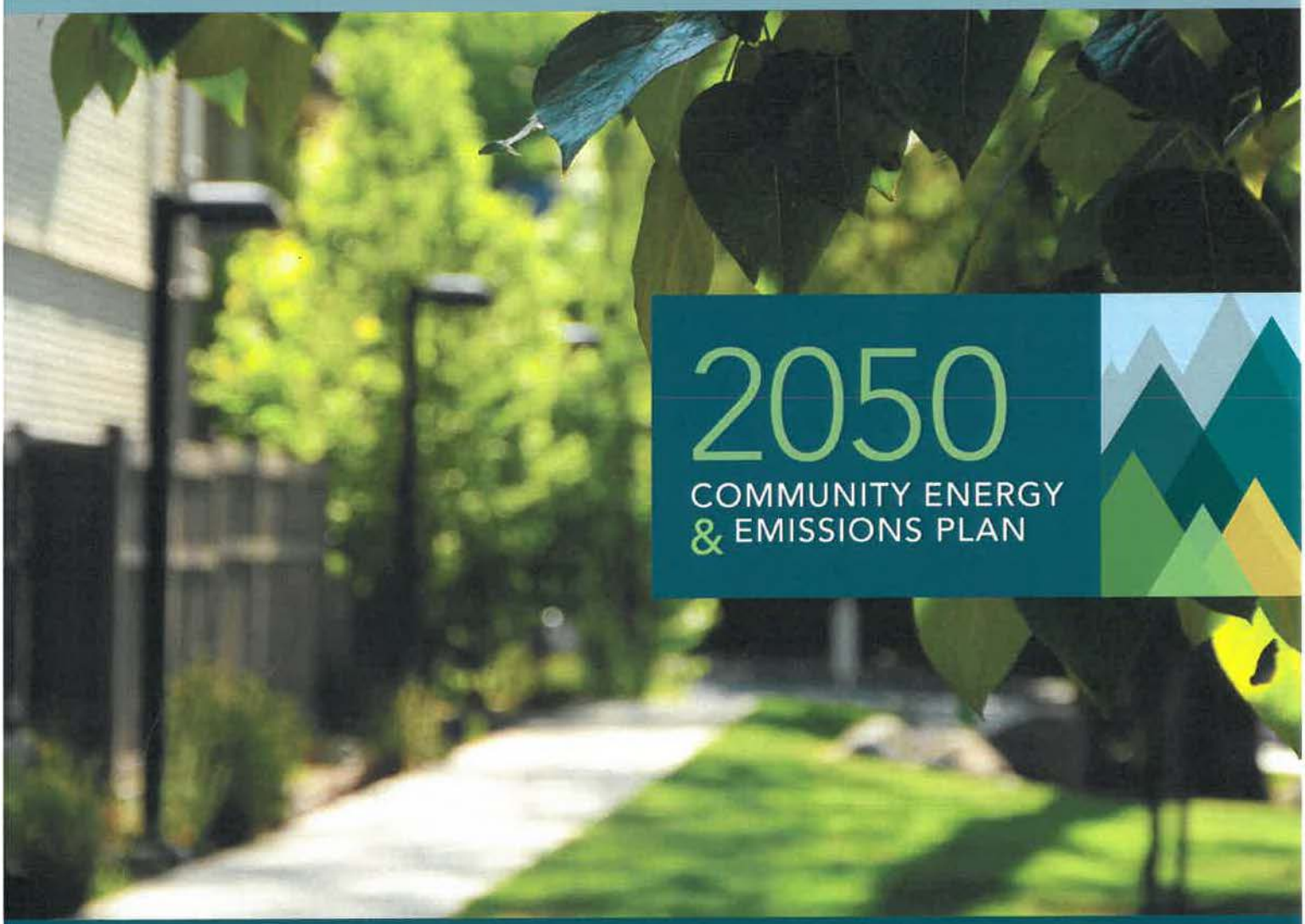
ATTACHMENT 3

Community Energy & Emissions Plan

PHASE 2 STAKEHOLDER & PUBLIC ENGAGEMENT SUMMARY

JULY 2018



DISTRICT OF NORTH VANCOUVER

INTEGRAL GROUP

DNV.org/CEEP

1. Introduction

The District of North Vancouver is developing a Community Energy and Emissions Plan (CEEP) to help reduce carbon emissions and become a more energy efficient community.

In February 2018, we met with members of the public and key stakeholder organizations to discuss the plan and help generate ideas. This summary explains how these ideas have shaped the actions that will be included in the CEEP.

We've also highlighted the key strategies that will help the District meet our climate targets. In addition to meeting energy use and emission reduction goals, the actions that the DNV is exploring also support the achievement of the District's goals to improve the health and well-being of its residents. These co-benefits have been identified using Happy City's Urban Happiness framework, which draws on leading research in the field of health and wellbeing to help local governments create urban environments that foster happier, healthier, more fulfilling lives for their communities.

The framework consists of eight core elements, each of which are defined below.

Joy
Maximize the pleasure and minimize the pain of urban experience.

Health
Enable, encourage, and reward healthy choices and active mobility.

Equity
Offer access and opportunity across the spectrum of human diversity.

Ease
Help the people who use or move through spaces experience a greater sense of control, comfort, and agency.

Resilience
Encourage the ecological, economic, and cultural diversities that help communities and ecosystems stay strong over the long term.

Meaning
Support community efforts to build lives of collective higher purpose.

Belonging
Instil people with a greater sense of attachment, ownership, and pride of place

Sociability
Promote positive relationships, enable social time, and facilitate trust-building encounters.

Happy City

2. Transportation and Land use

Key CEEP Strategies

- Reduce the number of vehicle trips taken in the District using Transportation Demand Management strategies (e.g. parking fees, bicycle facilities, transit subsidies)
- Ensure new developments are designed to be "complete communities" that allow living, working, and playing in the same place
- Use thoughtful neighbourhood and site design strategies to improve pedestrian and cyclist safety (e.g. traffic calming infrastructure such as intersection diverters) and enhance access to multimodal transportation systems (e.g. allocate more curb space to transit stops and bicycle facilities)
- Support Metro Vancouver's efforts to manage congestion with mobility pricing (e.g. parking fees, transit fares, road usage charges, etc.)
- Improve the efficiency of the transit network and service level through the use of "priority" measures (e.g. transit-only lanes) and improved accessibility (drop-off space, bicycle parking at major stops/exchanges)
- Advocate for provincial/federal Vehicle Emissions Standards to improve fuel efficiency and reduce carbon emissions
- Promote electric vehicle (EV) adoption by exploring bulk buying programs and advocating for a provincial Zero Emission Vehicle (ZEV) mandate
- Ensure EV readiness by requiring EV charging stations in residential and office buildings and public parking lots

What we heard

The DNV should work to:

- Ensure the creation of safe walking and cycling routes for children travelling to school
- Implement strategies to increase EV adoption
- Increase density in single family residential zones to improve affordability and build closer communities
- Implement densification in a way that doesn't impact the District's liveability or beauty
- Reduce parking requirements/allowances in buildings and for areas close to transit, cycling, or pedestrian infrastructure
- Build bike paths on all major roads and bridges designed to All Ages and Abilities (AAA) standards
- Promote shorter work days to provide residents with more time
- Consider the impact of autonomous vehicles on future transit use
- Encourage active transportation infrastructure (e.g. bike or stroller parking) across the District
- Improve transit services

Co-benefits

Happy City

3. Buildings and Energy

Key CEEP Strategies

- Phase in the new BC Energy Step Code for all new construction
- Implement a Building Retrofit program to improve efficiency and comfort levels in existing building stock
- Eliminate fossil fuel dependence (via fuel switching)

What we heard

The DNV should work to:

- Implement the BC Energy Step Code as quickly as possible while ensuring costs aren't too high
- Prohibit bylaws banning line-drying laundry outdoors in multi-family buildings
- Carefully consider the limited solar potential of solar energy alongside future electrical demand (i.e. from increased EV adoption)
- Explore online energy audit software (e.g. Snugg)
- Incentivize building retrofits (e.g. through property tax reductions)
- Encourage energy efficiency by highlighting benefits to comfort, water, waste, health, and safety
- Encourage housing developers near the Port to build to Passive House equivalent levels to improve indoor air quality
- Find a way to work with FortisBC on actions and opportunities to reduce natural gas consumption
- Identify means of shortening payback periods for building upgrades and solar installations

Co-benefits

4. Solid Waste

Key CEEP Strategies

- Set new Municipal Solid Waste Diversion Targets
- Expand organics collection programs (MURBs, commercial)
- Explore wood waste bans

What we heard

The DNV should work to:

- Require the use of multi-stream waste sorting spaces in all new multi-family buildings
- Find ways to better manage and enforce waste reduction in the Demolition, Land Clearing, and Construction (DLC) sector

Co-benefits

5. Urban Forestry

Key CEEP Strategies

- Increase seasonal shading of buildings and active transportation routes with urban forestry
- Establish urban forestry management bylaws

What we heard

The DNV should work to:

- Protect urban forestry canopy to help the District adapt to temperature increases as the climate warms

Co-benefits

6. General Comments

What we heard

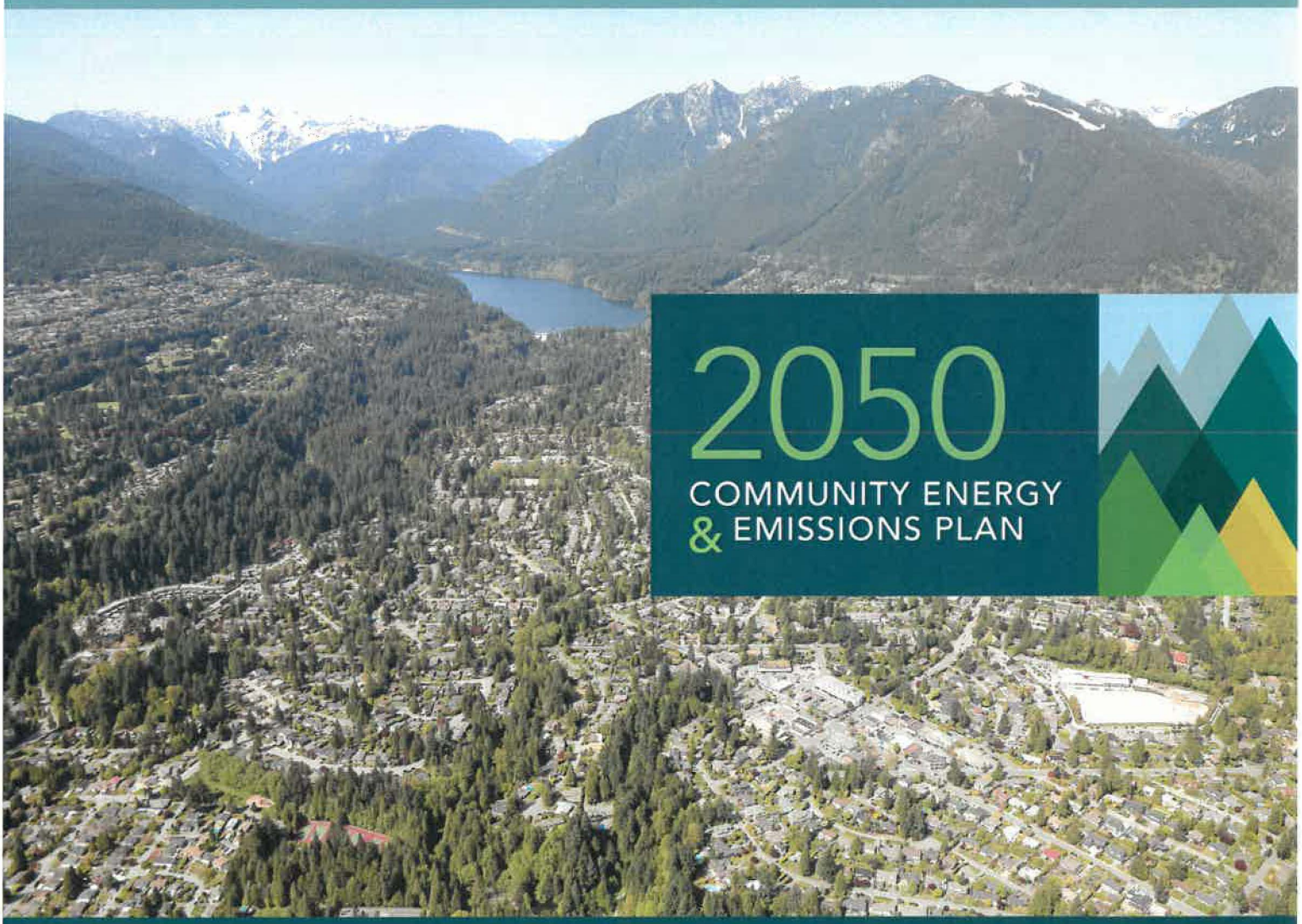
- Incentives should be aligned to ensure they result in low emissions outcomes, not just energy reductions
- Existing tools (e.g. community energy explorer website, thermal imaging, solar roof maps, etc.) should be used to engage residents
- Engagement and solutions should target a broad spectrum of residents
- CEEP messaging should be translated into multiple languages to engage the whole community
- Education should be provided on the benefits of active transportation
- Stories and images (not just data) should be used to demonstrate to the community the broad range of benefits the CEEP will bring to the District (focussing on quality of life and community building)

ATTACHMENT 4

Community Energy & Emissions Plan

PHASE 4 SURVEY RESPONSE SUMMARY

JANUARY 2019



DISTRICT OF NORTH VANCOUVER

INTEGRAL GROUP

DNV.org/CEEP

EXECUTIVE SUMMARY

This report summarizes the input received on the draft actions in the fourth phase (development of a draft plan) of the Community Energy and Emissions Plan (CEEP). The CEEP will serve to guide the actions we will take as a community to mitigate climate change by reducing our energy use and greenhouse gas emissions. Council directed staff to engage the public and gather input on the proposed actions.

Feedback was gathered through an online public survey, which was open for three weeks between September and October, 2018. In total, 152 completed survey responses were received.

WHAT WE HEARD

The following points summarize the key results and themes of the feedback received through the online survey:

- actions to reduce transportation related emissions were the most important to respondents
- support was highest for the following actions in each category:
  - enhancing the transit experience *(Transportation and Land Use)*
  - improving new commercial building efficiency *(Buildings and Energy)*
  - expanding the organics and recycling programs *(Solid Waste)*
  - planting additional trees on active transportation routes *(Urban Forestry)*
- in the comments for each category, the most frequently mentioned themes were:
  - concerns about cost implications and cost-benefit ratio for some of the actions;
  - prioritize public transit improvements;
  - reduce waste at its source: excess packaging and single-use items;
  - make tree removal more difficult and incentivize tree preservation; and
  - reduce congestion and provide more, better transportation alternatives.

Overall, there was broad support for many of the proposed actions. All of the actions mentioned in the survey were supported or strongly supported by at least 60% of respondents. With half of the proposed actions (11 actions out of 22) supported or strongly supported by more than 75% of respondents.

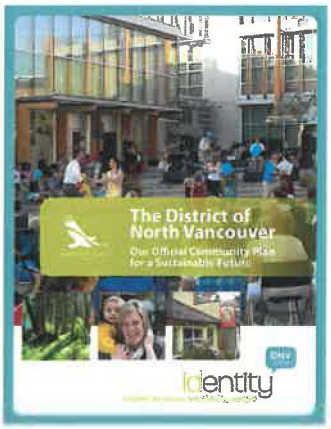
TABLE OF CONTENTS

1.0 CONTEXT

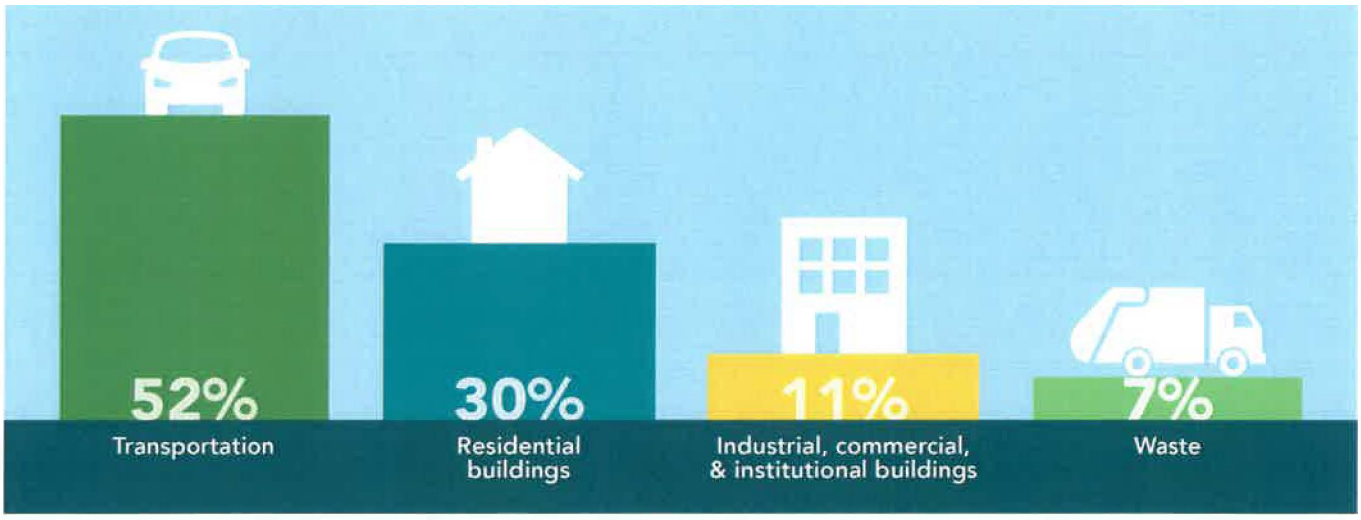
One of the strategic directions of the District's Official Community Plan (OCP) is to reduce the environmental footprint of our community. The target set out in the OCP is to reduce community greenhouse gas emissions by 33% by the year 2030. Once completed, the Community Energy and Emissions Plan (CEEP) will serve to guide the actions we will take as a community to reduce our energy use and greenhouse gas emissions.

The CEEP will focus on mitigating climate change at its source on a local scale, and will complement the District's existing Climate Change Adaptation Strategy and (Corporate) Strategic Energy Management Plan.

Throughout the development of the CEEP, various stakeholder groups have been engaged. This report summarizes the feedback that was received from the public through the final round of consultation that occurred in fall 2018.



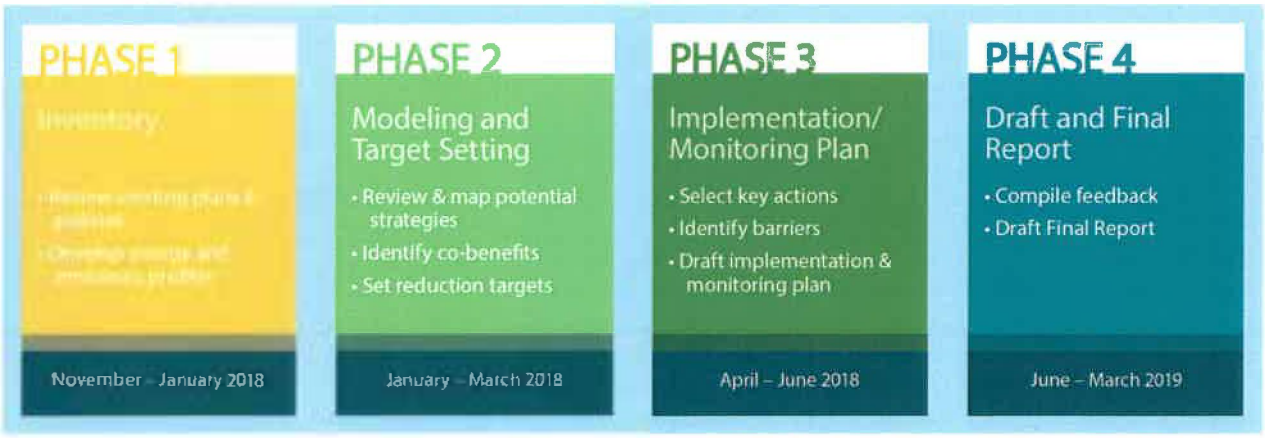
District of North Vancouver's Official Community Plan



The District's top four sources of carbon emissions

2.0 PROCESS

The community energy and emissions planning process began in November 2017, and included four phases, as shown below. This report summarizes the feedback received during the fourth and final phase of this process.



The four phases of the community energy and emissions planning process

3.0 OPPORTUNITIES FOR INPUT

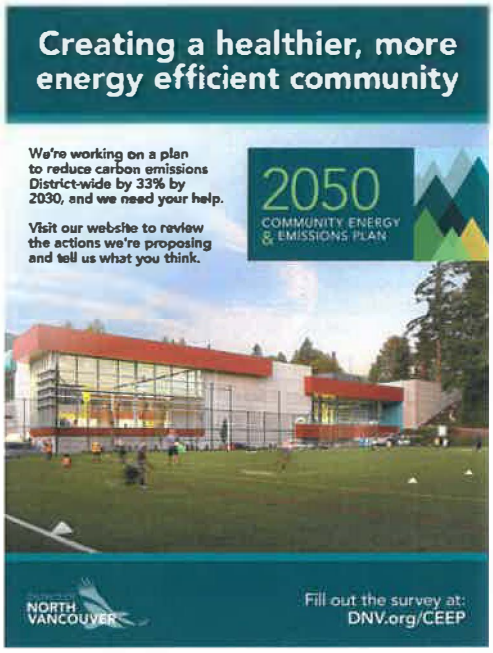
Throughout the process of developing and refining the CEEP, there were opportunities for the public and stakeholders to provide feedback, including a public conversation to gather ideas.

Engagement at prior stages included gathering feedback on key goals and action items at four key events at District Hall: a public information/idea generation session, a stakeholder workshop, and three Inter-Departmental Staff Committee workshops. A detailed summary of feedback collected in Phase 2 can be found at *DNV.org/CEEP*.

In the fourth and final phase of the process, the public was asked to provide feedback on proposed actions that, if implemented, would reduce our community's energy use and emissions. This feedback was gathered through an online public survey.

Online Public Survey

Public engagement can occur across a range of participation levels, from informing to empowering. Different levels of engagement are appropriate at different times and for different projects. The goal for this phase of engagement on the CEEP was to obtain public feedback on alternatives, which corresponds to the 'Consult' level on the International Association for Public Participation's (IAP2) Spectrum of Public Participation. This means that we will keep you informed, and listen to and acknowledge your concerns and aspirations in developing final solutions. We will also report back to you on how your input influenced the decision.



Poster advertising survey

3.1 ENGAGEMENT NOTIFICATION

We used several methods of communicating the opportunities for input, including:

- District's website (*DNV.org)* and social media (Facebook and Twitter);
- School District 44's social media (Facebook and Twitter);
- North Van Recreation & Culture website and social media (Facebook and Twitter); and
- North Vancouver District Public Library website and social media (Facebook and Twitter).

3.2 ONLINE SURVEY

The online survey asked for input on proposed actions to reduce energy use and emissions in the District of North Vancouver. It was open for three weeks on the District website, *DNV.org/CEEP*, from September 27, 2018 to October 19, 2018. In total, 152 survey responses were received.

4.0 WHAT WE HEARD

4.1 ONLINE SURVEY

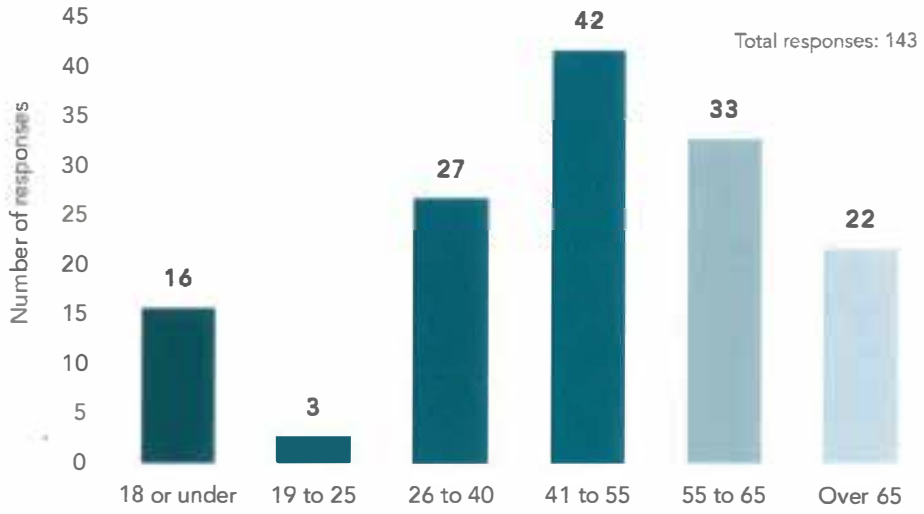
There were 152 respondents to the online survey. The number of responses to each question may vary because respondents may have chosen not to answer every question.

In the survey, background information was provided to give respondents context for each question. The background information for each question is summarized in this report, and accompanies each set of related questions.

4.1.1 Demographics

Survey respondents were from a range of age groups, with the highest percentage (29%) indicating they were between the ages of 41 to 55.

Age distribution of survey respondents



4.1.2 TRANSPORTATION AND LAND USE

Transportation accounts for more than 50% of our carbon emissions, making it a critical area for action. Taking action to reduce transportation related emissions also results in co-benefits such as increased health, reduced air pollution, safer streets for cyclists and pedestrians, and more vibrant communities.

How important is this series of actions to you?

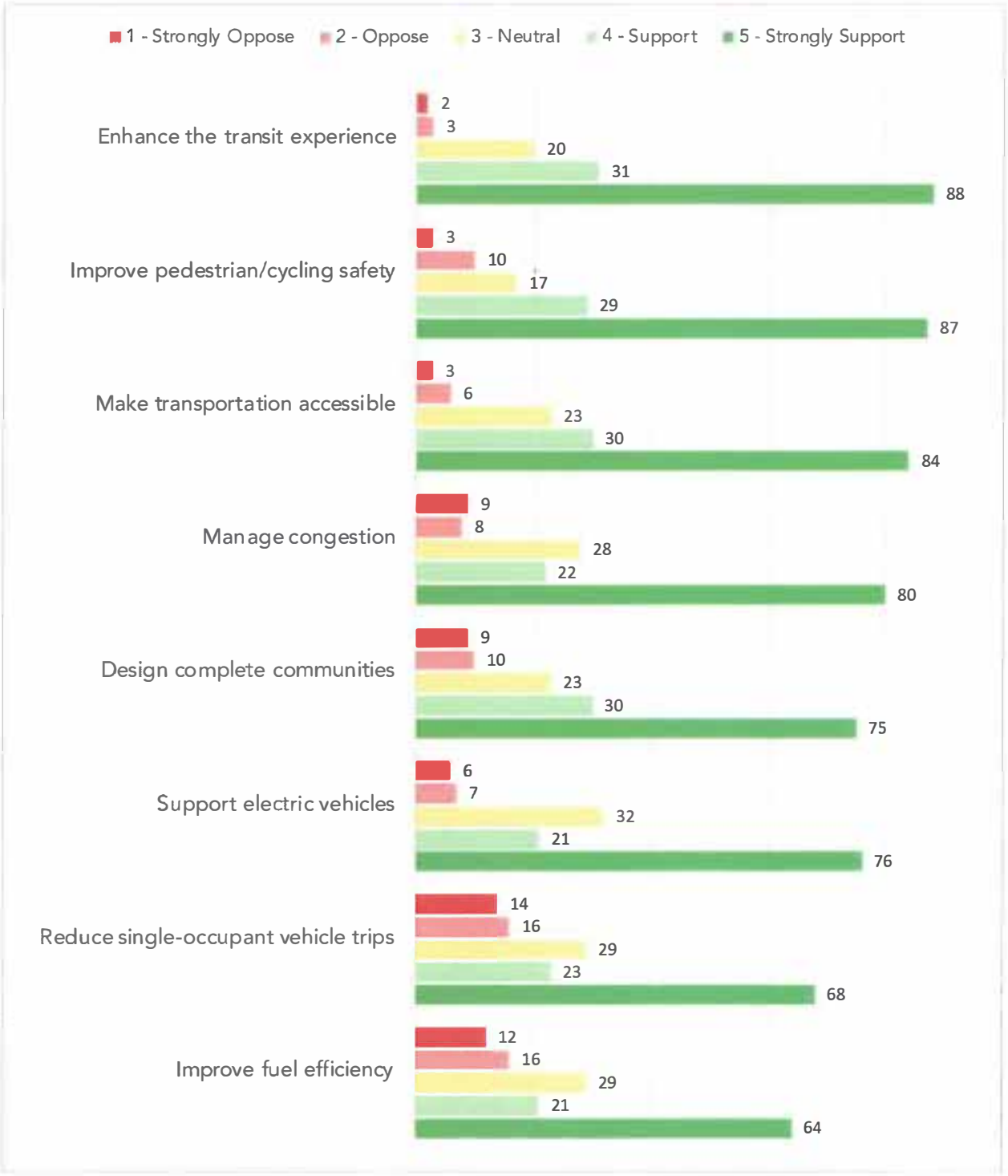
A total of 80% of respondents rated this series of actions as *important (4)* or *very important (5).* This set of actions was the most important set of actions to respondents.

What is your level of support for these actions?

Respondents ranked their level of support for each of the following actions. They are listed in order from most supported to least supported:

1. Enhance the transit experience *(83% support or strongly support)*
2. Improve pedestrian/cycling safety *(79% support or strongly support)*
3. Make transportation accessible *(78% support or strongly support)*
4. Design complete communities *(71% support or strongly support)*
5. Manage congestion *(69% support or strongly support)*
6. Support electric vehicles *(68% support or strongly support)*
7. Reduce single-occupant vehicle trips *(61% support or strongly support)*
8. Improve fuel efficiency *(60% support or strongly support)*

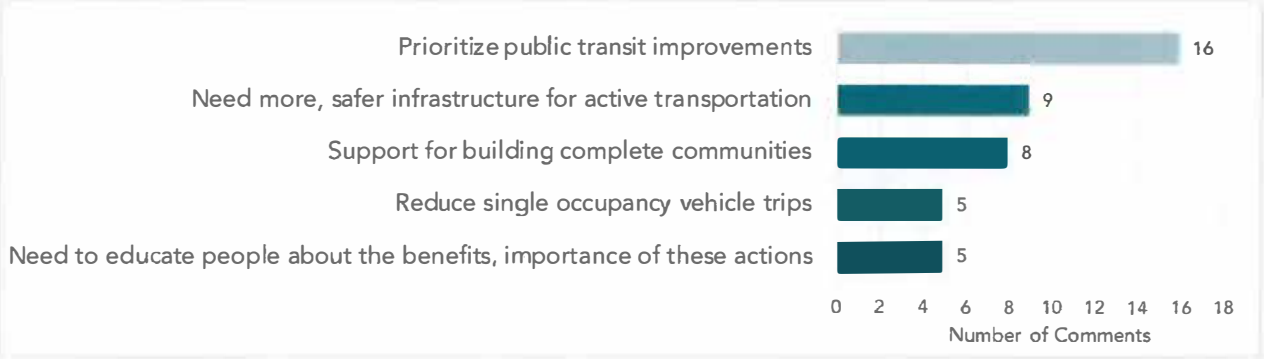
What is your level of support for these actions?



Do you have any additional comments about these actions?

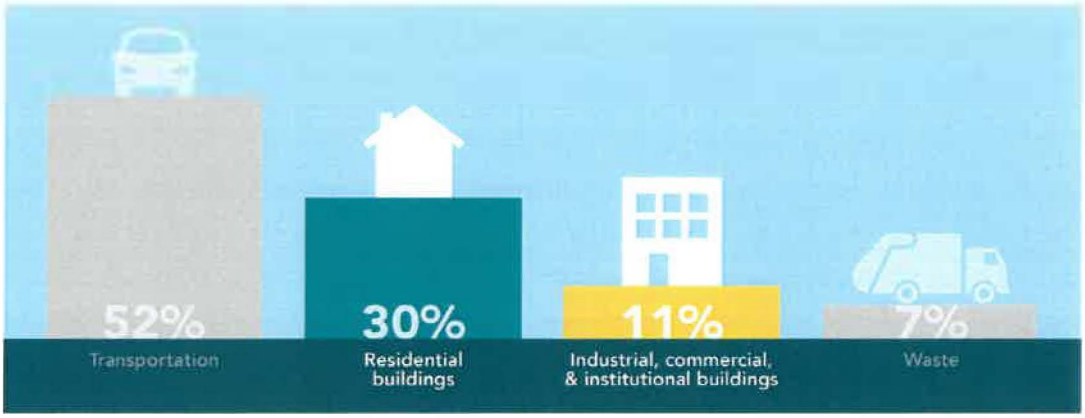
In total, 91 comments were received. The five most commonly mentioned themes were:

Five most common themes for comments on the proposed actions related to transportation and land use



4.1.3 BUILDINGS AND ENERGY

Energy use in residential, industrial, commercial, and institutional buildings accounts for more than 40% of carbon emissions, a large proportion of total carbon emissions in our community. Taking action to reduce energy use in buildings also results in co-benefits such as improved air quality, reduced risk of heat related health issues, and reduced heating costs.



How important is this series of actions to you?

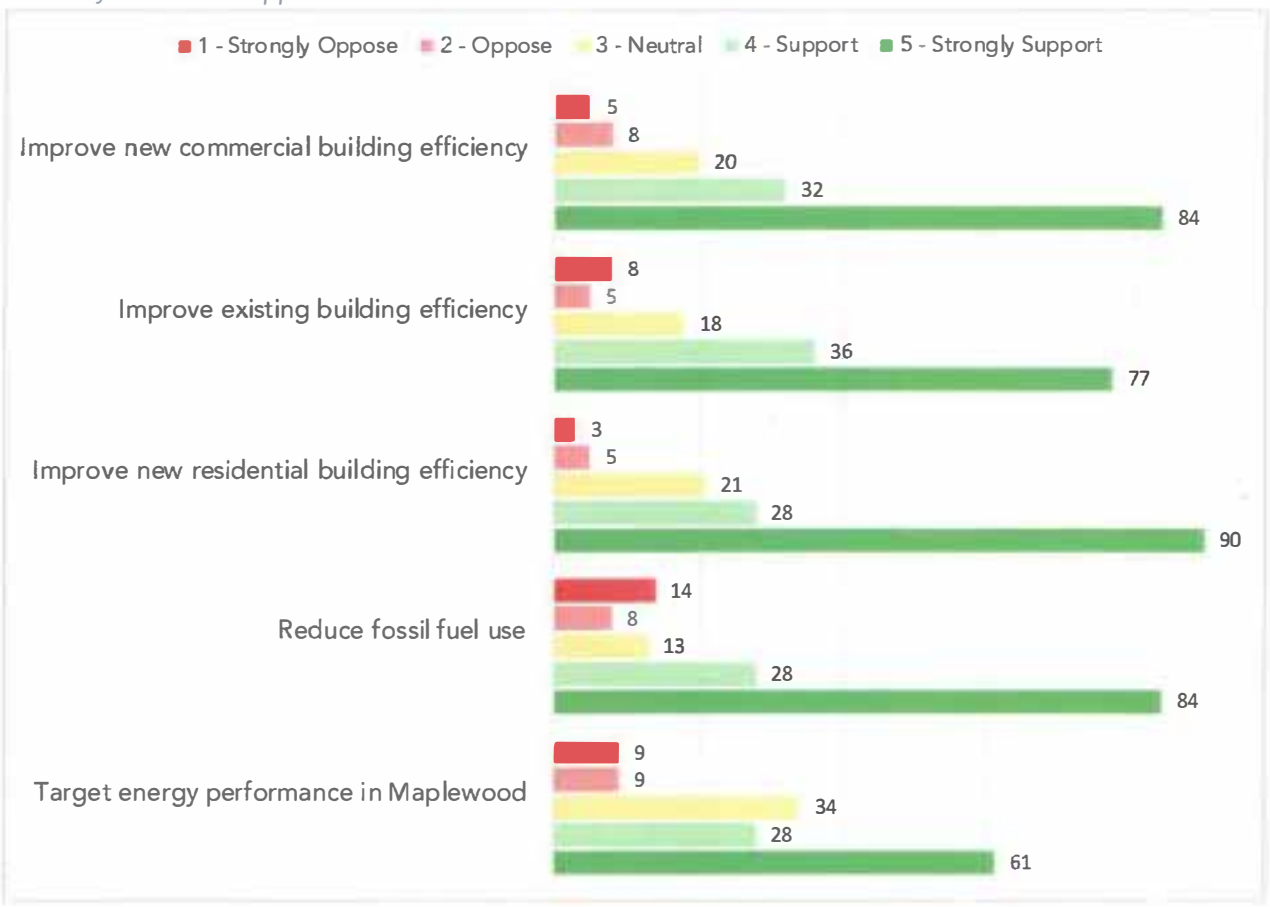
A total of 75% of respondents rated this series of actions as *important (4)* or *very important (5)*. This set of actions was the second most important set of actions to respondents.

What is your level of support for these actions?

Respondents ranked their level of support for each of the following actions. They are listed in order from most supported to least supported:

1. Improve new commercial building efficiency *(80% support or strongly support)*
2. Improve existing building efficiency *(78% support or strongly support)*
2. Improve new residential building efficiency *(77% support or strongly support)*
4. Reduce fossil fuel use *(76% support or strongly support)*
5. Target energy performance in Maplewood *(63% support or strongly support)*

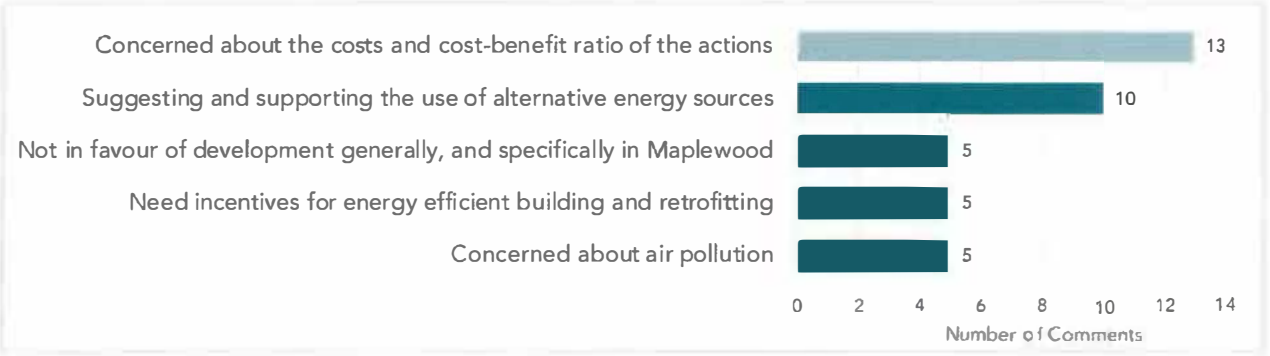
What is your level of support for these actions?



Do you have any additional comments about these actions?

In total, 60 comments were received. The five most commonly mentioned themes were:

Five most common themes for comments on the proposed actions related to buildings and energy



4.1.4 SOLID WASTE

Waste represents a small but significant portion of our community's carbon emissions. Energy is spent collecting and dealing with waste, and decomposing waste in our landfill is a significant source of methane; a powerful greenhouse gas. We can reduce emissions by reducing waste sent to the landfill and lowering the emissions generated from waste. Taking action to reduce waste also results in co-benefits such as a heightened sense of community pride, a greater sense of purpose among community members, and less time spent sorting waste.

How important is this series of actions to you?

A total of 73% of respondents rated this series of actions as *important (4)* or *very important (5)*. This set of actions was rated the same level of importance as those related to Urban Forestry.

What is your level of support for these actions?

Respondents ranked their level of support for each of the following actions. They are listed in order from most supported to least supported:

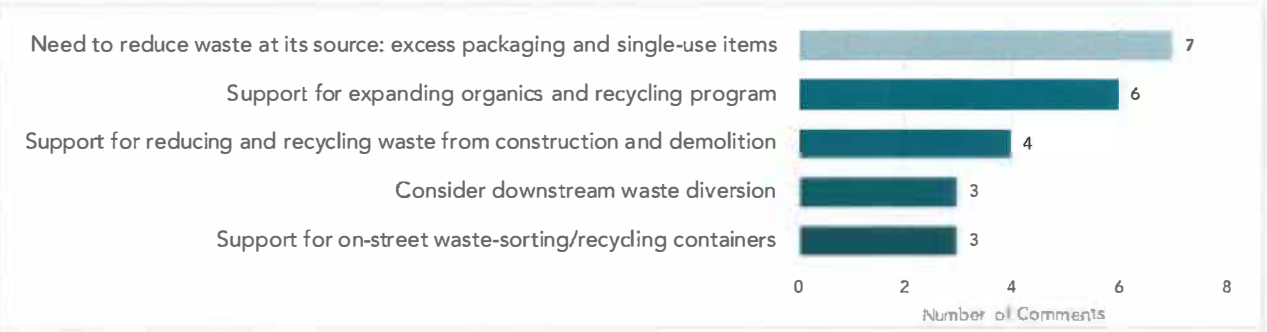
1. Expand organics and recycling programs *(82% support or strongly support)*
2. Reduce materials from construction and demolition *(80% support or strongly support)*
3. Set higher waste diversion targets *(74% support or strongly support)*
4. Increase methane capture *(74% support or strongly support)*
5. Install on-street waste sorting containers *(67% support or strongly support)*
6. Explore wood waste bans in landfills *(62% support or strongly support)*

What is your level of support for these actions?

Do you have any additional comments about these actions?

In total, 31 comments were received. The five most commonly mentioned themes were:

Five most common themes for comments on the proposed actions related to solid waste



4.1.5 URBAN FORESTRY

The urban tree canopy provides numerous benefits, including reducing both energy use and emissions. Planting trees can help to sequester carbon out of the atmosphere, and can help to reduce energy consumption in buildings by providing a source of shade in the hot summer months. By expanding our urban forests, we can further reduce our energy use and emissions. Expanding our urban forests also provides co-benefits such as a calmer, quieter urban setting, improved overall mental health, and protection from flooding during storms.

How important is this series of actions to you?

A total of 73% of respondents rated this series of actions as *important (4)* or *very important (5)*. This set of actions was rated the same level of importance as those related to Solid Waste.

What is your level of support for these actions?

Respondents ranked their level of support for each of the following actions. They are listed in order from most supported to least supported:

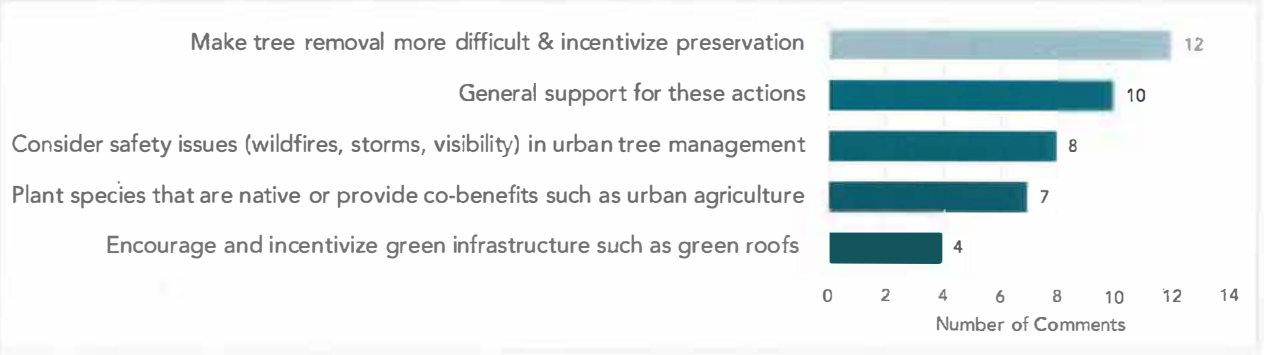
1. Plant additional trees for active transportation routes *(79% support or strongly support)*
3. Establish urban forestry management bylaws *(76% support or strongly support)*
3. Plant additional trees for buildings *(72% support or strongly support)*

What is your level of support for these actions?

Do you have any additional comments about these actions?

In total, 61 comments were received. The five most commonly mentioned themes were:

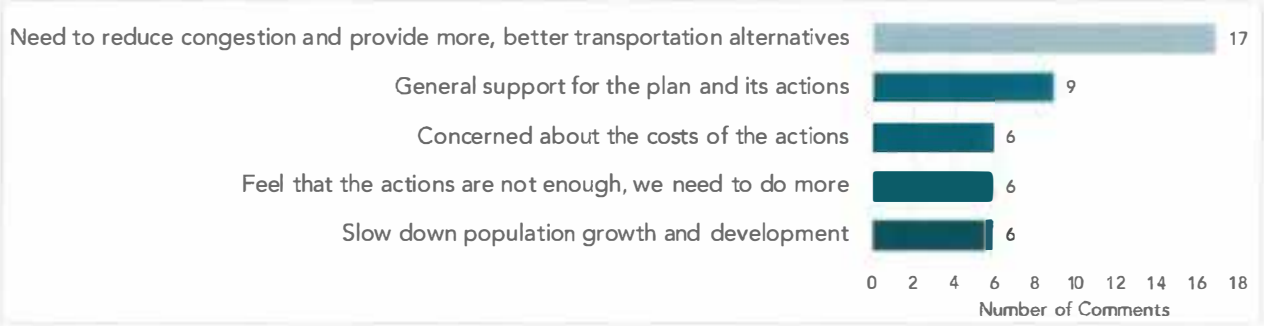
Five most common themes for comments on the proposed actions related to urban forestry



4.1.6 FINAL THOUGHTS

Respondents were asked to provide any final thoughts about the CEEP or climate action in the District. In total, 77 comments were received. The five most commonly mentioned themes were:

Five most common themes for respondents' final comments



5.0 CONCLUSION

Feedback on the proposed actions was gathered through an online public survey. The following points summarize the key results and themes of the feedback received:

- actions to reduce transportation related emissions were the most important to respondents
- support was highest for the following actions in each category:
  - enhancing the transit experience *(Transportation and Land Use)*
  - improving new commercial building efficiency *(Buildings and Energy)*
  - expanding the organics and recycling programs *(Solid Waste)*
  - planting additional trees on active transportation routes *(Urban Forestry)*
- in the comments for each category, the most frequently mentioned themes were:
  - concerns about cost implications and cost-benefit ratio for some of the actions;
  - prioritize public transit improvements;
  - reduce waste at its source: excess packaging and single-use items;
  - make tree removal more difficult and incentivize tree preservation; and
  - reduce congestion and provide more, better transportation alternatives.

Overall, there was broad support for many of the proposed actions. All of the actions mentioned in the survey were supported or strongly supported by at least 60% of respondents. With half of the proposed actions (11 actions out of 22) supported or strongly supported by more than 75% of respondents.

6.0 NEXT STEPS

This report will be shared with Council. The input received will be used to inform the final version of the CEEP, which is expected to go before Council in spring of 2019.