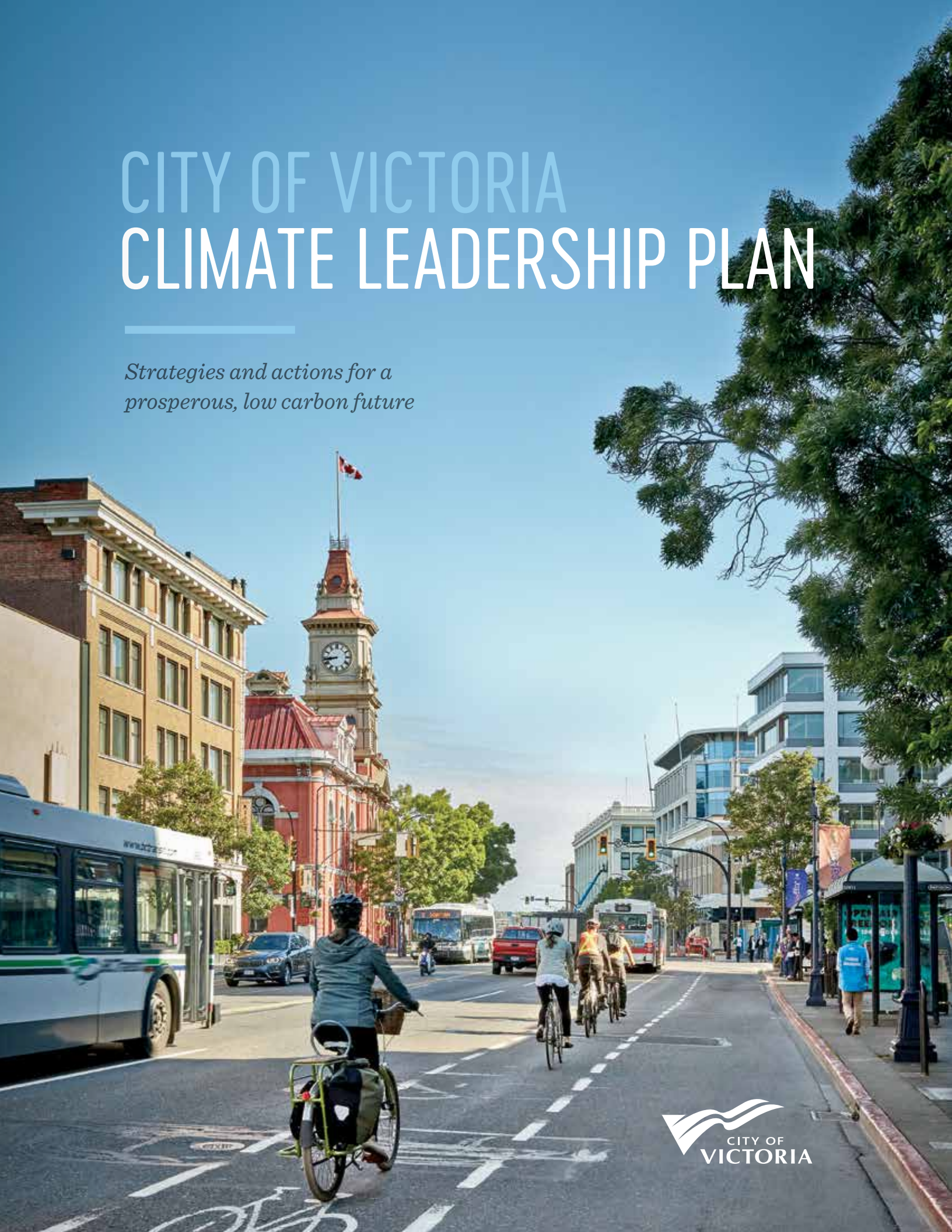
CITY OF VICTORIA
CLIMATE LEADERSHIP PLAN

Strategies and actions for a prosperous, low carbon future



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The City of Victoria is located on the traditional territories of the Songhees and Esquimalt Nations.

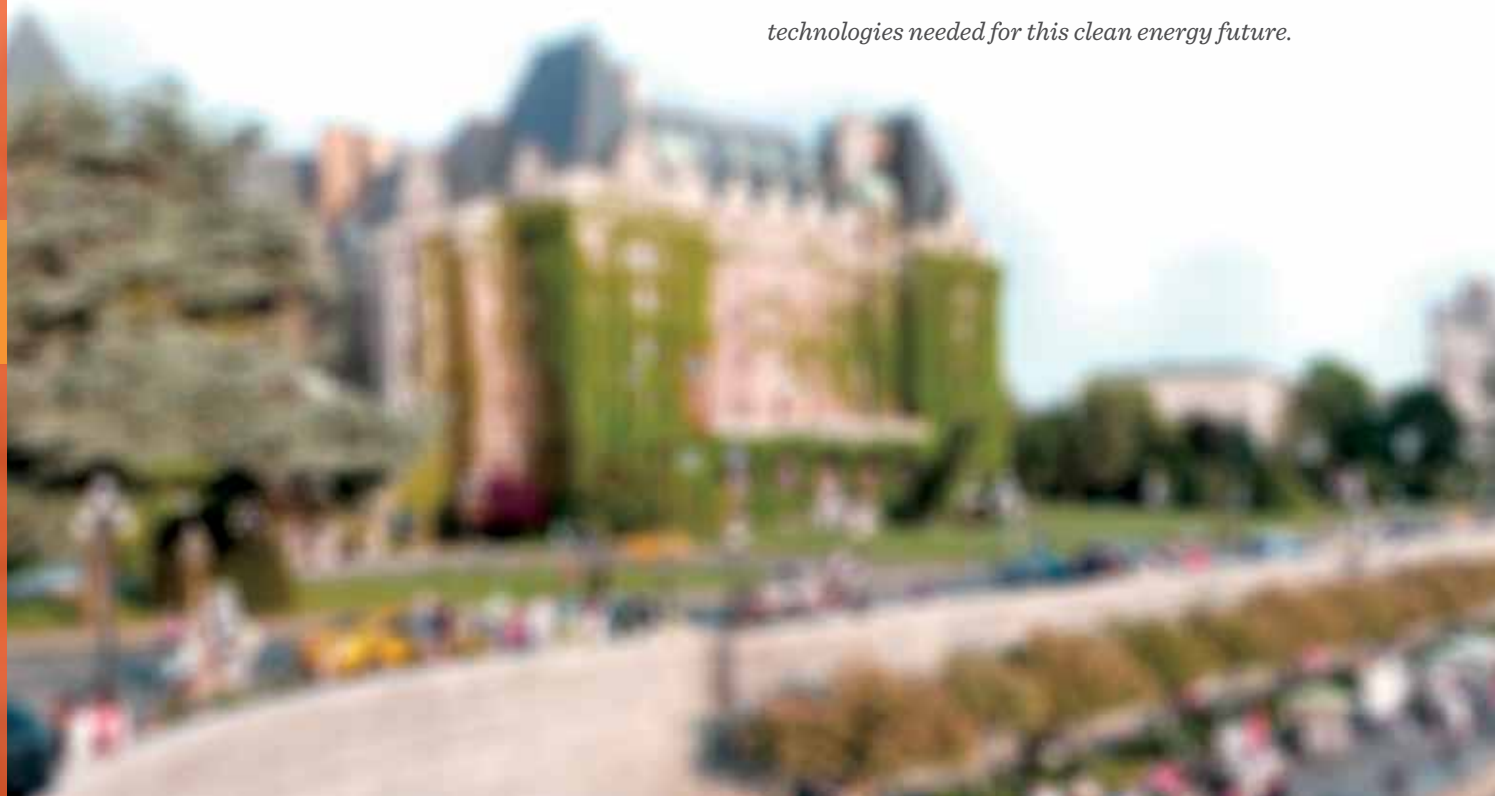
MESSAGE FROM THE MAYOR

It's 2050. Victoria is a prosperous, affordable, sustainable and smart city. Victorians' health and well-being is the best in the nation and Victoria features in the annual World Happiness Report as one of the happiest small cities on the planet. Here's how...

We live in a dense, compact city with people clustered along corridors, in village centres and downtown. We've stewarded our natural assets – tree canopy, parks and open spaces, ocean – and these continue to contribute to our quality of life and the livability of our city.

We live and work in buildings that are powered by 100 percent renewable energy. We move about mostly by affordable, efficient, 100 percent electric rapid public transit, and by walking and cycling. Some of us still drive, but we use vehicles powered by 100 percent renewable energy.

All our kids are safer, happier and healthier than they were in 2018. And they all have more opportunities. No one has been left behind in the transition from a fossil fuel based economy to a low carbon economy. New educational opportunities match the new job opportunities that have sprung up as Victoria's amazing entrepreneurs leapt at the challenge to innovate and invent the goods and technologies needed for this clean energy future.



Our Climate Leadership Plan lays the foundation for this future. It is a series of goals, targets, strategies and actions for each of us to work towards that will take us towards low carbon prosperity. The City's role is to lead and inspire, to transform our own fleet, buildings, energy use, consumption habits and waste management. We aim to make the City's buildings, fleets and public spaces into a model of what is possible. But the City's actions are not enough. Corporate emissions account for only one percent of total emissions in the city. Our core commitment and our number one job is to support our residents and businesses as they take action.

To get to 100 percent renewable energy by 2050 and to reduce our greenhouse gas emissions by 80 percent over 2007 levels by that same year means we need to do more than turning off lights when we leave the room, recycling, and using less water. It means that, at our core, we need to acknowledge that we have to fundamentally change the way we live in cities. This also means making our daily lives more convenient, affordable, efficient and happier at the same time as healing the planet.

First and foremost this climate challenge is human-centred. It is about us, all of us. Yes, technology and innovation will help us get there. But to truly solve the climate challenge we need to weave a strong social fabric. We must build on the gifts and talents of our friends, neighbours, and colleagues. It means we need to shift our thinking from me to we, from now to the long term. We are all in this together.

LISA HELPS, VICTORIA MAYOR

EXECUTIVE SUMMARY

Climate change poses the greatest environmental challenge we face. Extra heat in Earth's atmosphere from global burning of fossil fuels is affecting communities around the world, and Victoria is no exception. The Climate Leadership Plan (CLP) charts a local response to this global challenge.

Victoria has both a responsibility and an opportunity to respond to the causes and impacts of climate change. The City's vision for 2050 is of a vibrant, healthy, and prosperous community, fueled by renewable low carbon energy systems, and designed and integrated in ways that promote a high quality of life for all Victorians. The CLP presents goals and actions to deliver on this vision – actions that, together with actions across the world, can help mitigate global climate change. The City of Victoria is committed to an **80 percent reduction** in **greenhouse gas** (GHG) **emissions** and a shift from GHG-intensive fossil fuels to **100 percent renewable energy.**

Since the City's corporate operations contribute a small fraction of Victoria's GHG emissions and energy consumption, meeting the climate goals must be a community-wide effort. The CLP's core planning principle is to lead and inspire action, and to partner with citizens, businesses, other levels of government and stakeholders to meet climate goals and become a more prosperous and affordable community.

The CLP's goals and actions are organized in this plan by sector and type, and presented in five separate chapters. Each chapter includes baseline performance data and a climate action roadmap, which includes goals for the sector (see chart on next page), and specific action items to deliver on the goals.

Four of the five sector chapters address Victoria's GHG reduction and renewable energy challenge for Victoria's built environment (Low Carbon High-Performance Buildings), for how we get around (Low Carbon Mobility), for the materials we discard (Low Carbon Waste Management), and for the City's fleet and buildings (Municipal Operations). Throughout the sectors, the CLP presents actions to reduce GHGs, energy demand and replace fossil fuels with renewable energy. It also defines broader system redesigns that eliminate unnecessary energy use and build resilience.

The actions within the CLP also seek to maximize Victoria's resilience by enhancing infrastructure and ecosystems so they will flourish amidst the shifts and extremes from a changing climate. The challenge of preparing for climate-driven impacts is addressed in the CLP's final sector (Adapting Early). Through innovation, and the early launch of long-term projects, Victoria can manage the expected increase in severe and prolonged storms, heatwaves, flooding, and sea level rise. Early investments will minimize costly and disruptive actions later.

The CLP is a living document designed to evolve with scientific understanding and improved climate response strategies. One development underway is a growing understanding of the importance of embodied emissions, which are the GHGs produced to make and deliver the food, energy and products that we consume (see The Next Chapter: Embodied Emissions). Future iterations of the CLP will take these imported emissions into account to more comprehensively address Victoria's greenhouse gas `footprint.'

SECTOR	CLIMATE LEADERSHIP GOALS
 **BUILDINGS** Page 24	» All buildings are highly energy efficient. » All buildings are powered by renewable energy.
MOBILITY Page 34	» All Victorians have access to low carbon, high-performance and affordable multi-modal transportation. » Vehicles in Victoria are powered by renewable energy. » Smart land use minimizes transportation emissions.
 **WASTE MANAGEMENT** Page 42	» Organic materials are managed to avoid GHG emissions.
 **MUNICIPAL OPERATIONS** Page 48	» The City is a recognized leader in climate mitigation and adaptation. » The City takes integrated and informed climate action. » The City will provide timely and accurate data supporting strong climate mitigation and adaptation actions.
 **ADAPTING EARLY** Page 54	» All climate-related risks to city infrastructure are minimized through early planning and action. » Victoria's natural environment flourishes in a changing climate. » All Victorians are empowered and prepared for climate impacts and emergencies.

INTRODUCING THE CLIMATE LEADERSHIP PLAN

Victoria Council voted for action in August 2016 when it committed to reduce community-wide greenhouse gases (GHGs) ***by 80 percent by 2050 (from 2007 levels) and to shift away from fossil fuels to 100 percent renewable energy[1] by 2050.*** *These targets align with provincial and federal commitments as well as the international targets agreed to in the 2015 Paris Climate Agreement.[2]*

This Climate Leadership Plan (CLP) is the City's first attempt to comprehensively size-up and begin delivering on its climate and energy commitments. It is the result of community and stakeholder outreach and analysis by city departments, assisted by expert consultants. The result is a comprehensive assessment of Victoria's GHG emissions and sector-specific plans for tackling them.

The CLP calls for a transformation of how we use and manage energy, from heating and powering our homes and buildings to how we power our automobiles and dispose of our waste. It is an action plan to drastically improve energy efficiency, because doing more with less energy is the cheapest way to cut carbon emissions. It is also a plan to use low carbon energy to provide the remaining energy needed to support our daily quality of life.

Why must cities such as Victoria embark on such ambitious action if climate change is a global problem? The imperative to act locally stems first and foremost from the fact that cities are a big part of the problem. Urban centres consume nearly 80 percent of global energy and account for more than 70 percent of GHG emissions, and their share is growing.

But as global centres of innovation, technology, industry and efficiency, cities are also a big part of the solution. As Harvard professor and author Ed Glaeser has said, "cities magnify the human ability to learn from others around us."[3]

[1] The City of Victoria defines renewable energy as any energy that is generated from naturally occurring processes that can be replenished over a human timescale. This includes sunshine, wind, flowing water, and geothermal heat. In 2017, 40 percent of all energy used within Victoria's municipal boundaries came from renewable sources. By 2050, we aim to run exclusively on renewable energy.

[2] An agreement within the United Nations Framework Convention on Climate Change (UNFCCC) dealing with greenhouse gases emissions mitigation, adaptation and finance starting in the year 2020.

[3] Glaeser, E.L. (2011). Triumph of the City: how our greatest invention makes us richer, smarter, greener, healthier, and happier. New York: Penguin Press.

The CLP is about accelerating climate innovation and action, and providing goals to measure our progress. In some cases, it is not yet clear how to best achieve our goals, but bold and ambitious targets will help galvanize and align the innovative and creative solutions that are required. In most cases, no 'technology miracles' are required since affordable, low carbon options are already available in the marketplace.

This document is a 'leadership' plan because it is about more than just improving municipal services and operations. The City's corporate GHG emissions account for roughly one percent of our community's carbon footprint, so the CLP's big win lies in inspiring the entire Victoria community to bring climate action into their daily lives and decisions.

Victorians' creativity and innovation will play a part in reimagining how we all can do better, and they can build jobs and economic prosperity in the process. Local industries, for example, can showcase their national and international leadership in the design and delivery of high-performance buildings, vehicles, technology, and equipment that consume or help use drastically less energy. Only with the City working closely alongside community, industry and institutional partners can we all reach our targets.

Acting on climate change will also deliver financial, environmental, and social benefits across our community, like better air quality, less noise, reduced traffic congestion, increased building comfort, healthier and more active lifestyles, new jobs, and more independent and affordable energy choices.

VICTORIA'S CLIMATE IMPERATIVE

Global human civilization is highly dependent on fossil fuels to heat and power buildings, produce food, and propel vehicles. The result is a changing climate.

Burning fuels such as gasoline, diesel, heating oil and natural gas produces carbon dioxide (CO_2) — a heat-trapping greenhouse gas (GHG). That $C0_2$, along with other GHGs such as methane, traps the sun's energy and causes an overall warming of the planet. It is called the greenhouse effect, and it has heated Earth's surface by about 0.8 degrees Celsius since the end of the 19th Century. At least another 2 degrees of warming is expected by the end of this century, unless we act now.

Two or three degrees may not sound like much. But, as with a child's fever, a few degrees of extra warmth is enough to throw a complex, balanced system into danger. For the Earth, extra heat is already causing profound changes. As the United Nation's Inter-governmental Panel on Climate Change (IPCC) concluded in its latest global report: "Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased."[3]

Climate change is worsening because GHGs stay in Earth's atmosphere for decades, and because we keep adding more each year. The GHGs are building up. In 2016, the atmosphere contained over 400 parts per million (ppm) of CO_2 year-round for the first time in human history, and two years later CO_2 is already averaging 407 ppm.[4] The IPCC has warned that CO_2 concentrations should not exceed 445 to 490 ppm to limit global temperature rise to 2°C. Holding warming there is important because climate scientists say that adding more than 2°C to the global fever will unleash more extreme impacts. The 2015 Paris Climate Agreement binds the international community to keeping global warming to no more than 2°C, but also pledges further effort to limit the temperature increase during this century to 1.5°C.

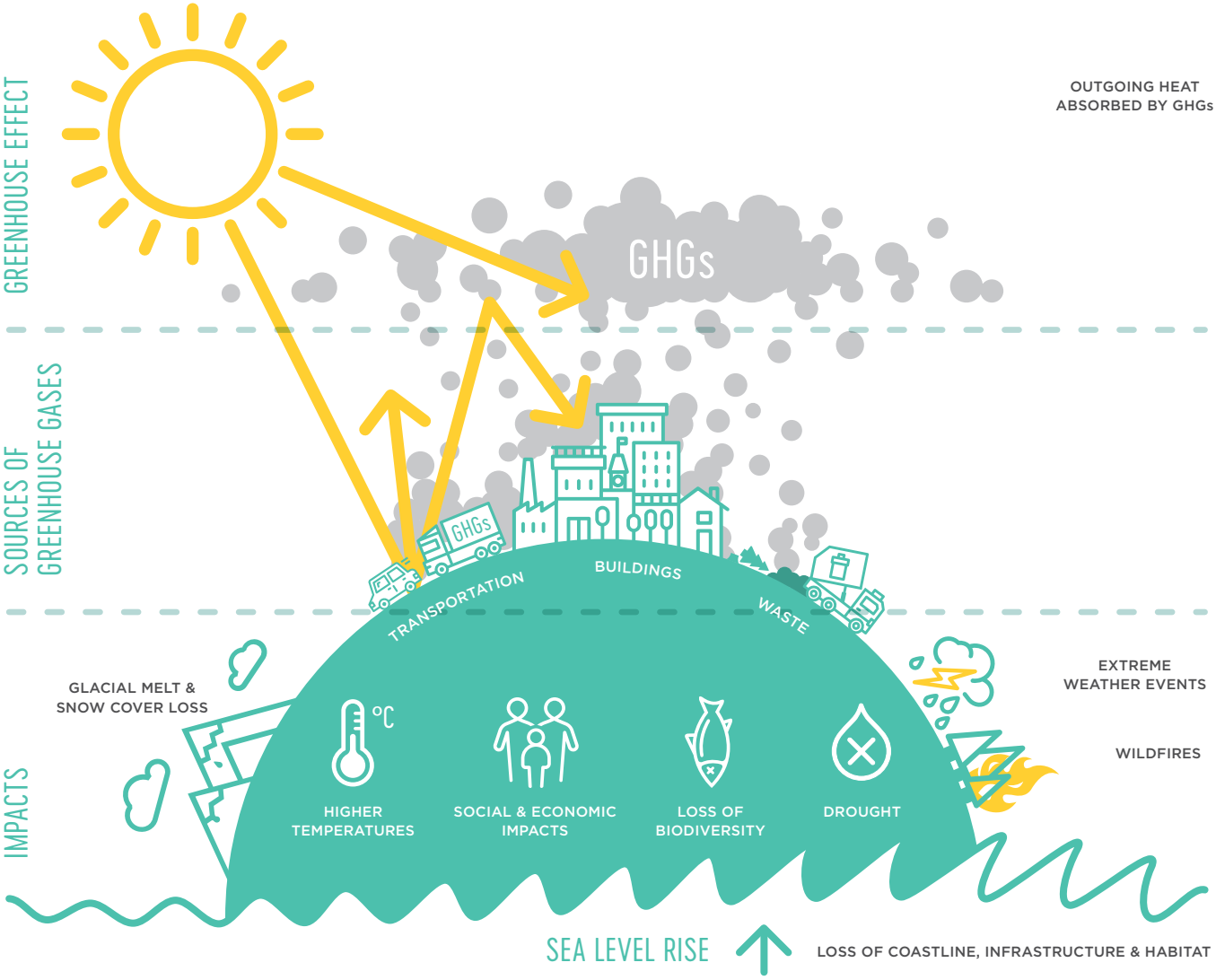
Holding the line on global temperature rise means slashing GHG emissions worldwide faster than planned. Nearly all countries have pledged to

[3] IPCC. (2014). Climate Change 2014 Synthesis Report. https://www.ipcc.ch/news_and_events/docs/ar5/ar5_syr_headlines_en.pdf
[4] As above.

reduce their emissions. Canada, for example, pledged to cut its emissions 80 percent by 2050, relative to 2005 levels. But the global ambition displayed to date falls far short of what is needed to meet the Paris commitments. The United Nations Environment Programme last year called the gap between national climate action plans and what is needed to meet the Paris agreement's 2°C target, "alarmingly high."[5]

Climate scientists have already documented a host of impacts including droughts, flooding, sea level rise, more frequent and destructive storms, global ecosystem decline, loss of biodiversity, food and water scarcity, and increased disease caused by historic GHG emissions. Their models project that climate-driven impacts could go from bad to catastrophic without rapid, deep cuts in future emissions. Leading economists estimate that such climate impacts and costs to protect against them could cut economic activity around the world by 5 to 20 percent.[6]

Bold, precautionary action at the earliest possible opportunity is the only reasonable response to minimize these risks.



[5] UNEP. (2017). Emissions Gap Report 2017. https://www.unenvironment.org/resources/emissions-gap-report
[6] Stern, N. H. (2007). The Economics of Climate Change: The Stern review. Cambridge, UK: Cambridge University Press.

LOCAL CLIMATE RISKS

By 2050, impacts of global GHG emissions on Greater Victoria[7] will likely include:

» **Increased seasonal precipitation** — 31 percent more rain and snow on 'very' wet days and 68 percent more on 'extremely' wet days — may cause local flooding and property damage.

» **Rising sea levels** of at least half a metre will likely cause local flooding, coastal erosion, and heightened risk of property damage, requiring increased investment in protections and infrastructure. These risks will be pronounced during more frequent storm events, especially storms that hit during high tides.

» **More frequent, longer and hotter heatwaves** will place socially and economically vulnerable populations at risk of negative health impacts including potentially deadly heat stress and stroke.

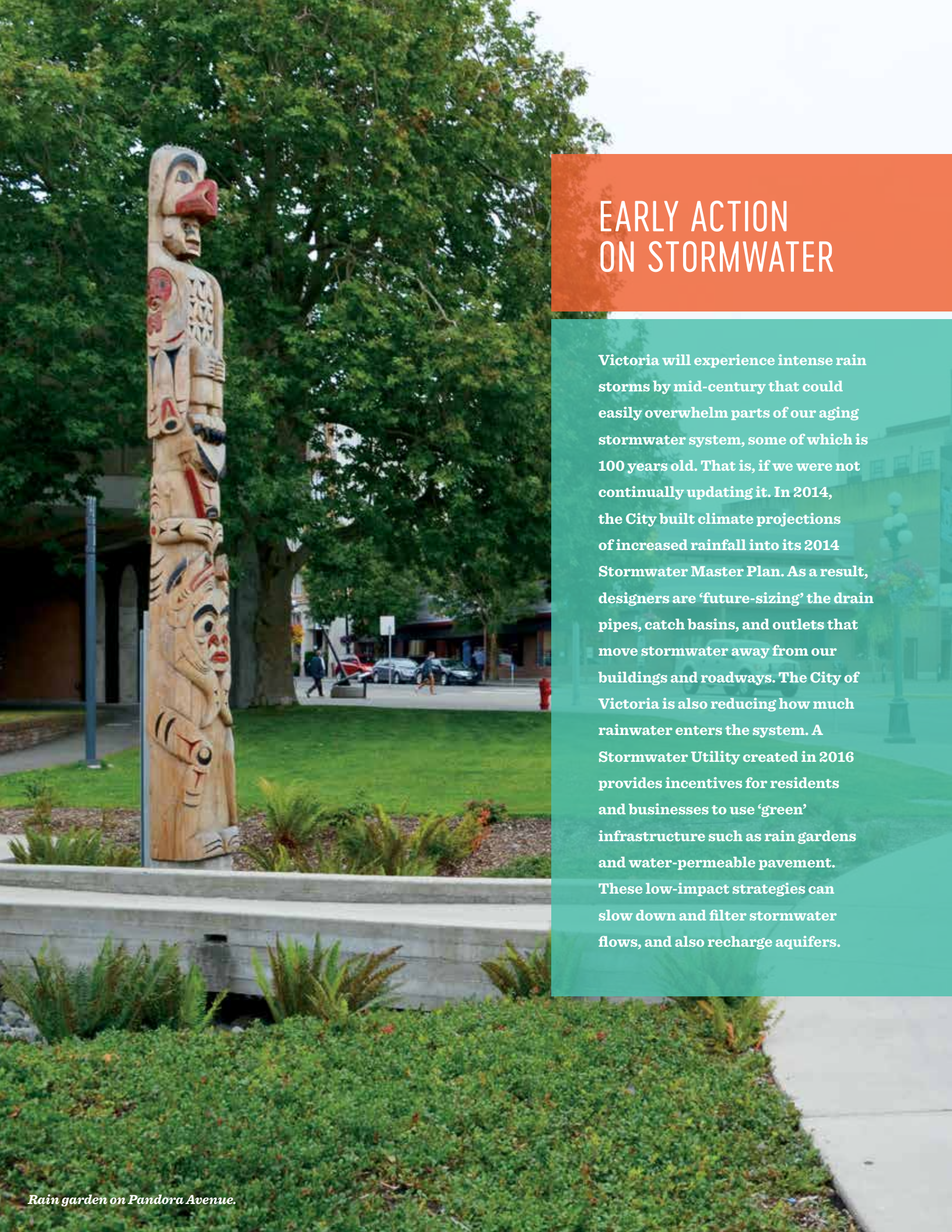
» **Other unavoidable impacts** include increased wildfires, drought, water contamination, and loss of biodiversity, as well as increased building and infrastructure damage and risk management costs.

Wider Climate Considerations

As the climate changes, so too do the ecosystems that we rely on. Globally, it is likely that climate change will exacerbate food insecurity in areas that already suffer most from hunger and malnutrition,[7] and the IPCC predicts that roughly one billion people could face increasing water scarcity as a result of climate change. Victorians are at lower risk of water shortages due to local precipitation levels and our watershed management and conservation practices. But climate change may disproportionately reduce access to a healthy diet in lower income groups by increasing food costs.[8]

A fallen tree after a strong windstorm in Victoria.

[7] CRD. (2017). Climate Projections for the Capital Region. (Projections based on RCP 8.5 and 2.6)
[8] BC Ministry of Health. (2013). Evidence review: Food security. https://www2.gov.bc.ca/assets/gov/health/about-bc-s-health-care-system/public-health/healthy-living-and-healthy-communities/food-security-evidence-review.pdf



EARLY ACTION ON STORMWATER

Victoria will experience intense rain storms by mid-century that could easily overwhelm parts of our aging stormwater system, some of which is 100 years old. That is, if we were not continually updating it. In 2014, the City built climate projections of increased rainfall into its 2014 Stormwater Master Plan. As a result, designers are 'future-sizing' the drain pipes, catch basins, and outlets that move stormwater away from our buildings and roadways. The City of Victoria is also reducing how much rainwater enters the system. A Stormwater Utility created in 2016 provides incentives for residents and businesses to use 'green' infrastructure such as rain gardens and water-permeable pavement. These low-impact strategies can slow down and filter stormwater flows, and also recharge aquifers.

Rain garden on Pandora Avenue.

VICTORIA'S CLIMATE CHALLENGE

Achieving Victoria's climate action goals — an 80 percent reduction of community-wide GHGs (based on 2007 levels) and transitioning to 100 percent renewable energy by 2050 — does not mean starting from scratch. As a community, we are already moving in the right direction, but we must increase our efforts.

Emissions Snapshot and Scenarios

Victoria's carbon footprint stems largely from the energy used to heat buildings, the fuels that propel vehicles, and what becomes of waste after it is discarded. In 2017, of the 370,000 tonnes of greenhouse gases emitted, approximately 50 percent of Victoria's GHG emissions came from buildings, 40 percent came from transportation, and 10 percent from waste.[9]

Electricity in Victoria is relatively clean, since nearly all of the electricity supplied by BC's power grid comes from renewable hydropower.[10] Due in part to this, the city is moving towards reaching its 100% renewable energy target. Currently, 40% of Victoria's energy is renewable (Figure 3).

Building-related GHG emissions thus come primarily from combustion of heating oil and natural gas (figure 2). The transportation sector produces GHGs mainly by burning gasoline, diesel, and propane fuels in passenger vehicles.

Regionally, emissions from municipal waste come from methane released by decomposition of organic waste at the Hartland Landfill. Methane is a powerful greenhouse gas, which traps heat in Earth's atmosphere more effectively than CO_2.

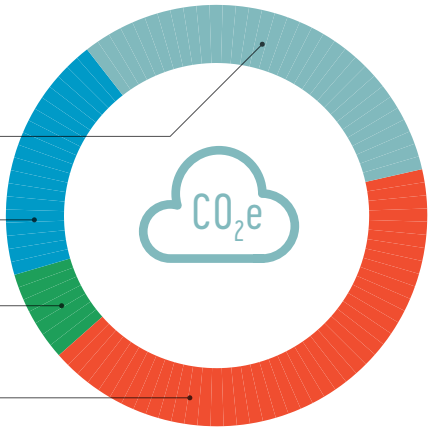
Interim targets:

To help Victoria track progress and make mid-course corrections as we work towards our 2050 commitments, the CLP sets a pair of interim targets. They are to reduce community GHG emissions by 50 percent (by 2007 levels) by 2030, and to cut the City of Victoria's corporate emissions by 60 percent by 2030.

[9] The City of Victoria tracks its emissions through the Global Protocol for Community-Scale Greenhouse Gas Emissions inventories (GPC).

[10] The Clean Energy Act mandates BC Hydro to supply at least 93 percent clean power, including renewable sources such as hydropower. In 2016 it supplied 96 percent clean power.

2017 GHG EMISSIONS BY SECTOR (369,609 tCO2e[11])



32% COMMERCIAL, INSTITUTIONAL, INDUSTRIAL, AND MULTI-UNIT RESIDENTIAL

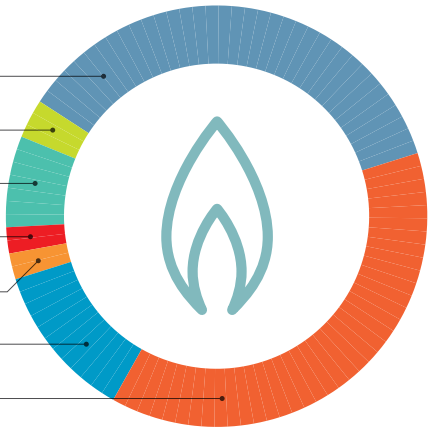
19% SINGLE FAMILY HOMES

9% SOLID AND LIQUID WASTE

40% ON-ROAD TRANSPORTATION

Figure 1: City of Victoria GPC Compliant Inventory, 2017

2017 GHG EMISSIONS BY FUEL TYPE



36% GASOLINE

3% ELECTRICITY

7% DIESEL

2% WOOD

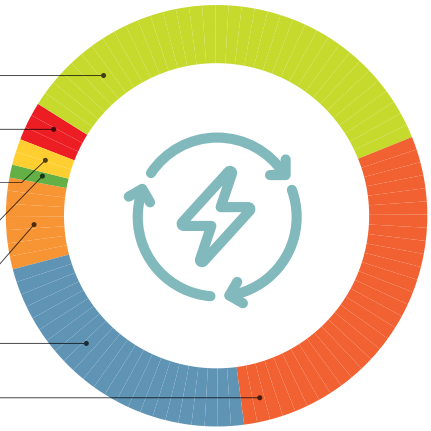
2% PROPANE

12% HEATING OIL

38% NATURAL GAS

Figure 2: City of Victoria GPC Compliant Inventory, 2017

2017 RENEWABLE AND NON-RENEWABLE ENERGY MIX



35% RENEWABLE ELECTRICITY

3% WOOD

2% BIODIESEL AND ETHANOL

<1% RENEWABLE NATURAL GAS

8% HEATING OIL AND PROPANE

23% GASOLINE AND DIESEL

29% NATURAL GAS

Figure 3: City of Victoria GPC Compliant Inventory, 2017

Between 2007 and 2017, Victoria's population increased by 9.9 percent, while our community GHG emissions dropped by 7.4 percent. This progress is mainly due to lower carbon building, transportation and waste systems, and to people making energy reduction a priority in their lives. While positive, the overall pace falls short of what is required to meet our 2050 GHG commitments and, if continued, would only bring us to a 32 percent reduction by mid-century. Reaching our targets will require wise planning decisions and collective acceleration of our climate action efforts.

[11] Carbon dioxide equivalent or CO_2e means the number of metric tonnes of CO_2 emissions with the same global warming potential as one metric tonne of another greenhouse gas.

Getting Past 'Business as Usual'

The City uses a model to estimate how many tonnes of GHGs the community is likely to release in the future. The model simulates the effectiveness of potential GHG reduction strategies for the buildings, transportation and waste sectors. Based on a suite of climate action strategies, two scenarios are modelled:

Business As Usual (BAU): Includes effects on GHG emissions from population and job growth, anticipated changes in Victoria's building stock, and established provincial/federal climate and energy policies, but assumes that Victoria takes no additional action to reduce its carbon footprint. Even when the established Official Community Plan climate commitments and approved City infrastructure programs (e.g. City's bike plan) are added to the BAU scenario, Victoria will not meet its targets.

Hitting our Targets: Projected GHG reductions anticipated from the strategies described in the CLP sectors, which collectively meet the City's 2050 emissions and renewable energy goals.

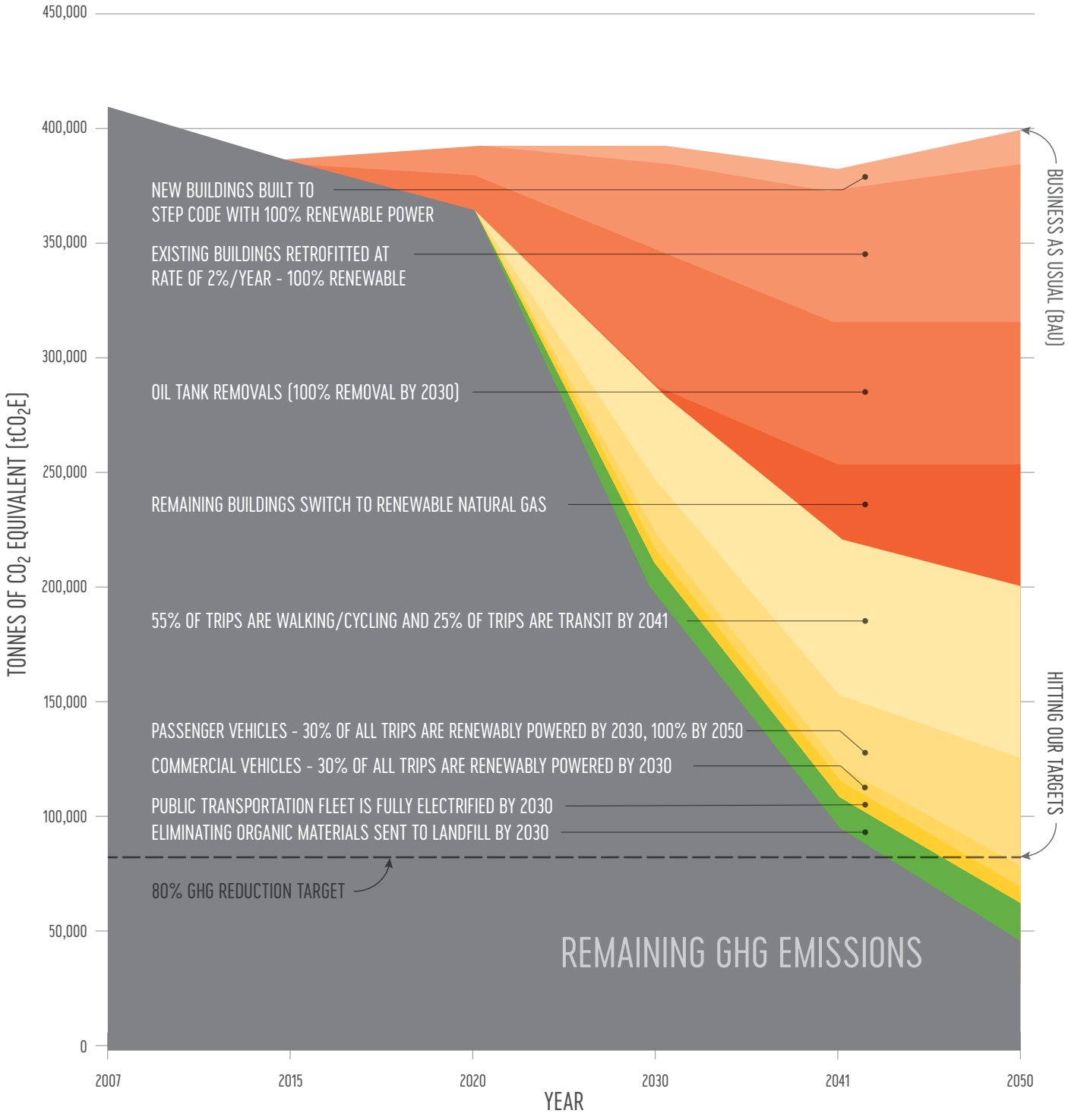
ADDITIONAL GHG SOURCES

Additional sources of GHG emissions include marine transportation (ferries, recreational and commercial vessels), air transportation, agriculture, forestry, and other land use, and industrial product use. These sources serve regional demands and are outside of the City's jurisdiction.

The City is committed to partnering with local marine and air transportation stakeholders to accurately measure and report on these local emissions and develop mitigation strategies.

This diagram shows how each strategy creates a reduction in GHGs and how, collectively, they will get us to an 80 percent reduction in GHGs.

PATHWAYS TO 2050 GHG REDUCTION TARGETS



GETTING TO LOW CARBON PROSPERITY

The City's vision for 2050 is of a vibrant, healthy, and prosperous community, fueled by renewable low carbon energy systems, and designed and integrated in ways that promote a high quality of life for all Victorians. The City's mission is to lead Victoria's transition to a renewable energy future, and to inform, equip, enable and inspire the community to rapidly reduce their own GHG emissions and prepare for climate change.

Leading Through Collaboration

Bold action now can overcome barriers and unlock opportunities to achieve 80 percent GHG reductions, and 100 percent renewable energy. The City can support GHG reductions through control of municipal infrastructure (e.g. roads, utilities, sidewalks, parking, facilities), and it can also influence community action through planning policies, guidelines and by-laws. Using these important municipal powers, the City can directly and indirectly influence GHG reductions.

Direct action will also tackle the City's corporate emissions. City-owned fleets, facilities and operations, account for only one percent of total emissions in Victoria. Reductions there can set an example for GHG performance and renewable energy adoption, but it is the broader community where the vast majority of emissions reduction and energy change must be achieved. Decisions and choices made by residents, business and institutions will shape the energy and GHG intensity of their buildings, transportation and waste.

To provide leadership, the City's role must also extend to informing, educating and encouraging change among resident and business stakeholders. The City must partner to remove barriers to action, and to develop the most useful climate action programs if we are to collectively meet our targets.

Planning principles can help guide this collaboration and continuous improvement. They represent values that underpin all of the climate actions defined in this plan, seeking to ensure that they are integrated with, and enhance, other community priorities.

Finally, the City also has an important advocacy role to play. The City will regularly call on regional, provincial and federal levels of government, as well as the private sector, to make climate action a priority.

CLIMATE LEADERSHIP PLANNING PRINCIPLES

1. **Lead and inspire** – The City will be a regional and national leader on climate mitigation and adaptation. It will take urgent action to drive innovative GHG reductions, creatively and collaboratively with other leaders and key stakeholders.

2. **Harmonize climate action to secure co-benefits** – GHG reduction actions should be integrated with all other priority areas for City planning, including health, safety, and environmental protection, affordability, and quality of life.

3. **Universal accountability** – All Victorians (residents, businesses, employees, and visitors) have a role to play in improving GHG performance, and should be encouraged to take meaningful action.

4. **Make energy visible** – Our community's energy use, GHG performance, and climate impacts must be clearly known to drive effective change.

5. **Evidence-based decisions** – Energy and GHG decisions should be socially-minded, cost-effective and supported by science, including a full, life-cycle understanding of relevant issues and technologies.

6. **Renewable energy for all** – Our entire community, regardless of circumstances, must have access to efficient, affordable and renewable energy options.

7. **Dismantle barriers** – The City will remove barriers preventing rapid decarbonisation of our energy mix by supporting polices that support smart energy choices and GHG-reduction behaviours.

8. **Climate resilience is developed early** – Victoria must act with a sense of urgency and take early and meaningful action to avoid the most disruptive economic, social, and environmental impacts imposed by climate change.

9. **Think globally, change locally, partner regionally** – Partnering and advocating across jurisdictional boundaries is key to achieving consensus and maximizing global GHG reductions.

10. **Track and Adjust** – The City will measure, track and report on its targets and actions annually, making adjustments where required.

THE CLIMATE LEADERSHIP PLAN

A series of goals, strategies, and actions have been developed for each of the five sectors to reduce energy consumption and GHG emissions, transition to renewable energy, and prepare Victoria for climate impacts.

The energy and GHG plans all begin by first maximizing energy efficiency, which has been called the "largest, least expensive, most benign, most quickly deployable, least visible, least understood, and most neglected way to provide energy services."[12] Energy efficiency improvements should always be at the top of the actions list when addressing energy and GHGs and will constitute a main pillar across all the City's climate actions.

The Actions: Viable, Renewable and Sustainable

The CLP's actions fit into four general classes:

Reduce *energy use, GHGs, and fossil fuels by eliminating waste and adopting aggressive efficiency improvements.*

Replace *fossil fuels with renewable fuels or low carbon fuel alternatives.*

Redesign *the system to 'design out' poor GHG performance in the built environment and city services.*

Resilience *through enhanced infrastructure, urban support systems, and ecosystems to enhance their ability to thrive amidst the shifts and extremes from a changing climate.*

[12] Lovins, et al. (2005). Energy End-use Efficiency. http://www.10xe.orwww.10xe.org/Knowledge-Center/Library/E05-16_EnergyEndUseEfficiency

Understanding Sector Goals, Targets and Actions

The CLP is divided into five chapters covering five sectors: buildings, mobility, waste management, municipal operations and adaptation. In each chapter, high-level goals describe broad climate action objectives for the sector, which are then supported by more detailed targets and a list of actions. Colour-coding identifies which actions are underway, those the City intends to initiate by 2020, and still others to follow in the future.

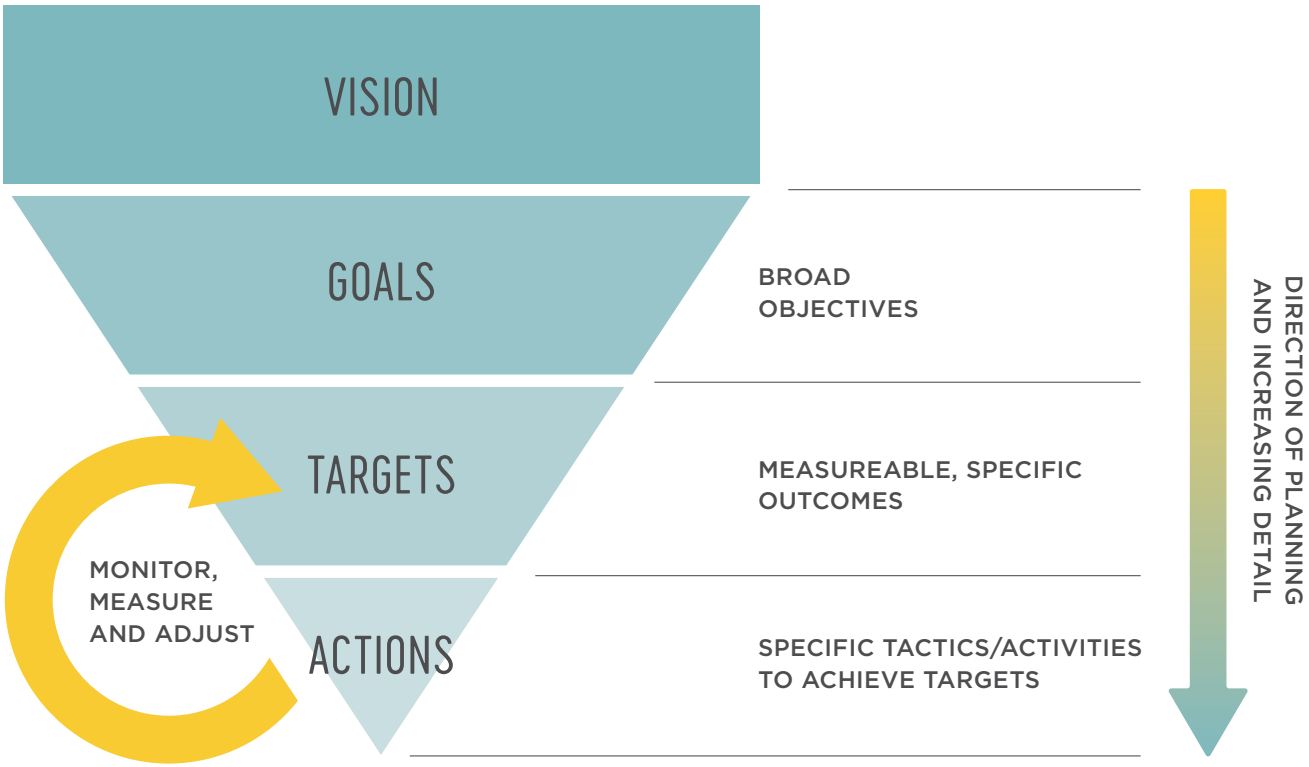
Only some actions include well-defined strategies. For the rest, the City must first gain a fuller understanding of the related barriers and opportunities to determine how best to proceed. In all cases, performance metrics will be established to track progress.

Goals

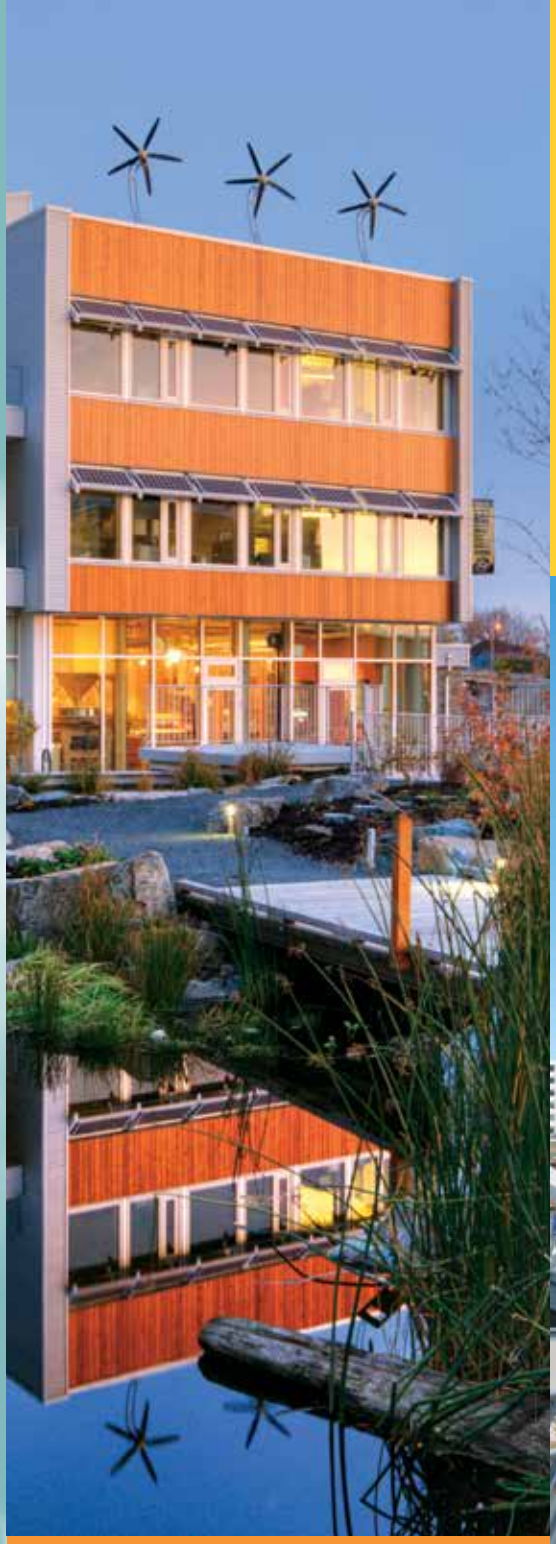
Targets

Actions

EACH SECTOR INCLUDES:



FIVE KEY SECTORS



Dockside Green mixed-use community.

LOW CARBON HIGH-PERFORMANCE BUILDINGS

The Vision *By 2050, Victoria will be home to efficient, renewably powered, high-performance buildings. Building design, operations and management will have evolved to deliver more sophisticated, comfortable, healthier, low carbon buildings, with far lower energy needs. Local industries will be recognized leaders in sustainable, high-performance building design and construction.*

The Goals

1 **All buildings are highly energy efficient.**

The path toward a renewable future begins with efficiency. As the National Building Strategy puts it, the bar needs to be set much higher so that building energy requirements become so slight that most can be met with renewable energy generated on-site.

2 **All buildings are powered by renewable energy.**

Widespread adoption of renewable fuels and on-site renewable power generation in residential and commercial buildings will be required. Renewable energy supply can come from utility hydro electricity, from on-site sources such as geothermal heating and rooftop solar panels, and, in some cases, renewable natural gas.

The Challenge

The energy Victorians use to heat, power, and cool our buildings, as well as run our appliances makes up half of the city's total GHG emissions. Nearly two-thirds, or fully 64 percent of the building-related emissions come from large multi-family, commercial, institutional, and industrial buildings, versus 36 percent from single-family homes (Figure 4).

Space heating accounts for half of both residential and commercial building energy consumption, and residences use another quarter of their energy heating water. Many buildings burn oil and natural gas to provide this heat, thus generating the majority of building-related GHGs (Figure 5). Victoria's building stock is aging, with 70 percent of the existing units built prior to 1980. For many of these buildings, aging conditions make for poor energy performance. Leaks allow heat to escape through windows, doors and external wall fixtures. Heat passes through poorly insulated attics and walls, and older heating and cooling systems operate at low efficiencies. Many still use oil furnaces that produce large amounts of GHGs. Multiple barriers are currently preventing building owners and residents from adopting energy and GHG improvements. These barriers include lack of energy-use data, planning obstacles, and competing costs and priorities. Due to these and other barriers, older and even relatively new buildings continue to exhibit poor energy and GHG performance.

If new and existing buildings continue to be inefficient and run on fossil fuels, then the City cannot meet its 2050 GHG reduction targets.

GHG CONTRIBUTION BY BUILDING TYPE AND HEATING SOURCE

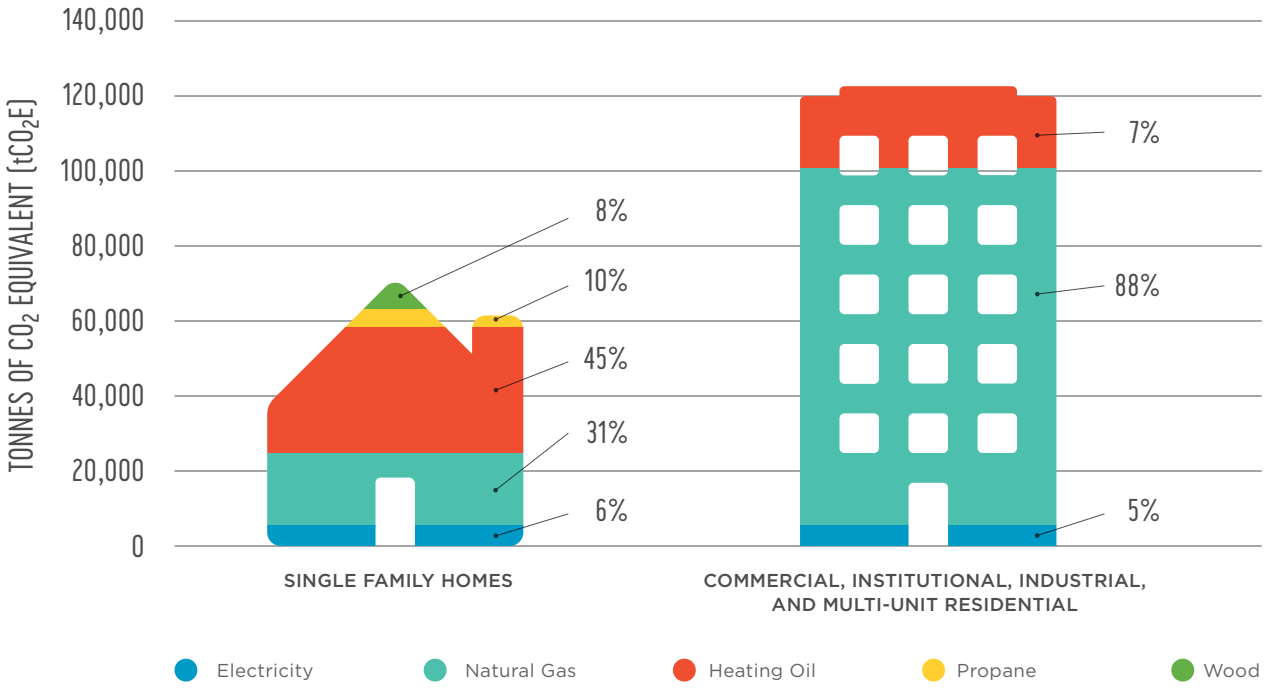


Figure 4: City of Victoria GPC compliant inventory, 2017

BC RESIDENTIAL BUILDING ENERGY CONSUMPTION BY END USE

BC COMMERCIAL BUILDING ENERGY CONSUMPTION BY END USE

Figure 5: 2014 NRCAN National Energy Use Database. Residential and Commercial Building Sectors, British Columbia.

The Plan

Strategies and actions to reduce GHGs target efficiency upgrades to reduce emissions. These upgrades can reduce operating costs and increase occupant comfort while delivering GHG reductions.

Options to slash heating related emissions include the first three climate action R's — **Reduce**, **Replace** and **Redesign**. A building's GHG emissions can be tackled by **reducing** energy use and eliminating energy waste. For example, improving energy efficiency of buildings through improved operations, design, envelope performance and equipment efficiencies – all reduce energy demand, while adding more insulation and preventing air leaks reduces heat losses.

Replacing starts with phasing out relatively costly, high-carbon oil furnaces and introducing renewable fuels and energy technologies, such as hydro powered electric heating, solar panels, or renewable natural gas. Replacing existing heating systems with ductless mini-split heat pump systems also removes the need for duct maintenance, and allows for easy-to-install heating and cooling in your home.

Redesign is about reimagining building designs, construction and operation, including the deployment of smart controls that monitor and manage building energy consumption. These actions — in fact all of the above — will benefit from stronger building codes.

Existing Buildings

Victoria's Climate Leadership Plan meshes with a fast-growing need to upgrade our aging building stock. Approximately 10 percent of the city's housing needs major repair,[13] and Landlord BC estimates that more than 20,000 rental units in the region will require significant upgrades over the next decade. About one percent of buildings are retrofitted each year, but the work often ignores energy efficiency. Ramping up retrofits represents a 'once in a generation' opportunity to cost-effectively implement energy efficiency improvements while other major work is underway, such as seismic and aesthetic upgrades. In order to meet the City's 2050 target of an 80 percent reduction in GHGs, the annual retrofit rate needs to at least double, and energy and GHG improvements must become a central part of every building renewal.

Meeting this goal will require advocacy and partnering by the City. National building codes and standards could require consistent and effective energy retrofits, and the Federal government recently indicated their intention to introduce a model building code for retrofits by 2022. The City will work with government partners and local stakeholders to develop strategies and actions to make low carbon building retrofits affordable and timely.

PUT A LABEL ON IT

What gets measured and communicated gets managed. We require consumer information on most items we buy in the supermarket and on major appliances, but not for the most valuable item that one can own: our home. The City will advocate for energy benchmarking and home energy labelling to help buyers and renters see the big picture — including what you can expect to pay in energy bills, and the GHG footprint of your home.

Retrofit Returns

Analysis of home energy retrofit data for Victoria indicates a widespread opportunity for cost-effective retrofits such as adding insulation and sealing air leaks that have a quick return on investment.[14] With the addition of deeper retrofits, significant GHG reductions are possible. For example, replacing oil and gas furnaces with air source heat pumps could save up to 50,000 tonnes of CO_2 per year (more than 13 percent of what we need to cut to reach our 2050 targets). A typical heat pump upgrade can also save homeowners 40 to 75 percent off their annual heating bills (if currently using 100 percent heating oil).[15]

Photo credits: Home Performance Stakeholder Council.

[13] Statistics Canada. (2015). NHS profile, Victoria, CMA, British Columbia, 2011.
[14] Evins, R., Bowley, W., Westermann, P., & Akhavan, M. (2018). Residential Retrofit Analysis for the City of Victoria. UVic Energy Systems and Sustainable Cities Group.
[15] Oil to Heat Pump Incentive Program. (2018). Why Upgrade? http://oiltoheatpump.ca/why-upgrade/

New Buildings

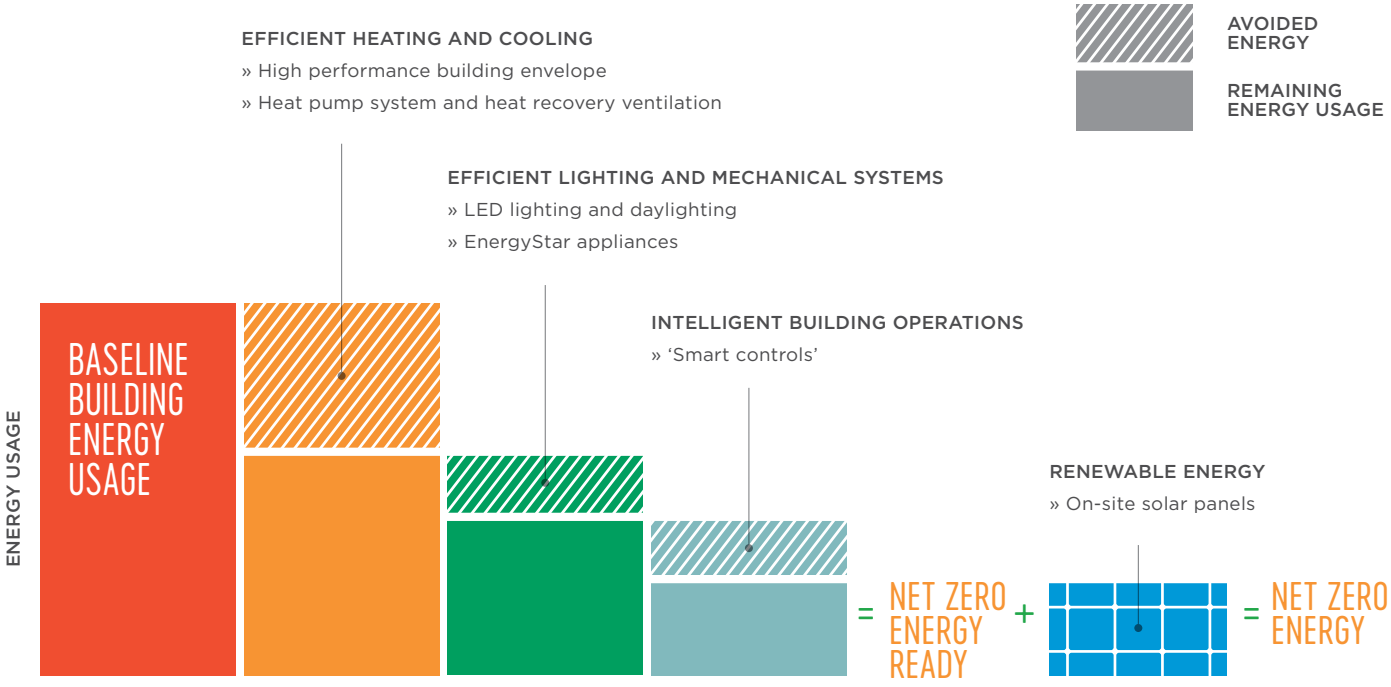
New buildings must become highly-efficient and shift to renewable energy in order to meet our GHG targets. For new buildings, the focus is on better building energy and GHG performance standards. Since each new building added to our city will last more than 50 years, on average, raising the bar now is critical to meeting our 2050 targets.

New building codes and standards, such as the BC Energy Step Code, can deliver GHG reductions through better building envelope design and construction, improved efficiencies for mechanical systems like heating/cooling as well as appliances and lighting, and via intelligent building operations. The City will advocate for stronger federal and provincial standards, and will adopt progressively more stringent energy efficiency requirements for new builds, as per the BC Energy Step Code. By 2032, new buildings will be "net-zero energy ready." That means they will be highly-efficient buildings that can easily accommodate future renewable energy add-ons, such as rooftop solar panels, that will enable them to produce at least as much energy as they consume.

Getting Ready For Net-Zero Energy

The graphic below depicts the value of designing energy efficiency into buildings from the outset. An efficient design can reduce total energy needs by more than 50 percent. Energy-wise operations coupled with on-site solar generation can nearly eliminate the remaining energy needs from external utilities or fuels.

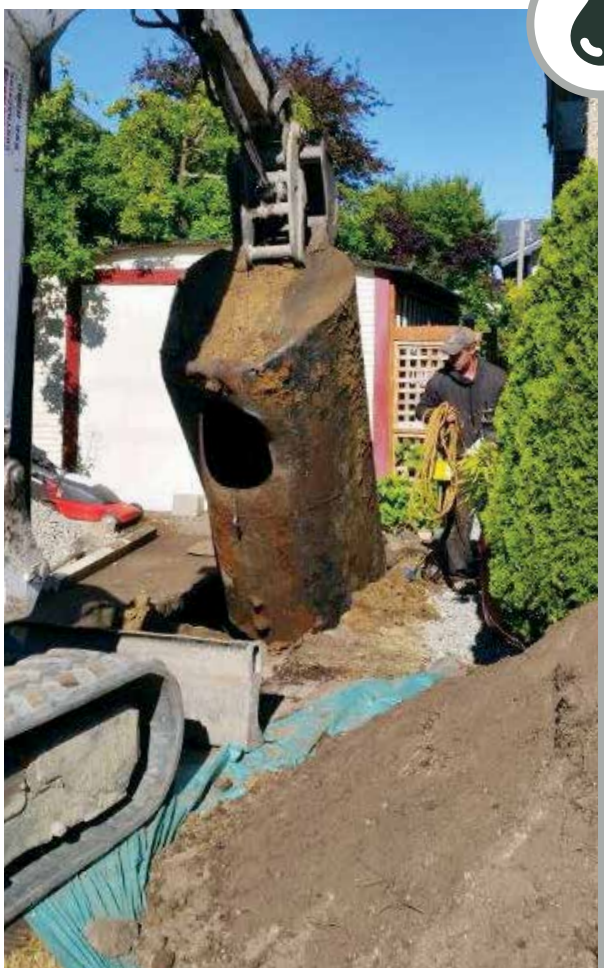
EFFICIENCY FIRST BUT NEVER ALONE - THE STEPS TO NET ZERO ENERGY READY BUILDINGS



Adapted from Pena, R. (2014). Living Proof: The Bullitt Centre. https://betterbricks.com/uploads/resources/living-proof-bullitt-center-case-study.pdf

Targets

GOAL 1:	TARGETS:
All buildings are highly efficient.	*By 2030, all new buildings are 'net-zero energy ready.'* *By 2050, all existing buildings meet new high efficiency standards.*
GOAL 2:	**TARGETS:**
All buildings are powered by renewable energy.	*By 2030, heating oil is phased out.* *By 2050, all buildings exclusively use renewable energy.*

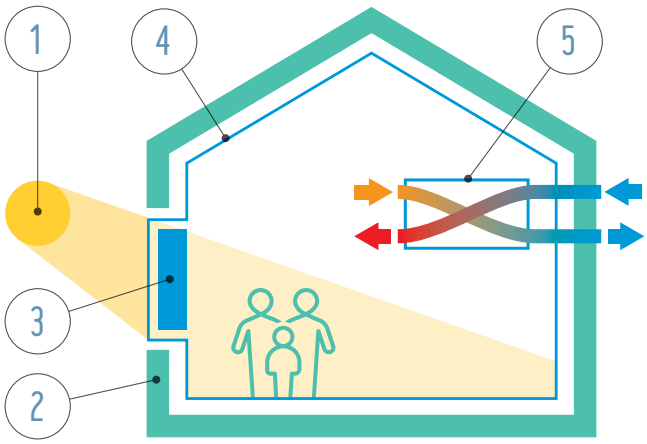


Did you know that owning an oil tank is risky? Remove the oil tank, remove the risk!

Both above ground and underground oil tanks are vulnerable to leaking. This leaked oil can migrate into the soil and stormwater system that leads to our local creeks and marine shorelines. When leaks happen, the owner of the property that is found to be the source of the oil leak is responsible to pay for the cost of the environmental clean-up, both on and off the source property. Home insurance does not cover these costs.

Community in Action

Carolyn has always sought ways to lower her family's environmental impact, and she and her family jumped at the opportunity to purchase a unit at the North Park Passive House. They are happy they did. As Carolyn puts it: "Living in a Passive House building has provided so many benefits for our family. Our home is ultra-quiet thanks to the triple-paned windows, the air never feels stuffy or drafty, and our heating bills are incredibly low. As a homeowner, living here also provides peace of mind with no furnace or air conditioner to worry about or maintain. Our strata fees are also low thanks to the solar panels that generate income for the strata. I feel that this is the future of building in Canada and that everyone should be able to enjoy the benefits of a Passive House home."



1. OPTIMIZE SOLAR ORIENTATION
2. HIGH INSULATION
3. HIGH PERFORMANCE WINDOWS AND DOORS
4. AIR TIGHT BUILDING
5. BALANCED VENTILATION WITH HEAT RECOVERY

What is a Passive House?

A Passive House is a building built to a proprietary standard that emphasizes a high-performance building envelope. Passive House buildings use up to 90 percent less heating and cooling energy than a conventional building through the application of design principles like: optimized solar orientation; high insulation; high performance windows and doors; air tightness; balanced ventilation with heat recovery; and more. The incremental cost of Passive House performance depends on several factors including the severity of the climate, the type of building and local availability of building components. The incremental building cost is typically around 5-8 percent for a builder with training and experience in Passive House construction.

Actions

SECTOR-WIDE ACTIONS

- Adopt the BC Energy Step Code, creating a roadmap towards net-zero energy ready buildings by 2030.
- Renew the City's Sustainability Checklist to include Step Code requirements for new buildings, as well as other sustainable building design elements that align with City goals.
- Support the development of a 'Building Centre of Excellence' to showcase leading-edge design and construction practices and to foster a high-performance culture within Victoria's building industry.
- Develop a strategy for reporting and tracking embodied energy and emissions — those associated with materials extraction, production and delivery — in new construction projects.

ACTIONS FOR EXISTING BUILDINGS

The City will develop and implement a Retrofit Strategy to realize significant energy efficiency and GHG reductions in the city's existing buildings. This strategy will include the following priority actions:

Single Family Homes:

- Design and deliver an innovative program for bundled and easy-to-achieve home energy retrofits.
- Collaborate with heritage organizations to identify and promote energy retrofitting opportunities for homeowners.
- Advocate for the development of a compulsory Canada/BC-wide home energy labelling program and, in the interim, implement a voluntary energy disclosure program.
- Advocate for utilities and other levels of government to develop consistent energy-efficiency incentives and funding mechanisms. Explore opportunities for innovative financing mechanisms.

Multi-unit residential and commercial buildings:

Design and deliver customized deep energy retrofit programs, phased-in by building type:

- rental apartment buildings,
- commercial buildings, and
- strata residential buildings (e.g. condominiums).

- Support the development of a Victoria 2030 District or a comparable voluntary energy benchmarking program for commercial buildings.
- Advocate for a compulsory provincial energy benchmarking program for large and complex buildings.

LEGEND: Action Underway · Initiate Action by 2020 · Future Action

ACTIONS TO SUPPORT RENEWABLE FUELS AND ELECTRICITY

- Implement a transition plan to phase out heating oil systems in residential, commercial, and institutional properties by 2030.
- Remove regulatory barriers to promote the installation of renewable energy systems, supported by planning guidance and education tools.
- Assess opportunities to accelerate renewable natural gas uptake in residential, commercial, and institutional buildings.
- Assess and report on opportunities for implementing district energy systems in the city.

Community in Action

Leaders in the Victoria community are already transforming homes into highly efficient buildings that run on renewable energy. Jack and Lori, residents of Vic West, retrofitted their late 19th century character house into a net-zero energy home powered completely by rooftop solar panels.

Jack and Lori's initial steps were efficiency upgrades such as increased insulation, draft sealing and new windows. They also upgraded their space and water heating equipment. At first they replaced the home's oil furnace with electric baseboard and floor heating, which reduced fossil fuel emissions and removed the risk of a costly oil spill (among other benefits). But those 'resistance' heaters used more electricity than was necessary, so they replaced them with an air-source heat pump that significantly cut the home's electric heating load.

The retrofits provide clear benefits for Jack and Lori. Not only is the house more comfortable, but its annual energy bill has dropped to practically zero. Plus, they have inspired their friends and neighbours to complete major home retrofit projects by consulting with energy advisors, replacing oil furnaces with heat pumps, and completing other efficiency upgrades. Their work is an example of grassroots action, and they like to lend a hand when other homeowners take on similar solar projects. Their only stipulation: they must agree to do the same for others.

The Johnson Street Bridge multi-use pathway.

LOW CARBON MOBILITY

The Vision *By 2050, people, goods and services moving around Victoria will generate little or no GHG emissions. A seamless and integrated mobility system prioritizes low carbon transportation including walking, biking, public transit and shared electric mobility options. Residents live in well-designed neighbourhoods with attractive amenities. The few remaining machines using internal combustion engines run on renewable fuels.*

The Goals

1	**All Victorians have access to low carbon, high-performance and affordable multi-modal transportation.**	Investments in public transit and active transportation infrastructure will enhance community-wide access to services, employment, recreation and education.
2	**Vehicles in Victoria are powered by renewable energy.**	Victoria's multi-modal transportation system will prioritize less energy intensive options. Where vehicles are required, they will be powered by renewable energy.
3	**Smart land use minimizes transportation emissions.**	Victoria's neighbourhoods will be mixed use with nearby amenities that promote and encourage sustainable mobility choices. Job and population growth occurs in areas served well by transit and with infrastructure for renewably powered vehicles.

The Challenge

Transportation activities make up the second largest source of GHG emissions (40 percent).[16] Most of those emissions are CO_2 from burning gasoline in passenger vehicles. Commercial vehicles represent the second largest source of transportation-related GHGs, largely from diesel fuel combustion. And it is not just city residents burning fuel - Victoria is the economic hub for a region that is home to nearly 400,000 people. Each day, tourists and residents from other municipalities travel in and around Victoria.

Although three-quarters of Victorians live within five kilometres of their employment,[17] most residents and commuters choose to travel in and around Victoria in single-occupant vehicles.[18]

To make it worse, many vehicles on our roads are gas-guzzlers. Large, old and inefficient vehicles generate avoidable GHG emissions each kilometre they are driven. The figure on the next page depicts the relative carbon intensity of travel modes, including larger vehicles.

Encouraging more people to choose lower carbon transportation will require more attractive alternatives to personal cars. Buses do not yet beat the convenience of the personal motor vehicle. Dedicated bus lanes and transit signal priority measures are important steps in freeing buses from congestion on the road. Modern, clean and convenient transit, along with first-mile and last-mile solutions are needed.

The same goes for biking and walking. More people will choose to walk and cycle when those options are safe, convenient, fast and attractive. New and emerging mobility options (ride share, ride hailing, car share, electric bikes) are critical to reducing fuel use and transportation related emissions. Together, these options are beginning to provide viable low carbon mobility alternatives, and are making people think twice about owning fuel-burning vehicles.

GHG CONTRIBUTION BY VEHICLE TYPE

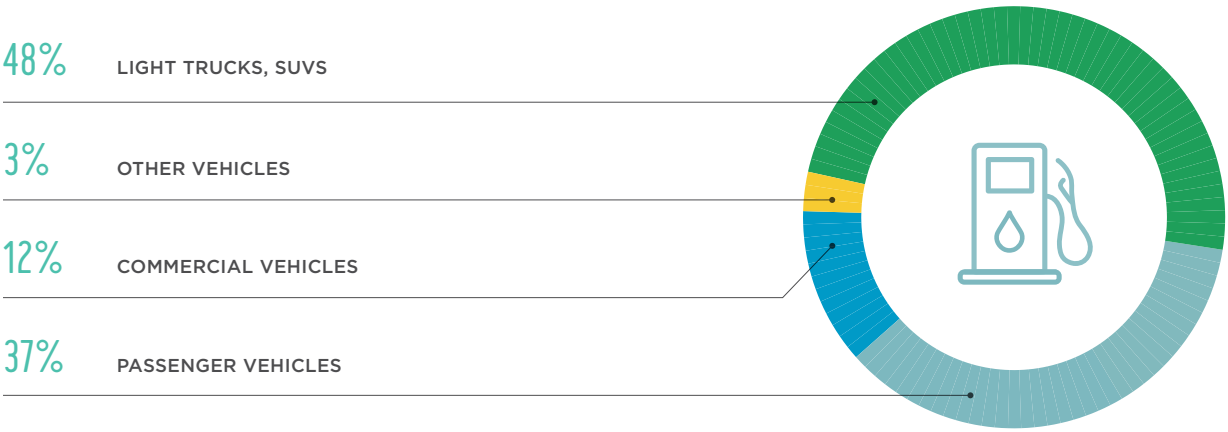


Figure 6: Transportation equaled 148,000 tonnes of CO_2e (City of Victoria, GPC compliant inventory, 2015).

[16] The scope of transportation greenhouse gas emissions data referenced (40 percent) is for the Municipality of Victoria only. For the emissions profile of the region, visit https://www.crd.bc.ca
[17] CRD. (2017). 2017 Capital Region District Origin Destination Household Travel Survey.
[18] Statistics Canada. (2018). Census Profile, 2016 Census.

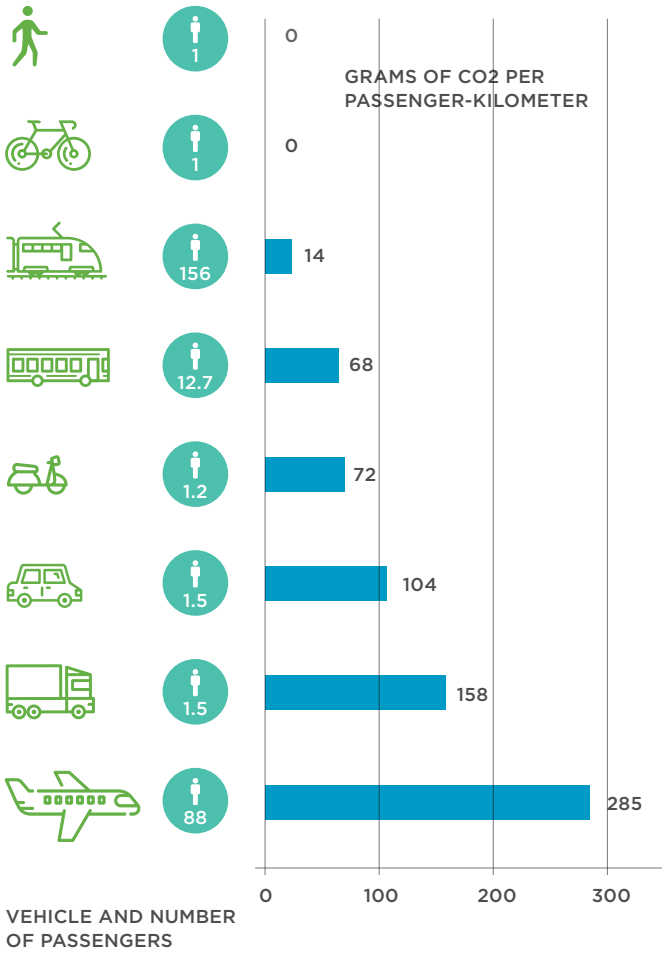


Figure 7: Indicative grams of CO_2 per passenger-kilometre. Sourced from: European Environment Agency, European Union. (2016). Carbon Dioxide Emissions From Passenger Transport. https://www.eea.europa.eu

BC Transit electric bus in downtown Victoria.

The Plan

Achieving the 2050 targets will require a massive shift to low carbon modes of transportation. This CLP sector seeks to make alternatives to gasoline and diesel-fuelled vehicles more compelling through a variety of strategies, including:

» Encouraging the use of renewably powered and energy efficiency vehicles;

» Introducing game-changing improvements in the convenience and reliability of transit;

» Expanding infrastructure that makes walking and cycling safer and more convenient;

» Accelerating shared-mobility choices like car-sharing, and bike-sharing.

The plan will **reduce** the number of vehicles in Victoria, the number of kilometres they are driven, and the frequency of driving alone. It also aims to promote vehicle fuel efficiencies and expand the use of electric vehicles (EVs) and clean fuels such as hydrogen and advanced biofuels. Some biofuel technologies, such as cellulosic ethanol technology, can avoid food / fuel conflicts or risks to biodiversity.

EVs are quickly gaining traction in the region, particularly with rising fuel prices, and the CLP will encourage expanding charging infrastructure and incentives to spur them on. Shared mobility, including vehicles and bikes, will offer more options for Victorians to reduce vehicle ownership as fleets expand into every neighbourhood.

Redesigning the way we move around the city and shape land-use development will also be important strategies. Mixed-use neighbourhoods will allow people to access the amenities and services they need with reduced reliance on vehicle travel.

Targets

GOAL	TARGETS
GOAL 1: **All Victorians have access to low carbon, high-performance and affordable multi-modal transportation.**	**TARGETS:** *By 2030, 25 percent of all trips by Victoria residents are taken by public transportation.* *By 2030, 100 percent of BC Transit buses in Victoria are renewably powered.* *By 2030, Victoria residents choose walking and cycling for 55 percent of all trips.*
GOAL 2: **Vehicles in Victoria are powered by renewable energy.**	**TARGETS:** *By 2030, renewable energy powers 30 percent of passenger vehicles registered in Victoria, and 100 percent of passenger vehicles are renewably powered by 2050.* *By 2030, 30 percent of commercial vehicles operating in Victoria are renewably powered.*
GOAL 3: **Smart land use minimizes transportation emissions.**	**TARGETS:** *By 2030, 100 percent of Victoria's neighbourhoods are "complete" by design with substantial transportation system diversity.*

2017 TRANSPORTATION MODE SPLIT

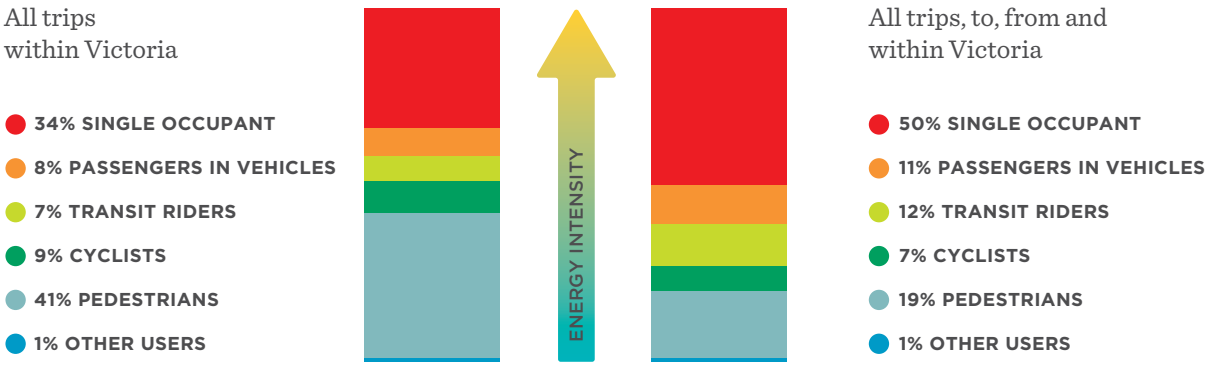


Figure 8: 2017 Capital Region District Origin Destination Household Travel Survey. All numbers are based on 24-hour travel for people 11 years old and up.

Community in Action

Brian and Rosie have always been on-the-go. Whether it is getting around town to run errands, completing work trips, or going on weekend adventures around the island, the pair each need a vehicle on a daily basis. Being environmentally-conscious, they both realized that action needed to be taken to reduce the amount of carbon emissions their busy lifestyles produced. Shortly after they purchased their first battery-powered electric vehicle, they realized some unexpected benefits. For one thing it turned out to be a smart economic move for the family, thanks to savings on fuel, repairs and maintenance. The vehicle could also comfortably make trips out to Duncan and Shawnigan Lake. And thanks to accessible charging stations around Victoria, easily located via smart phone apps, finding a place to plug in has been no problem. When time came to upgrade their second vehicle, they needed something that could perform on long-distance trips to the mainland and interior - an efficient plug-in hybrid that has both batteries and a gasoline engine.

3.6%

of Victoria's current passenger vehicle inventory are electric, hybrid and bio-powered (3X 2011 ownership rates of 1.1 percent).[19]

Moving in a New Direction. A family of four can have big travel needs, but for Claire, Tom and their two children, Mateo and Elara, they have a small transportation footprint. The family made a commitment more than a decade ago to shed the hassles of owning a vehicle and now rely on walking, cycling, public transit and car sharing. "Sometimes there can be a bit more planning involved, but over time, being a car-free family requires less work and costs less. You quickly realize the benefits like not having to worry about insurance renewal or unexpected vehicle repairs," says Tom. By joining a local car share organization, their family has access to dozens of vehicles including mini-vans, pick-up trucks, hybrid sedans and even an electric SUV. "We still drive a vehicle – just a lot less than we would if we owned one. And because we are cycling and walking more often, we get to be out in our community, get regular exercise and our children know the rules of the road."

[19] CRD. (2017). 2017 Capital Region District Origin Destination Household Travel Survey.

Actions

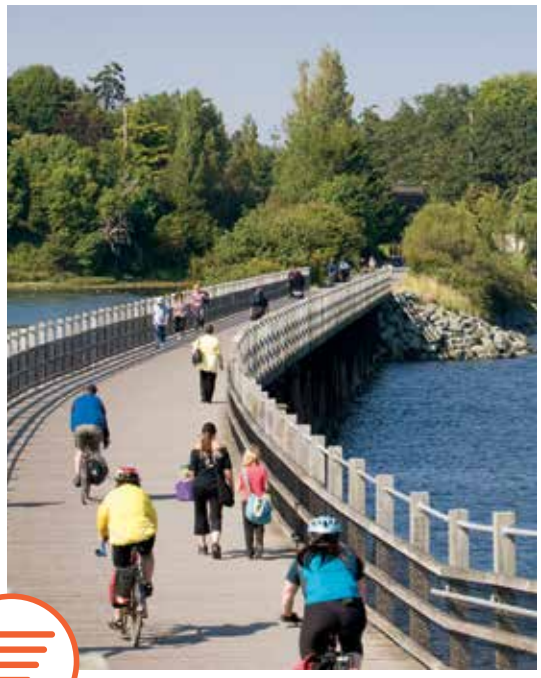
- Complete the City's Sustainable Mobility Strategy (SMS), which will allow the city to develop the management systems, programs and other tools to optimize and transform the movement of people, goods and services. As part of the SMS, the City will set specific targets for reducing single-occupancy vehicle use, vehicle kilometres traveled, and vehicle ownership. It will also adopt multi-modal service indicators and identify performance criteria for "complete" neighbourhoods and transportation service diversity.
- Work with municipal partners to implement "smart city" technologies that improve safety, affordability and convenience for public transit, walking, cycling, car-sharing and ride-sharing.
- Invest annually in design and construction of new walking and cycling infrastructure, including secure bike parking in the downtown core and in village centres.
- Expand EV charging stations in City parkades, recreation centres, community centres and public spaces.
- Invest in 'transit-signal priority' measures to reduce transit wait times in the downtown core.
- Design and implement an EV ecosystem strategy, including design guidelines for new development projects, to promote and support the adoption of electrified personal, public, and commercial vehicles.
- Expand the Active & Safe Routes to School program to all Victoria elementary schools.
- Introduce an electric bicycle incentive program in partnership with CRD and the Province.
- Promote and incentivize comprehensive transportation demand-management strategies for new development projects.
- Assist commercial operators in their transition to renewably-powered fleet.
- Pilot a sustainable urban freight improvement program for downtown using compact electric logistics vehicles and cargo-bicycles.
- Sponsor community-led events, educational programs, and celebrations that encourage use of low carbon transportation.
- Invest in education and promotional programs for Victoria households, informed by behavioral insights, to increase use of public transit and active transportation.
- Develop a transportation GHG information strategy in partnership with CRD and ICBC, supported by technology to facilitate transportation GHG planning and action.
- Advocate for energy performance requirements in provincial ride-sharing regulations.
- Expand car share services in the downtown core and village centres.

LEGEND: Action Underway · Initiate Action by 2020 · Future Action

- Advocate for significantly improved commercial vehicle performance, higher fuel efficiency, and tighter air quality standards and monitoring and reporting.
- Work with port authorities to supply on-site renewable energy for marine vessels.
- Advocate to the Provincial government to require ICBC to offer distance-based or pay-as-you-drive automobile insurance.
- Partner with the CRD to undertake a regional pricing analysis on effective, fair and long-term mobility options such as decongestion charges.
- Invest in programs that support transportation demand management for businesses and public institutions operating in Victoria.
- Implement rapid transit on major corridors and micro transit services within neighbourhoods.
- Support the expansion of electric buses, including BC Transit and other commercial fleets, through infrastructure and permit programs.

Photo credit: Darren Stone, Times-Colonist

The majority of vehicles on the road today burn gasoline and diesel, accounting for 40 percent of our community GHGs.



Cyclists and pedestrians along the Selkirk Trestle, Galloping Goose Trail.

2018 Sustainable Mobility Strategy

The majority of actions in transportation will come through the development of the City's Sustainable Mobility Strategy. The Sustainable Mobility Strategy will support delivery of an integrated and highly-efficient transportation network to provide affordable and low carbon mobility options for Victorians, and facilitate the effective delivery of goods and services across the municipality.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LOW CARBON WASTE MANAGEMENT

The Vision *By 2050 waste-related emissions have been eliminated. Greenhouse gases produced by organic materials collected and treated in the region supply renewable energy to the community. Continuous improvement of the City's waste management systems has dramatically reduced landfilling of waste to near zero. In fact, 'waste' is rarely heard in our vocabulary by mid-century. Instead, we focus on managing 'materials' and 'resources.'*

The Goal

1

Organic materials are managed to avoid GHG emissions.

Reduce GHG emissions associated with organic waste decomposition by reducing food and yard waste at the source and minimizing the amount sent to landfill. Address management of other materials that produce methane when landfilled (e.g. wood, paper, textiles) as part of the City's sustainable waste management strategy.[20]

The City will support innovation to improve the capture and use of methane from collected organic waste.

[20] The City's sustainable waste management strategy will also address other elements of waste management that generate GHG emissions, including transportation and processing. The CLP covers these elements in its building and mobility sector plans.

The Challenge

Greenhouse gas emissions from waste come largely from the breakdown of organic materials in our landfill. That process releases methane, a greenhouse gas far more potent than CO_2. Organic wastes from Victoria, decomposing at Hartland Landfill, produce the equivalent of 27, 000 tonnes of CO_2, which is approximately 7 percent of our community's GHG emissions (an additional 2 percent of waste emissions are associated with the city's liquid waste). Until recently, organic materials such as kitchen waste were treated as garbage and buried in our landfill; in 2015, kitchen scraps were banned. This move reduced the volume of organic material arriving at the Hartland Landfill, but it has not eliminated it. Kitchen scraps and other easy-to-compost materials still make up the largest share of the regional waste arriving at Hartland — 21 percent or roughly 75 kilograms per person every year.[21] Other organic wastes that generate methane at a slower rate, including wood, paper and textiles, make up another 38 percent of Hartland's intake.

Photo credit: Capital Regional District

A truck dumping different types of solid waste at the Hartland Landfill.

LANDFILL WASTE GENERATING GHGS AT HARTLAND LANDFILL

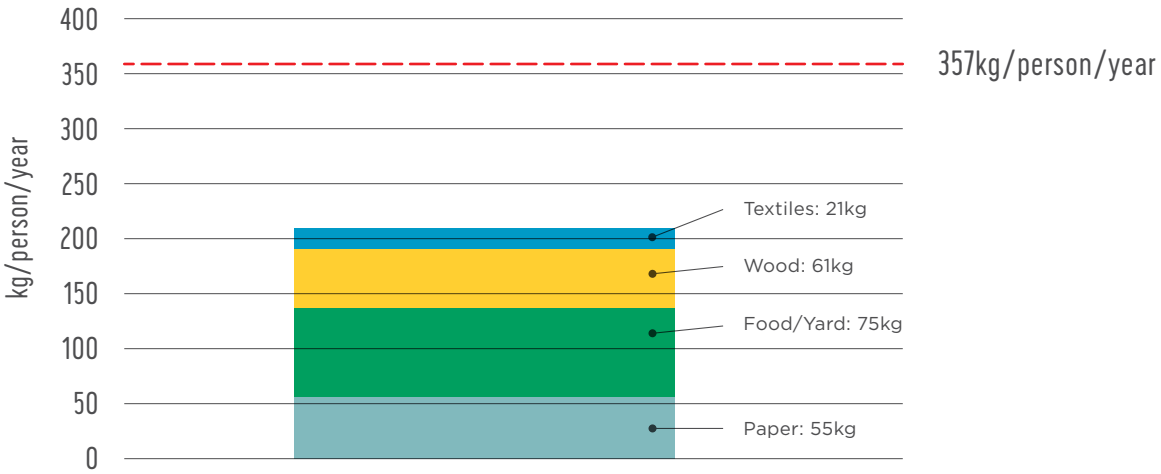


Figure 9: Landfill Waste Generating GHGs at Hartland Landfill. Numbers from the 2016 CRD Waste Stream Composition Study.

[21] CRD. (2017). Solid Waste Stream Composition Study. https://www.crd.bc.ca/docs/default-source/recycling-waste-pdf/WasteCompositionStudy2016.pdf?sfvrsn=4

The Plan

Reducing GHGs from waste will require major reductions in waste disposal. In addition, landfill gas capture must continue to be maximized. Above all, reducing the amount of waste we generate in the first place is the smartest way to decrease waste related GHG emissions.

There are significant costs involved in landfilling waste and in composting it, so reducing waste generation can save money. Opportunities to reduce organic waste and GHGs include changing consumer and business behaviours and better design and planning.

Organic wastes that continue to be collected will be diverted to sustainable treatment processes that capture any methane emissions and nutrients.

A staff member at a downtown Victoria restaurant emptying kitchen scraps into a compost bin.

Targets

GOAL 1:

Organic materials are managed to avoid GHG emissions.

TARGETS:

Eliminate 100 percent of food and yard waste sent to the landfill by 2030.

Eliminate 100 percent of other organic materials sent to the landfill by 2030.

Capture methane from collected organic waste to provide renewable energy by 2025.

Actions

- Continually improve the residential kitchen and yard waste collection and diversion programs, including for multi-family residences.
- Foster behaviour change to reduce food waste through the "Love Food Hate Waste" educational campaign.
- Partner with CRD to deliver a regional, industrial treatment facility for organic waste by 2025.
- Work with local stakeholders to reduce food waste from restaurants and to divert it from the landfill.
- Reduce additional sources of food waste in the city, such as from the commercial sector and tourism industry.
- Partner with CRD and neighbouring municipalities to get more value from organic waste through pilot programs that stimulate new demand and keep nutrients in the region.
- Work with stakeholders to reduce and divert other materials that produce methane when landfilled (e.g. wood, paper, textiles).

These efforts will be part of a larger sustainable waste management strategy. The strategy's purpose is to reduce overall waste generation and disposal and to realize economic and community benefits in the process.

LEGEND:

- Action Underway
- Initiate Action by 2020
- Future Action

Hartland Landfill has a target to capture 75 percent of the methane produced from its decomposing waste. Collected methane is combusted and turned into electricity – enough to power 1,100 homes. Because not all of the methane can be collected, it is important to keep compostable material out of the landfill.

DID YOU KNOW? METHANE IS A GHG 25 TIMES MORE POTENT THAN CO_2.

Children make the connection about recycling nutrients back to the soil at the Victoria Compost Education Centre .

Photo credits: Victoria Compost Education Centre

Creating compost from food and yard waste at a community workshop.

Community In Action

Food Rescue Project Food waste from supermarkets has gathered an increasing amount of public attention, particularly after a law passed in France that forbids throwing away unsold food. French supermarkets must now donate the food to charities and food banks. In Victoria, the Food Rescue Project is a grassroots initiative that works along these lines. The Victoria Foundation, the Rotary Clubs of Greater Victoria, Thrifty Foods and the Mustard Seed Street Church collaborated under the Food Share Network to launch the Project in 2017.

Here's how it works: Eleven Thrifty Foods stores, as well as Whole Foods and Country Grocer stores identify bakery, dairy and produce items that are fresh and edible, but that cannot be sold. Mustard Seed collects this food and brings it to their Food Rescue Distribution Centre warehouse where volunteers wash the food and organize it into hampers. There is also a commercial kitchen to transform some rescued food into soups and other value-added products. From the warehouse, the food is distributed to food-insecure communities across Greater Victoria.

The Food Rescue Project directly benefits more than 35,000 people each month. During its first year of operation, the Food Rescue Project kept 114,000 kg of dairy products, and 457,000 kg of fruits and vegetables from entering the waste stream. The Food Rescue Project demonstrates how collective action can have positive social and economic impacts alongside greenhouse gas reductions.

Photo credits: Victoria Foundation


DOWNTOWN

MUNICIPAL OPERATIONS

The Vision *By 2050, all of the City's operations, fleet and buildings will be renewably powered. The City has consistently demonstrated a track-record of successful GHG reduction programs and partnerships with community. The City has found innovative ways to minimize energy use and GHGs without diluting the quality of public services or the quality of community life.*

The Goals

1 **The City is a recognized leader in climate mitigation and adaptation.**

The City demonstrates leadership in climate action by cutting its corporate annual GHG emissions by over 3,000 tonnes, and by minimizing climate-related risks to City infrastructure through early planning and action.

2 **The City takes integrated and informed climate action.**

Climate action is integrated with all City programs and plans as they are renewed, and City action is informed by a full understanding of through-life social, environmental, and economic costs, risks and benefits. Understanding the full suite of sustainability risks and benefits for each asset and service area allows the City to make smart investments to reduce GHGs as much as possible for every dollar invested.

3 **The City will provide timely and accurate data supporting strong climate mitigation and adaptation actions.**

The City will develop an energy and GHG information management strategy that defines, tracks and analyzes energy use and GHG production across all sectors. The data will be publicly-accessible to improve both City and community decision making.

The Challenge

The City of Victoria's corporate operations released about one percent of total community GHGs (3,400 tonnes in 2017).

Most of the City's corporate GHG emissions come from the combustion of fossil fuels to provide heat and hot water to buildings, and to operate the City's fleet. The City manages over 100 buildings, occupying more than 500,000 square feet. Annually, they generate over 1,500 tonnes of GHG emissions. In addition to our emergency service vehicles (police and fire), the City has a fleet of over 200 vehicles supporting the departments of Parks, Recreation and Facilities and Engineering and Public Works. Collectively, the City fleet consumed over 850,000 litres of gasoline and diesel fuel in 2017, generating over 1,900 tonnes of GHGs.

GHG emissions from transportation remained stable over the past decade. Over the same period, building-related emissions declined almost 25 percent. Several factors have reduced building-related GHGs since 2007 (GHGs from City operations have declined by 14 percent since 2007 (see figure 8) the City has fewer building assets, electrical supply now has lower GHG intensity than previous years, and the City has completed energy efficiency, heating and air conditioning upgrades in both the Victoria Conference Centre and at City Hall.

Parks staff training on chainsaw safety.

GHGs FROM CITY OPERATIONS

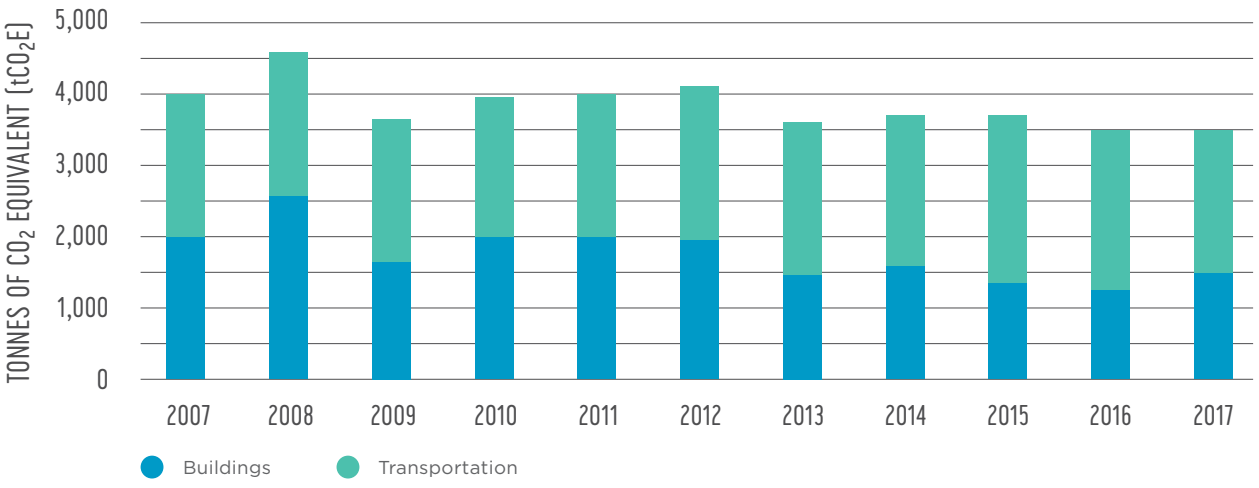


Figure 10: City of Victoria corporate GHG inventory, 2017.

The Plan

The CLP targets further improvements in the City's overall corporate energy efficiency, in its GHG performance and in its role as a leader, inspiring broader action by the community.

In many cases, the city will need a **redesign** in how it delivers services and manages infrastructure. This will be pursued through a comprehensive corporate energy management plan that weaves energy efficiency and GHG performance into City plans and policies. This includes everything from parks and underground utilities to the City's procurement processes.

The City will directly **reduce** GHGs through three main actions: upgraded efficiency in buildings, improved vehicle efficiency and reduced fuel demand, and a progressive shift from fossil-fuel burning equipment to those running on electricity, renewable natural gas, hydrogen or advanced biofuels.

Since 2016, the City has added three e-bikes, eight hybrid vehicles and nine electric vehicles to its fleet, and it is just getting started. The City looks to the marketplace for EV solutions every time it buys new vehicles and it is working to help vehicle providers understand exactly what kind of performance it needs, so they can build EVs that meet the mark.

Specialty vehicles like this Palo Alto garbage truck are now available in electric models. The City of Victoria is actively looking to replace its fleet with electric alternatives.

City in Action

Did you know that the Victoria Conference Centre now runs on 100 percent renewable energy? In 2017 it switched to Renewable Natural Gas (RNG). RNG is made out of organic materials that would otherwise decompose and release methane into our atmosphere – a highly potent GHG!

Targets

GOAL	TARGETS
GOAL 1: **The City is a recognized leader in climate mitigation and adaptation action.**	*By 2040, all City facilities are powered 100 percent by renewable energy.* *All new City facilities are renewably powered.* *By 2025, all City power tools and small engine-driven equipment are renewably powered.* *By 2040, 80 percent of the City fleet is electrified or renewably powered.*
GOAL 2: **The City takes integrated and informed climate action.**	*By 2020, capital and operating plans are informed by climate data, carbon pricing, and the City's GHG reduction targets.* *By 2022 the City has developed a 'triple bottom line' accounting system that guides City business planning by assessing and balancing environmental and social risks and financial costs and opportunities.*
GOAL 3: **The City will provide timely and accurate data supporting strong climate mitigation and adaptation actions.**	*By 2022, partner with other local governments and the region to develop a community-accessible Energy and GHG information management System (EGIMS) to define, communicate and track community energy and GHG reduction across all sectors.*

6,700
LED STREETLIGHTS

Did you know that the City has completed its streetlight replacement program to swap-in energy- efficient LEDs? It has replaced 6,700 street lights reducing energy use by 50 percent, avoiding, an estimated $200,000 in energy costs per year, which frees up financing to help support increased electrification across our community.

Actions

- Develop a corporate energy and emissions management plan — including a 'triple bottom line' accounting system — to assess and balance environmental, social and financial risks and opportunities. The plan will also support deep energy retrofits for existing facilities.
- Incorporate climate action performance measures into the City's annual budgeting process.
- Develop a Climate Action Economic Assessment Tool for both GHG mitigation and adaptation actions to identify the high-priority community programs that will deliver the most affordable GHG reductions for buildings, transportation and waste management.
- Expand procurement policies to include sustainability performance criteria, including GHG production, and avoidance of all types of waste.
- Establish a two-year staff corporate energy and climate action position using matching funds from an external partner. Join BC Hydro's Corporate Energy Manager Program.
- Update the corporate building policy for new construction to reference BC Energy Step Code requirements and provide staff training to support its adoption.
- Formalize fleet electrification through the City's fleet master planning process.
- Plan for City vehicle electrification systems and networks.
- Where electric vehicles are not available, switch to low carbon fuels.
- Implement fleet telematics to identify vehicle and operational energy use patterns to inform decision making.
- Reduce per-vehicle GHG emissions through fleet operation and maintenance as well as vehicle right-sizing.
- Partner with other municipalities and orders of government to support development of the full suite of EVs required by municipal fleets.
- Develop the City's web-based GHG / Energy education, awareness and information exchange portal to promote information sharing and empower the public to achieve measurable, and trackable, GHG reductions.
- Build an education program to improve staff's capacity for energy and GHG management in their day-to-day decision making.
- Pilot new technologies in City-owned assets to assess suitability for broad community application.

City carpenters working on Fort Street.

LEGEND: Action Underway · Initiate Action by 2020 · Future Action

Darren Stone, Times-Colonist

Dallas Road seawall.

ADAPTING EARLY

The Vision *In 2050, Victorians share sustainable community values, civic pride, neighbourhood partnerships, and a wise and common long-term planning view. Innovative adaptation projects were completed early and affordably to manage an increase in severe and prolonged storms, heatwaves, flooding, and sea level rise, recognizing that modest early investments would minimize costly and disruptive actions later. Victoria's municipal infrastructure is strong and supports a healthy, biodiverse and resilient natural environment, a thriving economy, and a vibrant, active community.*

The Goals

1. **All climate-related risks to City infrastructure are minimized through early and wise planning and action.**

   By managing its natural and built assets, the City ensures that new infrastructure projects will be able to withstand the new climate realities of 2050 and beyond.

2. **Victoria's natural environment flourishes in a changing climate.**

   Through growing expertise and ongoing climate-aware management, Victoria reduces climate stress on its parks and natural environment.

3. **All Victorians are empowered and prepared for climate impacts and emergencies.**

   Education and collaboration enables the community and the City to ensure that all corners of Victoria are prepared for the changes ahead, particularly our most vulnerable populations, including lower income and older residents who often lack the resources to respond effectively to changing conditions.

The Challenge

Victoria will experience hotter and drier summers, warmer and wetter winters, rising sea levels, and more extreme storms, no matter how effectively the world reduces future carbon emissions.[22] The severity of these issues will depend on the collective actions taken in the years ahead, to further mitigate climate change and reduce the impacts from GHGs already in our atmosphere.

Hotter and drier summers will stress our trees, parks, and gardens, and could make it harder to find local and affordable food, despite longer regional growing seasons.

More intense rain storms could strain our infrastructure and contribute to local flooding. Sea level rise will also contribute to flooding, and in the process, can cause coastal erosion, and damage our cherished waterfront environment. Victoria must reduce GHG emissions and begin to adapt to climate impacts early if it is to avoid the need for disruptive and costly action later.

Climate adaptation got started in Victoria a decade ago, when cities in BC got their first look at reliable, accurate climate projections for regional temperature and precipitation in 2050 and 2080. In 2011, Victoria joined the first cohort of Canadian cities creating climate adaptation strategies. Since then climate risk has been incorporated into numerous City master plans and strategies.

The challenge now is finding strategies for prioritizing near-term actions to address present and future climate impacts, and thus ensure that Victoria remains resilient and prosperous. Acting early to anticipate climate change will avoid disruptive and costly action later. The National Roundtable on the Environment and the Economy estimated that climate change could cost Canada up to $43 billion per year by mid-century, but projected that the price tag could be more than halved through early action. The Roundtable's endorsement of early action has been affirmed by BC's Auditor General, and by the United States' National Institute of Building Sciences. The latter found that every dollar spent on reaching higher than the baseline building code requirements saved society four dollars in avoided damage during natural disasters. In addition, by becoming more climate resilient, we can support the security of our food, water, and energy, deepen our stewardship of the natural environment, take care of our community's most vulnerable, and strengthen our regional self-sufficiency.

DID YOU KNOW?

The City of Victoria has several plans and strategies that incorporate climate adaptation, including:

[22] CRD. (2017). Climate Projections for the Capital Region. https://www.crd.bc.ca/docs/default-source/climate-action-pdf/reports/2017-07-17_climateprojectionsforthecapitalregion_final.pdf

The Plan

The City of Victoria will rely on solid evidence and best-practice to identify climate risks due to aging infrastructure, environmental degradation, or social inequity, and to prioritize actions. For example, Victoria's challenges are similar to that of many Canadian cities where a significant portion of the physical infrastructure is in need of replacement. Resilient infrastructure maintains functionality in the face of shocks or extreme events. By being proactive and continuing to build climate adaptation into the city's business, the City of Victoria will work towards protecting and enhancing its social, natural and built infrastructure. Critically, it will do so while continuing to provide its full set of services to residents, businesses and visitors.

The City cannot manage all risks associated with climate change on its own. For example, homeowners, landlords, and tenants are primarily responsibility for keeping residential buildings safe and vibrant. Similarly, the private sector owns many assets that the community relies on. Only by working together and supporting our community's most vulnerable populations, including lower income and older residents, can we be successful in preparing for the changes ahead. Research shows that these groups are at greater risk from climate impacts, while often possessing the fewest resources to respond. Addressing these social risks can simultaneously boost quality of life and climate resilience for those who need it most.

Adaption planning will involve the creation of a monitoring and evaluation framework for adaptation, which can be more difficult to quantify than the 'mitigation' measures anticipated by the CLP's other sector plans. This framework will be will be built into a separate climate adaptation planning document that will help us implement the CLP's adaptation actions and update the public on action progress.

PARKS AND ECOSYSTEMS

Climate adaptation action for our parks and ecosystems protects both their intrinsic value and their place in our municipal identity. It is also about sustaining their role as natural infrastructure that provides essential services. Our urban forest helps reduce flood risk by absorbing rainwater, and also provides shade that will help keep our buildings and public spaces cool during increasing hot periods in the future. Early and wise planning and action will help ensure a beautiful and productive natural environment in Victoria for generations to come.

Garry oak tree meadow.

Targets

GOAL	TARGETS
GOAL 1: **All climate-related risks to City infrastructure are minimized through early and wise planning and action.**	**TARGETS:** *Climate resilience is embedded into all City business.* *The City's infrastructure and services are ready to protect and respond to the risks associated with a changing climate.*
GOAL 2: **Victoria's natural environment flourishes in a changing climate.**	**TARGETS:** *Natural habitats support healthy fish, wildlife, and plant populations and healthy ecosystem function.*
GOAL 3: **All Victorians are empowered and prepared for climate-related impacts and emergencies.**	**TARGETS:** *The community is knowledgeable and prepared to address the impacts from a changing climate.* *The City incorporates best practices in risk communication covering all climate hazards.* *Climate resilience enhances quality of life for all Victorians, especially the most vulnerable.*

Resiliency

Resiliency is the capacity of built, natural and human systems to cope and recover from climate impacts in an efficient and timely manner. The characteristics of diversity and redundancy – which are central to resilience – are found everywhere in nature, and provide important lessons that can be applied in the pursuit of climate resilience. At the building level, green roofs, trees, lawns, cisterns, and ultimately the city drainage network all serve to remove rainwater from the building vicinity either through evapotranspiration, storage, or removal. These diverse systems work towards the same goal, and help build resilience into the system so that when one part stops working, the building can rely on the others to keep dry.

Burnside Gorge Community Centre green roof.

Actions

- Develop the 'business case for adaptation' to demonstrate benefits of taking early action.
- Conduct a community-wide climate vulnerability and risk assessment.
- Assess how existing City plans incorporate climate risk and identify opportunities to align with ongoing and future City business.
- Seek funding, investment, and partnership opportunities to enhance the speed and quality of adaptation initiatives.
- Minimize flood risks through natural and engineered stormwater infrastructure.
- Analyze the economic, social and environmental implications of adopting a flood construction level.
- Study how the direct and indirect impacts of climate change will affect the local economy.
- Engage community members in refreshing the "Climate Adaptation Plan" and include actions for sectors beyond the municipal corporation (e.g., residents).
- Create a community-wide monitoring and evaluation framework to assess resilience and demonstrate progress.
- Consider future climate impacts when designing and retrofitting City buildings.
- Study the interdependencies between infrastructure systems to minimize cascading effects.
- Continue to integrate climate change impacts in environmental management decisions.
- Increase native plantings on City owned and managed land to enhance biodiversity and support ecosystem migration.
- Support CRD initiatives and investments to acquire, expand and protect green spaces across the region.
- Explore the creation of Environmental Development Permit Areas or other mechanisms to protect and enhance shoreline and marine habitats.
- Work with partners to engage, educate and influence the general public to manage privately owned urban forest to be resilient to climate change.
- Develop or amend landscaping guidelines to encourage private developments to use native tree stock that is adapted/resilient to future climate change.
- Integrate climate adaptation with work being done on local and regional food security, where appropriate.

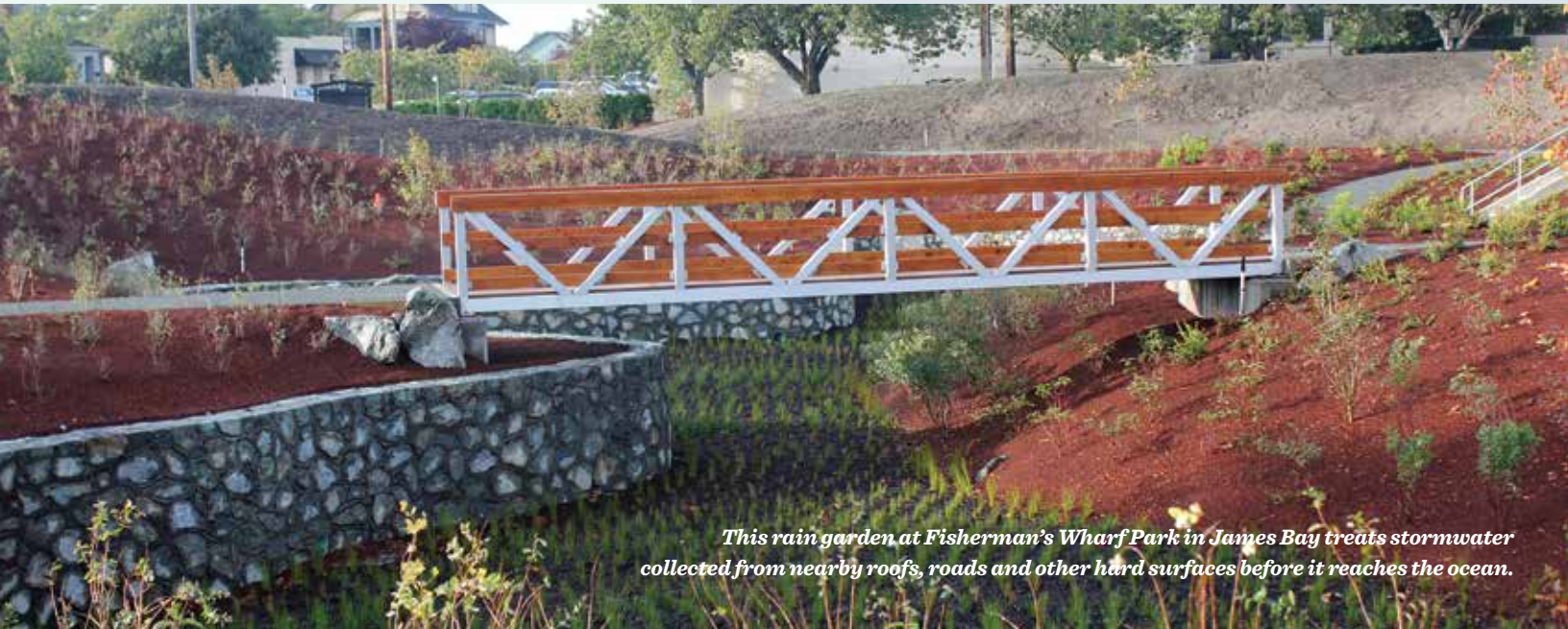
LEGEND: Action Underway · Initiate Action by 2020 · Future Action

- Continue to improve public communication methods in advance of extreme weather events.
- Continue to integrate climate risks into emergency preparedness and recovery planning.
- Support projects and programs that increase resilience in populations vulnerable to climate change.
- Collaborate with community partners to expand public knowledge of the impacts of climate change and the preparation required for all Victorians.
- Compile a resource that communicates private sector responsibilities for climate adaptation, and connects them to resources and programs that will help them mitigate risks.

Community in Action

Installing a heat pump in your home, or business not only provides low carbon heating through the winter, but can also be used to provide cooling during the increasingly warm summer months. This was one of the many reasons that Maggie and Dave decided to get one for their new home.

Although Victoria has not traditionally needed much cooling during the summer, this will change in the coming decades, when heatwaves and higher average temperatures are more common. For all of these reasons, we are seeing more and more Victorians making the choice to replace their old furnaces, baseboard heaters, and boilers with ultra efficient heat pumps.



This rain garden at Fisherman's Wharf Park in James Bay treats stormwater collected from nearby roofs, roads and other hard surfaces before it reaches the ocean.

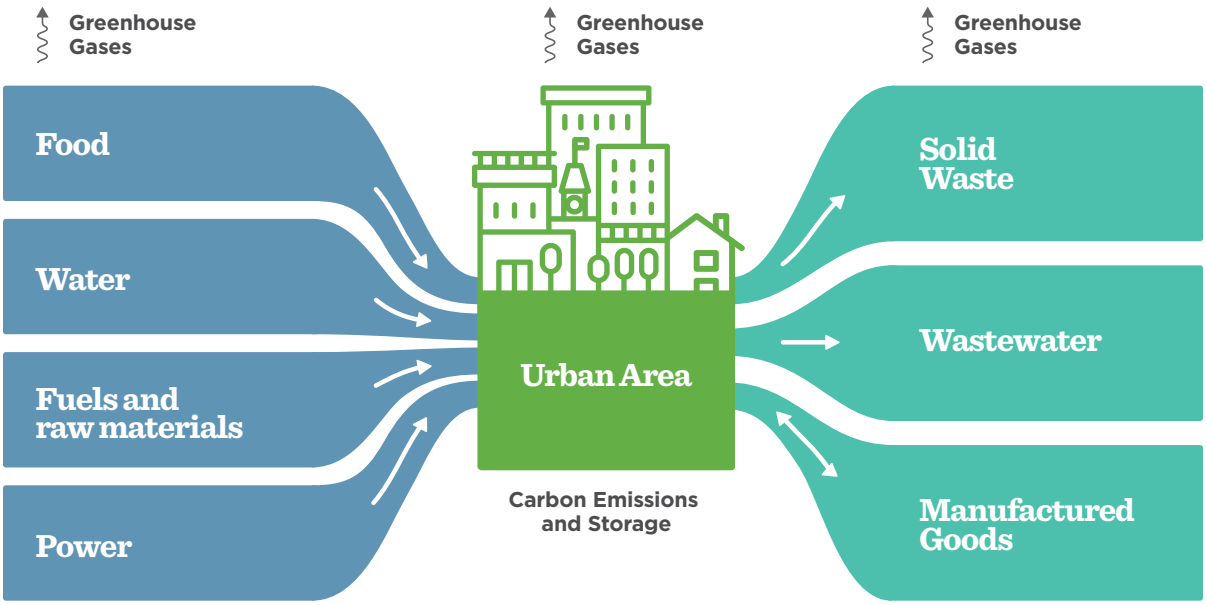
THE NEXT CHAPTER: EMBODIED EMISSIONS

Accounting for Consumption The Climate Leadership Plan focuses on greenhouse gas emissions generated locally - from buildings, transportation and waste. This is the recognized global standard for emissions reporting and action, but there is an emerging initiative that takes broader stock of a community's climate impacts. It calls for a fuller understanding of the GHG impacts — including emissions generated beyond city limits to make and deliver the materials, products and services that we consume. Identifying and measuring these 'embodied emissions' is a key step towards creating opportunities for cities to lead the way towards a more sustainable future.

Research indicates that embodied (or consumption-based) GHG emissions are approximately 60 percent greater than the GHGs generated within city boundaries.[23]

While cities do not have direct control over the embodied emissions of most goods and products, they do have many opportunities to design and promote more sustainable urban lifestyles that can help reduce these consumption-based emissions. As work on climate action expands at the City, opportunities to reduce embodied emissions and shift to low carbon consumption patterns will be explored.

CITY FLOWS: THE CURRENT MODEL OF "TAKE, MAKE, WASTE.



[23] C40. (2018). Consumption Based GHG Eemissions of C40 cities. http://www.c40.org/researches/consumption-based-emissions

Fostering a Circular Economy

The Circular Economy concept is gaining momentum as a new model for reducing waste and improving the efficiency of our current system. The concept looks at transitioning away from the extraction, use and disposal of resources towards a system that keeps resources in use indefinitely.

The City will work towards alignment with the principles of a Circular Economy, and develop actions to reduce consumption-based GHGs. Potential future actions include adopting consumption-based emissions accounting for the City of Victoria, and developing a sustainable consumption strategy that identifies and prioritizes options for lower carbon consumption.

Eco-City Project

In 2017, the City of Victoria piloted the use of a new tool to create a consumption-based inventory. The results revealed a doubling of GHGs when taking into account the embodied emissions from the products and goods consumed by Victorians. The results of Victoria's consumption-based inventory shows that the choices we make as individuals in what we consume have a significant role to play in reducing our community's GHG emissions.

CONSUMPTION BASED GHG EMISSIONS, 2015

TOTAL tCO_2e/ca: 8.3 TOTAL tCO_2e: 703,000

Figure 11 : City of Victoria ecoCity Footprint Tool Pilot Summary Report (2017).

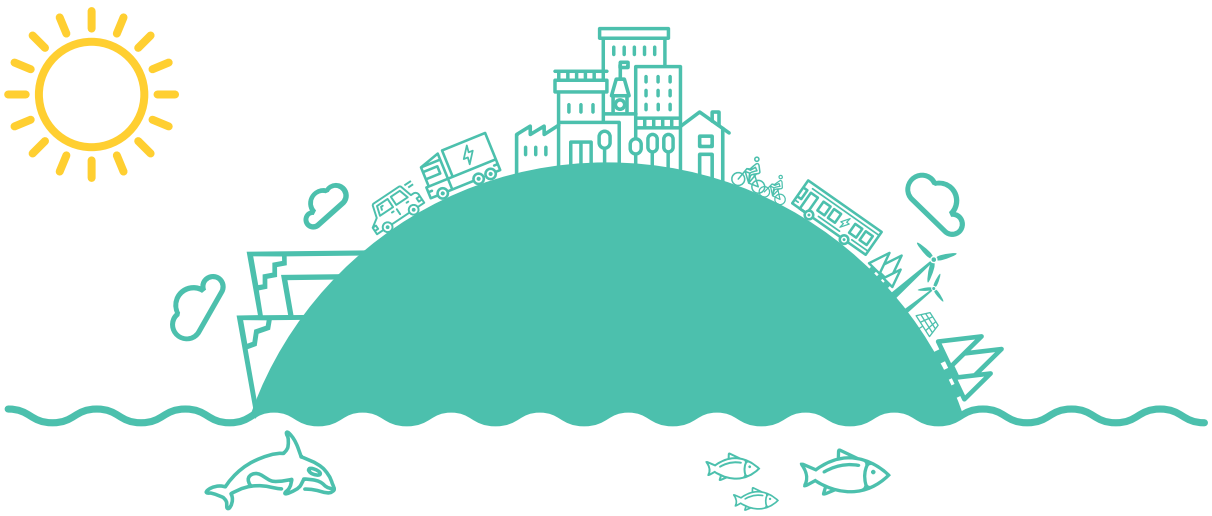
BUILDING MOMENTUM

The CLP is the City's first step toward galvanizing our community around the actions needed to reduce GHGs by 80 percent by 2050, along with a corresponding and necessary shift to 100 percent renewable energy. The CLP calls for reducing energy and GHGs, replacing fossil fuels with low carbon alternatives, redesigning systems to produce less GHGs, and building resilience into our community. Distinct pathways to a low carbon future for the buildings, mobility and waste sectors focus toward building a more prosperous and sustainable future, to be reached through early, well-informed and affordable planning and investments.

Reaching the City's ambitious, but achievable climate action targets will require strong and enduring collaboration across our community, business, government and residential groups.

Through the CLP, the City pledges to help ensure that the necessary information and decision-making systems are in place to support all community members as they seek to make cost-effective, low carbon energy choices. Our community's willingness and ability to take action will determine the overall pace, scale and success of our climate actions.

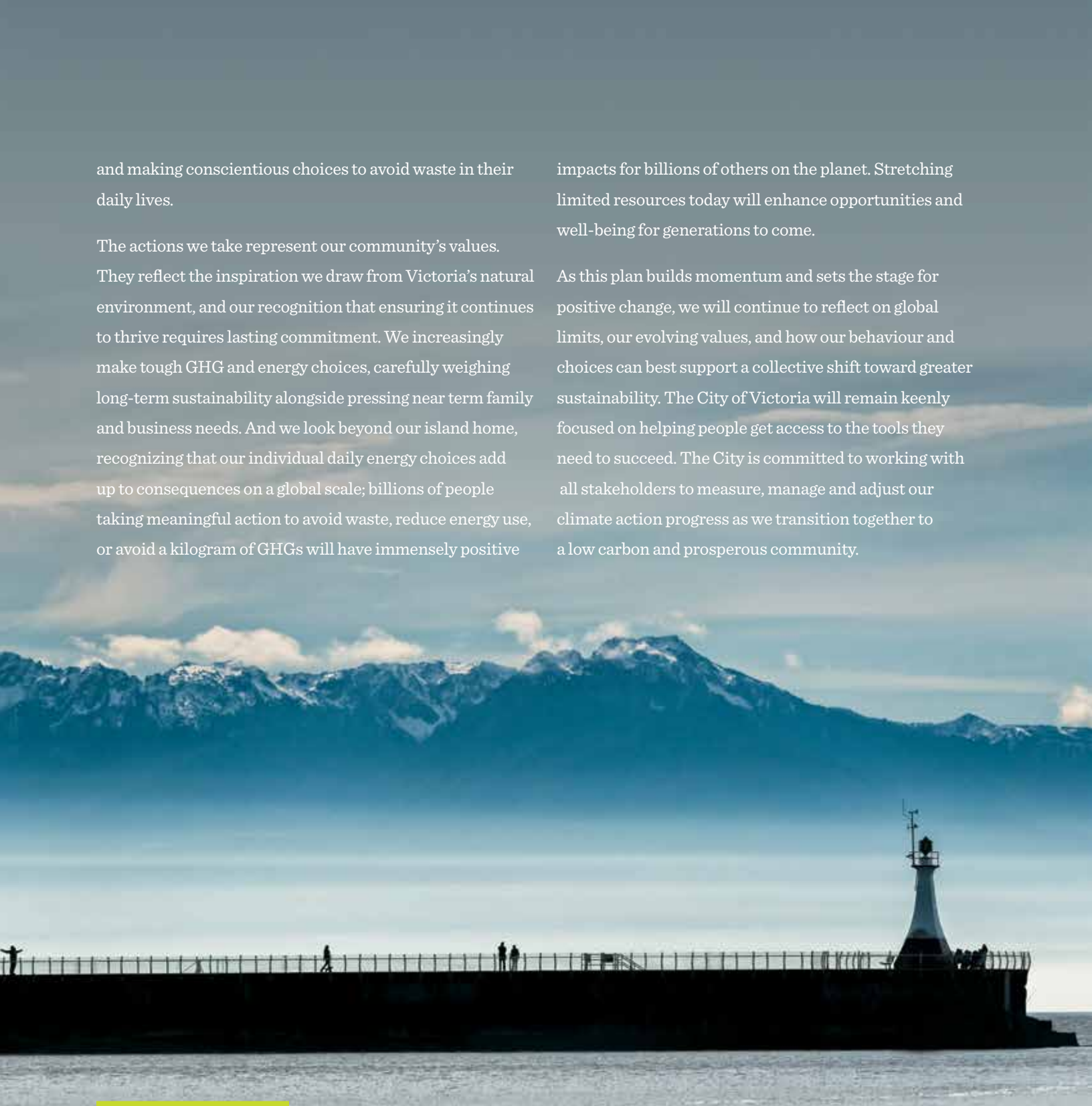
In many cases, we already have the tools, technology and information to make convenient and high-impact GHG and energy improvements. Across Victoria, many community members are taking action today and are on track to achieve the 2050 targets. These climate leaders are keeping their well-insulated homes comfortable by using affordable and efficient heat pumps; rethinking their mobility choices by taking transit, riding bikes and walking for local trips; driving plug-in hybrids and electric vehicles;



and making conscientious choices to avoid waste in their daily lives.

The actions we take represent our community's values. They reflect the inspiration we draw from Victoria's natural environment, and our recognition that ensuring it continues to thrive requires lasting commitment. We increasingly make tough GHG and energy choices, carefully weighing long-term sustainability alongside pressing near term family and business needs. And we look beyond our island home, recognizing that our individual daily energy choices add up to consequences on a global scale; billions of people taking meaningful action to avoid waste, reduce energy use, or avoid a kilogram of GHGs will have immensely positive impacts for billions of others on the planet. Stretching limited resources today will enhance opportunities and well-being for generations to come.

As this plan builds momentum and sets the stage for positive change, we will continue to reflect on global limits, our evolving values, and how our behaviour and choices can best support a collective shift toward greater sustainability. The City of Victoria will remain keenly focused on helping people get access to the tools they need to succeed. The City is committed to working with all stakeholders to measure, manage and adjust our climate action progress as we transition together to a low carbon and prosperous community.



Acknowledgements

The Climate Leadership Plan has been developed through deep collaboration across all City departments, and has been made possible thanks to the tireless efforts of many groups across Victoria, including neighbouring municipalities, academia, industry, non-profits, technical experts, and partners in regional and provincial governments. The City is extremely grateful to all leaders and community members who have given freely of their time to help build this plan, and who have demonstrated inspirational leadership in our collective bid to reduce GHGs and thrive in our community.

2018 CITY OF VICTORIA
CLIMATE LEADERSHIP PLAN

victoria.ca/climateaction

CITY OF VICTORIA

100%

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