

GOAL FIVE

Carbon-Free Choices for Everyone

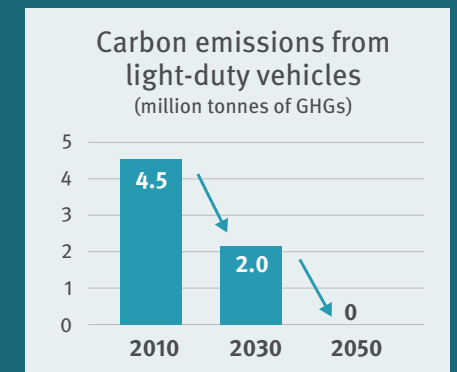


? WHERE WE ARE TODAY

“Where I live, and for the trips I need to make, I need to use a car whose emissions aren’t good for my neighbourhood or the planet. I’d like my travel to be emissions-free.”

📍 WHERE WE WANT TO BE

We all have transportation choices that are carbon-free, supporting global efforts to respond to the climate emergency such that, by 2030, we have lowered carbon pollution from light-duty vehicles by 65% over 2010 levels, and we have eliminated carbon pollution from transport altogether by 2050.



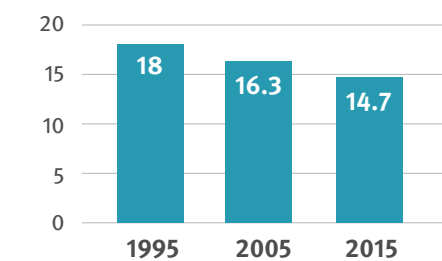
The world is currently on track for over 3°C of global warming by the end of the century, bringing severe and harmful consequences to ecosystems and communities around the world. Climate impacts — such as extreme weather, heat waves, and wildfire smoke — are already being felt in our region and are expected to intensify. Plainly, we are in the midst of an accelerating climate emergency.

To avoid the worst impacts of climate change, the United Nations Intergovernmental Panel on Climate Change (IPCC) warns that we must limit global warming to 1.5°C. This means slashing carbon pollution globally by 45% below 2010 levels by 2030, and reaching net zero emissions by 2050.

In 2008, the Metro Vancouver region set bold climate action targets and in 2019 updated them to align with the current IPCC targets. These are to reduce GHG emissions 45% from 2010 levels by

2030 and to eliminate them altogether by 2050. However, despite these bold targets and despite the urgency, our region has barely managed to achieve a 1% reduction in GHG emissions since 2010. With only eight years left to achieve a further 44% reduction, incremental changes will not suffice if the region is to come close to meeting our climate targets.

Metro Vancouver Total Regional Greenhouse Gas Emissions (million of tonnes of GHGs)



IPCC warns that this global 2030 target is not merely an interim milestone — rather, it must itself be met in order to avoid sending the global climate system past critical thresholds that we are now on the cusp of crossing. While technology may play a more significant role in helping meet our 2050 target — in order to achieve a 5–10% reduction in GHG emissions every year for the remainder of this decade to meet our 2030 target — we need significant, urgent, and immediate action by all levels of government on the scale of the mobilization that this country realized during the Second World War.

Transportation is both a contributor to the problem and a major part of the solution. In Metro Vancouver, transportation is the largest single source of greenhouse gas emissions, with on-road transportation responsible for 35% of regional emissions. While every sector must do its part to mobilize all available ideas, tools, and resources to meet our region-wide targets, the transportation sector — particularly light-duty vehicles — must play a leading role. Fortunately, the transition to a carbon-free transportation system — which is also supported by strategies and actions from Goals 1 to 4 — will yield numerous co-benefits, not the least of which include cleaner air, quieter streets, and energy savings, and new economic development and job opportunities spurred by innovation in the zero-emission transportation sector.

Reducing emissions of all types

The purpose of this goal is to reduce or eliminate greenhouse gas emissions stemming from transportation in the region — but also other health-harming air contaminants, such as nitrogen dioxide, volatile organic compounds, and particulate matter. The emission of GHGs and air contaminants is highly correlated, and so when this Goal area speaks of moving to low or zero emissions, it generally covers all tailpipe emissions. This means that addressing climate change also supports better lung health, particularly for people who live alongside busy roads.

Accordingly, the headline target for this goal is focused on light-duty vehicles — committing us to urgently reduce carbon pollution from light-duty vehicles by 65% over 2010 levels by 2030. Our region has set this more ambitious target for light-duty vehicles because:

- Heavy-duty vehicles are vital to our economy and currently have fewer options to transition to zero emissions; they will require additional support to meet region-wide targets while maintaining economic viability and competitiveness.
- Electric propulsion technology is further advanced and more economically viable for light-duty vehicles.
- Light-duty vehicles generally turn over more quickly than buildings, industry, or heavy-duty vehicles.

While no one can escape the rapidly accelerating impacts of climate change, these impacts do and will affect people differently based on who they are, where they live, and the resources at their disposal. Often, those who contributed least to carbon pollution will experience the worst impacts. Accordingly, climate justice is a key perspective that Transport 2050 brings to these actions — linking the call for climate action with the call for social equity, both globally and here within our own region.

The following pages describe what it will take to achieve our region’s goals of **reducing carbon pollution from light-duty vehicles by 65% over 2010 levels by 2030, and eliminating carbon pollution from transport altogether by 2050**:

- Reducing the overall energy requirements of the transportation system by rapidly shifting as many passenger trips as possible to the **most energy-efficient modes** — walking, rolling, cycling, and transit — in order to **reduce the kilometres driven by vehicles**. Accomplishing dramatic shifts in a short period of time will require a combination

of regulations, design interventions, and incentives.

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- Rapid transition of vehicle fleets to electric by increasing the availability and affordability of this technology, both for light- and heavy-duty vehicles.
- Ready access to a low-carbon refuelling and charging infrastructure.
- Considering the **upstream and downstream emissions** involved in manufacturing, transporting, and disposing of transportation assets and infrastructure, we need to better account for these emissions and factor them into our purchasing and investment decisions.



On Resilience and Carbon-Free Choices

Carbon-free policy actions will reduce our dependence on fossil fuels, which are imported. A shift to more locally produced renewable energy — such as electricity or biofuels — will increase the region’s ability to weather shocks and disruptions to fossil fuel supply chains.

The widespread adoption of electric vehicles — in commercial, fleet, or individual applications — has the potential to support regional resilience by serving as distributed power storage during outages.

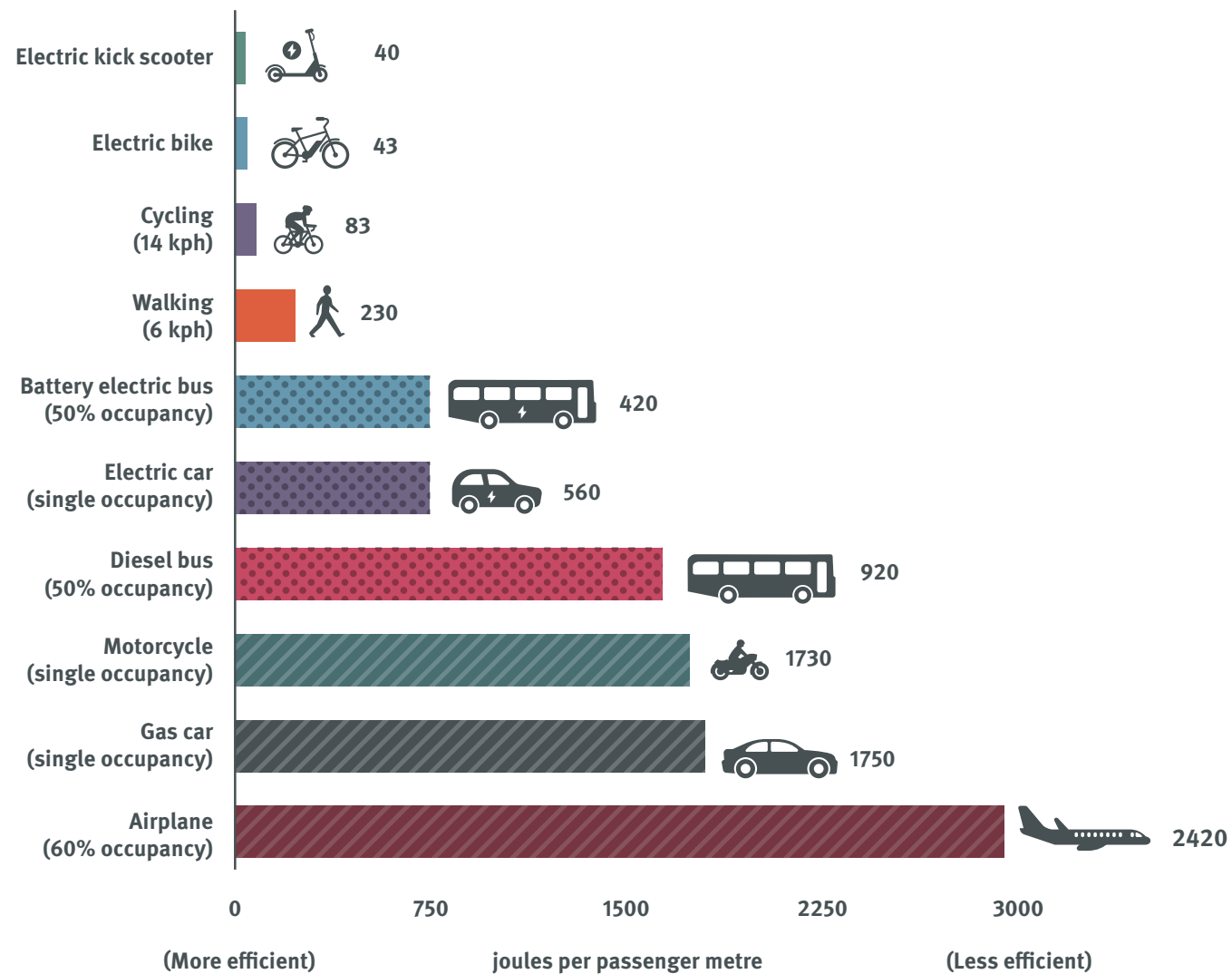
To better understand what tomorrow might bring, Metro Vancouver and TransLink partnered to develop the *Regional Long-Range Growth and Transportation Scenarios* report. This report examines four plausible futures for Metro Vancouver, which can help us identify measures to ensure that both transportation and the region are more resilient.

Strategies and Actions

Strategy 5.1: Reduce the energy requirements of the transport system.

Achieving a carbon-free transportation system requires reducing the energy needed to power the system. This is accomplished by shifting trips to energy-efficient modes in ways that align with the street design and speeds outlined in the people-first streets approach under Goal 4. Many of these actions reflect other strategies and actions in this document. Others are adapted from the Regional Goods Movement Strategy.

Figure 11: Energy Efficiency by Mode of Transportation



Actions

5.1.1. Shift trips to the most energy-efficient modes.

- Increase the attractiveness and competitiveness of alternatives to the automobile (e.g., active transportation or transit) through the strategies and actions under Goals 1, 2, 3, and 4.
- Where driving is required, create policies, incentives, and disincentives to encourage the matching of passenger vehicle size with trip need.

5.1.2. Design energy-efficient cities, with slower overall travel speeds and more compact land use. Refer to Strategies 1.1 and 1.2 for specific actions, and the people-first streets approach proposed under Goal 4.

- Coordinate industrial land use and the transportation needs of the freight sector, per Action 2.2.1, to promote the efficient use of lands that considers transportation emissions implications.

5.1.3. Support carriers specializing in smaller, zero-emission freight vehicles. This includes supporting cargo bicycles and small-scale automated neighbourhood delivery pods for last-mile freight applications in low-speed and pedestrianized zones in the urban parts of the region by:

- Designing urban bikeways and parking areas to accommodate these types of vehicles.
- Establishing infrastructure and operating standards for these types of vehicles in order to prioritize the safety and comfort of people walking, biking, and rolling — especially for people with disabilities.
- Providing administrative, technical, and financial support and incentives to freight and logistics companies to incorporate these types of vehicles into their fleets.
- Supporting industry and municipalities in the development of neighbourhood logistics hubs where appropriate as outlined in Action 1.4.2.

Sources for Figure 11: Banister, David, "Sustainable Transport and Public Policy", *Transportation Engineering and Planning*, 2009; "Mi Electric Scooter (M365)", Xiaomi, September 19, 2018. <https://www.mi.com/us/mi-electric-scooter/specs/>; Tom McCarran, Nicole Carpenter, "Electric Bikes: Survey and Energy Efficiency Analysis", March 8, 2018, <https://www.encyvermont.com/Media/Default/docs/white-papers/efficiency-vermont-electric-bike-white-paper.pdf>; "Fuel Economy of the 2018 Nissan Leaf", U.S. E.P.A., May 23, 2018, <https://www.fueleconomy.gov/feg/noframes/39860.shtml>; "Energy Efficiency in Transportation", Ecohungry.com, January 12, 2022, <https://ecohungry.com/energy-efficiency-in-transportation/>

Strategy 5.2: Transition to zero-emissions vehicles.

Already in British Columbia, around one in 10 new vehicles sold is electric. We should continue to support this trend, which will do much of the heavy lifting in reducing transportation GHGs in our region. This strategy includes key actions to support the transition towards zero-emission vehicles — of all types.



For medium- and heavy-duty vehicles, the technology to support the shift to zero emissions is at earlier stages of development and commercialization. For this sector, many of the following actions will take some time to become viable, and so are expected to have a larger impact over the long term.

New challenges will also arise with the transition to electric vehicles. These include a greater dependence on our province's hydroelectric power resources, challenges to ensuring equitable access to electric vehicles (EVs), a lack of mechanisms to ensure that EV road users pay a fair share towards regional transportation funding, loss of fuel tax revenues (which currently comprise 25% of TransLink's revenue sources), and the possibility that a much lower per-kilometre operating cost will encourage more driving. A significant increase in driving and traffic congestion, particularly when paired with automation, will compromise some of our other goals.

Some of the strategies and actions in this section aim to address these new challenges.

Actions

- 5.2.1. Increase availability and access to **electric bikes, scooters, and other forms of electric micromobility**, which can make active transportation more accessible to more people. A number of actions under Goals 1 through 4 speak to increasing access to and awareness of micromobility in general. Some specific actions that support electrified micromobility could include:
- Providing rebates or tax discounts to reduce the cost of electrified bikes, cargo bikes, and scooters.
 - Designing e-micromobility charging into public facilities and bike parkades to extend range.

- 5.2.2. Accelerate the **electrification of light-duty passenger vehicles**. This action builds on the existing momentum to transition light-duty passenger vehicle fleets to zero emissions. This category of vehicle includes commercial vehicles used for passenger movement.
- Immediately accelerate the *BC Zero-Emission Vehicles Act* such that, by 2030 (instead of 2035), all new light-duty vehicles sold in BC are zero emission.
 - Develop requirements for light-duty vehicles such as low- or zero-emissions zones, or vehicle emissions levies with rebates for replacing older vehicles.
 - Make electric vehicles more affordable through measures such as incentives, loans, or vehicle scrappage programs for older and more polluting vehicles, and prioritizing access for low-income residents, Indigenous Peoples living in on-reserve communities, and small businesses (including drivers of the gig economy who rely on their vehicles to earn income).  
 - Secure commitments from government, quasi-governmental organizations, and institutional organizations in the region to immediately begin procuring zero-emission vehicles for all light-duty vehicles in order to fully transition to zero-emissions fleets by 2030.
 - Prioritize electrification of high annual mileage shared-use mobility fleets, including ride-hailing, taxis, and carshare vehicles, through collaboration, incentives, and regulation [see Action 1.3.4.].
 - Incentivize the adoption of zero-emission vehicles by reflecting an appropriate cost of carbon consistent with achieving regional, provincial, and federal GHG reduction targets in pricing mechanisms (such as where fees are paid for registration, licensing, parking, pickups, and drop-offs) or through restricting physical access for non-zero-emissions vehicles in urban areas.
 - Explore options to accelerate the retirement of older, more polluting vehicles, such as through temporarily increasing funding for vehicle scrappage programs, targeting gasoline or diesel vehicles with poor fuel economy and high usage.
 - Establish requirements for all automated vehicles, and any other newly developed transportation modes, to be zero emission ahead of *BC Zero-Emission Vehicles Act* requirements.

- 5.2.3. Support the transition of **medium- and heavy-duty vehicles** to low emissions in the near term, and zero emissions over the long term, as technologies become more commercially viable for this sector.
- Ensure that all public transit vehicles purchased moving forward are zero emissions.
 - Introduce low- or zero-emissions zones in Urban Centres and Frequent Transit Development Areas (FTDAs).
 - Ease travel-time restrictions for low- and zero-emission freight vehicles in certain areas and/or corridors.
 - Provide preferential parking, loading, and unloading zone access for low- or zero-emission freight vehicles.
 - Introduce loans, tax credits, and grants for purchasing and leasing low- and zero-emission freight vehicles and agricultural equipment.
 - Explore emissions-based licensing, parking, and pickup and drop-off charges.
 - Support measures that help accelerate the turnover of truck fleets as near-zero and zero-emission vehicles and autonomous technology become commercially viable and available.
 - Establish standards for carbon-neutral delivery certification that increase industry and public exposure to, and demand for, zero-emission freight vehicles.
 - Expand the *Zero-Emission Vehicles Act* to introduce sales requirements for medium- and heavy-duty vehicles.
- 5.2.4. Ensure that the **price of carbon** is aligned with the ability of the region to meet the greenhouse gas reduction targets with consideration of the full suite of actions and strategies. This will require that the senior government carbon pricing regimens be adjusted over time, or that a regional carbon price be considered to supplement.

Strategy 5.3: Support ready access to low-carbon fuels for the transportation system.

To support the transition to zero-emission vehicles, renewable fuels (such as renewable diesel, hydrogen, renewable natural gas, and biofuels) and charging systems will need to be accessible for vehicles of all sizes. This will need to be supplemented by low-emission alternatives to conventional fuels, where vehicles are unable to fully transition to zero emissions.

Actions





- 5.3.1. Urgently complete a network of **EV charging infrastructure for light-duty passenger vehicles**:
- Coordinate with all levels of government to develop a Regional Electric Vehicle Charging Strategy that evaluates the availability of charging infrastructure to support the transition to electric vehicles and considers options for filling identified gaps.
 - Prioritize the development of incentive or loan programs or regulatory changes (such as EV-readiness requirements in new buildings) to support charging infrastructure in low-income communities; Indigenous communities; and in rental apartments, secondary suites, and subsidized housing. 🌍 🍃
 - Rapidly develop a public network of vehicle charging stations that support taxis, ride-hailing, and shared mobility vehicles.
 - Expand the availability of electric vehicle charging in residential, commercial, industrial, and institutional buildings.
 - Work towards regional standards for electric vehicle charging, including design standards, data and communications protocols, and vehicle connectors. Standards will allow for more efficient interoperability and a better user experience.
 - Develop a coordinated approach for deployment of standard electric vehicle charging infrastructure, maintenance, and storage facilities for shared automated vehicle (AV) fleets.

Carbon-free public transportation

TransLink, in addition to planning the regional transportation system, is responsible for operating public transportation in Metro Vancouver. With over 200 trolley-electric and battery-electric buses, and a fully electrified SkyTrain network, TransLink has a substantial fleet that does not generate tailpipe emissions. TransLink has also adopted a Climate Action Strategy for a net-zero GHG and climate-resilient public transportation system by 2050.

translink.ca/sustainability



- 5.3.2. Develop a robust network of **EV charging** and **zero-emission refuelling** infrastructure for **commercial** freight and work vehicles and transit buses, including:
- Develop a Zero-Carbon Refuelling Strategy to support refuelling and charging infrastructure for commercial vehicles, in particular, medium- and heavy-duty trucks and buses, and agricultural equipment. Include identifying where refuelling stations are needed for different fuels, including electricity, hydrogen, renewable diesel, and other fuels, especially along freight routes identified in Action 2.2.3. Consider opportunities to leverage public investment in bus charging infrastructure for commercial vehicle use.
 - Establish incentives (including loans, tax credits, grants) for purchasing, leasing, and piloting refuelling or charging infrastructure for zero-emission freight vehicles and agricultural equipment.
 - Explore the viability of sharing public fast-charger access between heavy commercial vehicles.
 - Establish incentives to support charging infrastructure in existing commercial, institutional, and industrial buildings, and EV-readiness requirements in developments.
- 5.3.3. To address **vehicle emissions in the short- to medium-term** transition period:
- Continue to decrease the carbon intensity of transportation fuels, through increasing the stringency of BC’s low-carbon fuel standard and the federal Clean Fuel Standard, per direction in the *Climate 2050 Transportation Roadmap*.
 - Enable access to renewable biofuels for this region through strategic investments locally and abroad. 
- 5.3.4. Work with BC Hydro to ensure **sufficient and stable renewable power** to support the mass transition to electric mobility, including:
- Exploring measures to encourage off-peak vehicle charging to reduce pressure on the grid. 
 - Supporting the growth of a diversity of renewable power sources, including locally distributed power generation. 
 - Exploring vehicle-to-grid capabilities, which could provide peak load levelling and backup power in the event of disruptions. 

Strategy 5.4: Account for and reduce upstream and downstream emissions in the transportation system.

Beyond the operation of transportation, emissions are also generated from the construction, maintenance, and end-of-life management of infrastructure. This includes indirect emissions resulting from raw materials extraction, manufacturing, or processing; transportation; and end-of-life management of transportation infrastructure and assets, including roadways and other public assets, private and public vehicles, and fuels and energy. Concrete — widely used in transportation infrastructure — is particularly carbon-intensive and accounts for 8% of global greenhouse gas emissions and can account for up to 92%¹⁵ of the life cycle emissions of major transportation projects. These actions aim to account for and minimize these upstream and downstream emissions.

Actions

- 5.4.1. Incorporate **life cycle greenhouse gas emissions into business cases** for major transportation investments in this region.
- 5.4.2. Establish a **carbon value** that reflects current scientific consensus of the price per tonne of greenhouse gas emissions needed to reach provincial and regional greenhouse gas reduction targets and incorporate that carbon value into business cases for major transportation investments and significant program or policy decisions in this region.
- 5.4.3. Leverage public sector buying power to establish **sustainable procurement** standards that stimulate innovation towards low- or zero-emission transportation products and services.
- 5.4.4. Use **life cycle greenhouse gas emissions assessments** as a basis for advocating to senior levels of government or internationally for measures to reduce upstream emissions.

¹⁵ Refers to a 30-year life cycle. Source: Steer, “RTS GHG Estimation Methods and Results”, January 15, 2020.

