

Part B

Regional Context, Challenges,
and Opportunities





Looking Back: The Major Forces and Pivotal Decisions That Shaped Our Region

The history of this region begins with the Indigenous Peoples who, since time immemorial, have inhabited and cared for this land near the mouth of the Sto:lo River (Fraser River) and along the edge of the Salish Sea. With its confluence of waterways and abundant resources, this region has always been a place for meeting, food sustenance, and trade.

Over this region's long history, external forces, events, and technological developments have shaped and altered its trajectory. They've introduced rapid changes in the economy, society, and environment. Reshaping land use, how our communities look, people's behaviour and preferences, and how we move and live.

Examples of some of the external forces that have played a major role in shaping the region that we are today include:

Shifting trade patterns that have shaped where communities and transportation infrastructure are located, and how power and wealth are distributed.

Colonial assimilation laws and practices that were imposed by the Canadian government to control all aspects of the lives of Indigenous Peoples and to criminalize traditional practices, languages, cultural events, and gatherings. Canada created reserve lands to isolate Indigenous Peoples and to seize lands and resources for the use and benefit of others. Residential schools operated by Christian churches and the Canadian government allowed Indigenous children to be abused, neglected, and isolated from their families and, in many cases, caused their deaths. The *Indian Act* enforced in 1876 is still in existence today.

Natural events such as earthquakes and the flooding of the Fraser Valley in 1948 that resulted in the region laying the groundwork for integrated regional planning to help coordinate urban growth and to avoid development in flood plains.

The oil crisis of the 1970s that resulted in oil supply shortages and a fourfold increase in gasoline prices; this dramatically impacted the cost of living for many people and prompted the development of fuel economy standards for vehicles.

Economic recessions in 1981–82, 1990–92, 2008–09, and 2020 that resulted in job losses in many BC sectors and a growing wealth gap.

A global climate emergency that resulted in strong climate commitments in BC, dating back to 2007.

The Truth and Reconciliation Commission (TRC), with the release of its 2015 report with 94 Calls to Action, that resulted in the utilization of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) as the framework for reconciliation across all sectors of society, resulting in the current understanding that reconciliation is everyone's responsibility.

The COVID-19 pandemic that resulted in major shifts in transportation patterns and a dramatic uptake of remote work, e-learning, and home deliveries. For trips that still needed to be made, many people chose private vehicles or active transportation to avoid crowds of people. Transit ridership fell by around half. Essential workers, many of whom work in lower-wage jobs, have borne the brunt of the health risks.

It's up to us to leverage external forces to propel the kind of change that we collectively want to see — in order to create a transportation system that is effective, equitable, and future-ready.



Looking Ahead

This is a crucial moment in time. With generation-defining challenges, with unprecedented opportunities, and with the next major transport revolution likely just around the corner, the choices we make today and over the next decade will shape how we live and move for generations.

As we look forward, a frank understanding of where Metro Vancouver is now will set the stage for the decisions we need to make over the next few years to set us in the right direction for the long term.

We don't know for certain what the future will look like. However, based on the lessons of

the past, we know that external forces — from major events to disruptive new technologies — can arrive quickly, with major impacts. The COVID-19 pandemic has illustrated how quickly such things can affect our lives and the systems that we all rely on. We need to prepare the transportation system for future uncertainties like this, especially since, all too often, it's been society's most vulnerable who have borne a disproportionate share of the costs.

By future-proofing the transportation system, we can contribute to a more resilient region, helping us weather tomorrow's shocks and disruptions, whatever they may be.

Creating a resilient transportation system and region

Resilience is the capacity of individuals, communities, organizations, and natural systems to **prepare for, avoid, absorb, recover from, and adapt to shocks and stresses** through the preservation, restoration, and adaptation of essential functions. Resilience also involves learning from shocks and stresses to build back better.

Transport 2050 aims to enhance the resilience and ability of our residents, transportation system, and region to continue to operate, recover, and maintain their core purposes in the face of change and disruption. Resilience in Transport 2050 includes:

1. **Robust** approaches that improve the quality of an asset, program, or operation so it can better withstand shocks and stresses
2. **Redundancy** in critical systems that provide alternatives if one part of a system fails
3. **Resourceful** approaches that can mobilize diverse resources and partnerships across sectors
4. **Rapid** approaches that can quickly deploy the tools and processes needed to address shocks and stresses

Early in the development of Transport 2050 and Metro 2050, TransLink and Metro Vancouver partnered to think about how the region could be impacted by various shocks, stresses, forces, and trends in the coming decades, focusing especially on the disruptions that are likely as a result of climate instability, and as a result of rapid technological and economic changes.



To learn more, see the [Regional Long-Range Growth and Transportation Scenarios report](#).

Actions that advance a more resilient transportation system in our region are shown with this icon: . For a summary of all resilience-related actions, see Part K: Thematic Index.

Recognizing the Rights of Indigenous Peoples

Challenges

Nearly all of present-day British Columbia sits on lands over which different Indigenous Nations enjoy inherent rights and title, as set out in the Constitution and confirmed by the Supreme Court of Canada.

One Indigenous Nation in the South Coast region of British Columbia — *sćəwaθən məsteyəxʷ* (Tsawwassen First Nation) — has negotiated a modern treaty and a formalized role in decision-making processes through the Mayors' Council on Regional Transportation and the Metro Vancouver Board, per the *South Coast British Columbia Transportation Authority Act*.

We find ourselves planning, operating, and building on the unceded territory of the *q'ícəy* (Katzie), *q'w'a:h'á'əh* (Kwantlen), *k'w'ik'wə́ləm* (Kwikwetlem), *máthxwi* (Matsqui), *x'w'məθk'əyám* (Musqueam), *q'iq'éyt* (Qayqayt), *se'mya'me* (Semiahmoo), *Skwxwú7mesh Úxwumixw* (Squamish), *səl'ilil'wətaʔ* (Tsleil-Waututh), and *sćəwaθən məsteyəxʷ* (Tsawwassen) Nations.

Opportunities

By listening, understanding, and recognizing historical and current injustices; by supporting implementation of the *Declaration on the Rights of Indigenous Peoples Act*; and by establishing more collaborative relationships with Indigenous Nations, TransLink and transportation authorities can take more concrete steps towards advancing reconciliation.



Advancing Social Equity

Challenges

Many groups face barriers travelling around the region, whether caused by age, ability, race, faith, national origin, socio-economic status, sexual orientation, or gender identity.

Whether due to limited travel options, physical safety or barriers, or harassment and discrimination, moving around the region is more challenging for some people than others.

Opportunities

By taking steps to remove these barriers and by furthering our understanding of them, we can make it easier for everyone to access the opportunities they need to thrive.

Improving Affordability

Challenges

Region-wide, nearly one-third of households spend more than 70% of their before-tax income on the two major and interrelated costs of housing and transportation.

In particular, these residents are struggling under the weight of unaffordable housing and transportation costs, leaving them with difficult choices about what to spend or forgo on food, clothing, childcare, and other critical expenses.

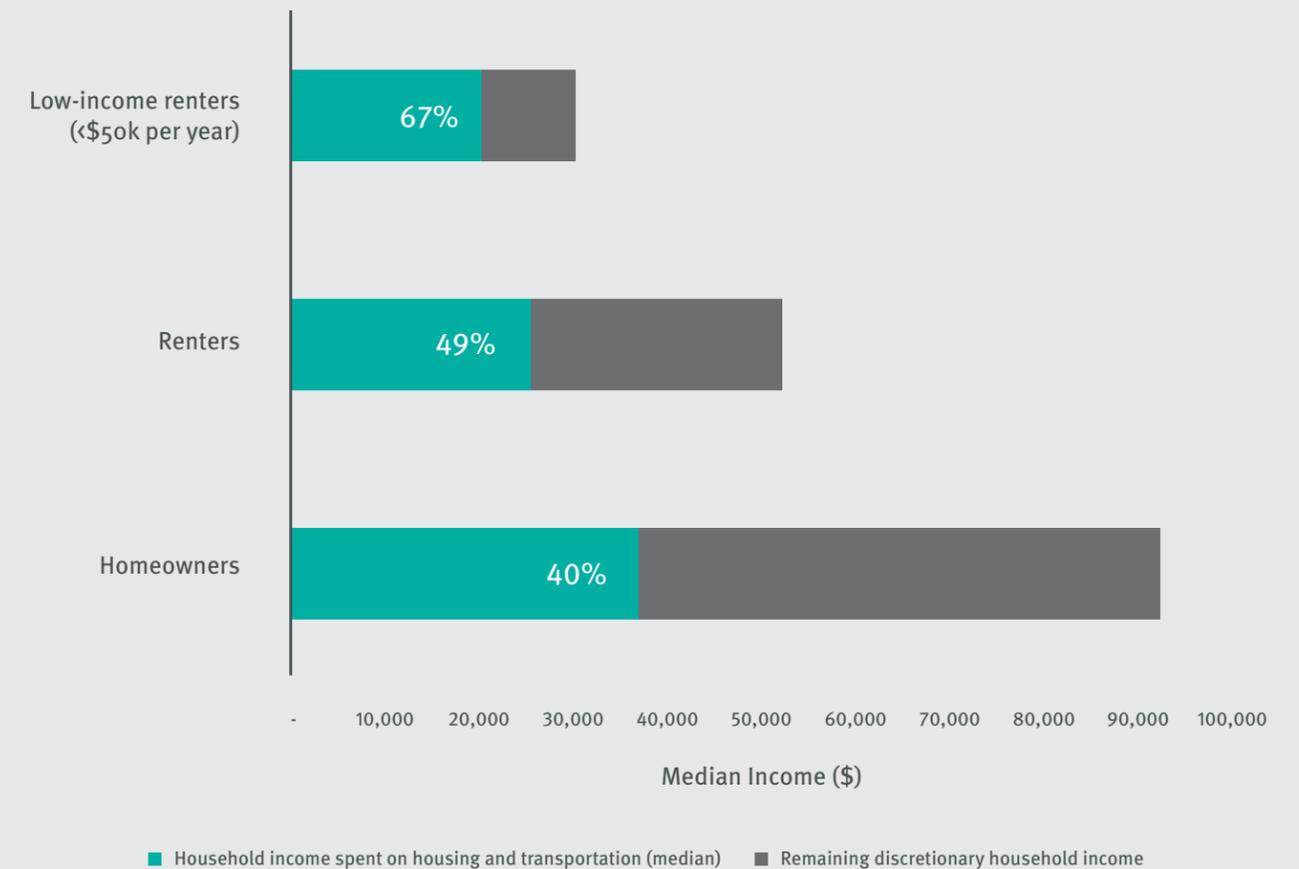
Opportunities

By working together, the Government of Canada, the Government of BC, Metro Vancouver, and the region's municipalities can increase the supply of affordable housing that is next to frequent transit, can increase the supply of the most affordable modes, and can ensure that any transport fares or fees are linked to the ability to pay.

We can realize a more equitable region by advancing a transportation system that supports the needs of everyone



Figure 1: Income Spent on Housing and Transportation as a Proportion of Total Household Income (Median)



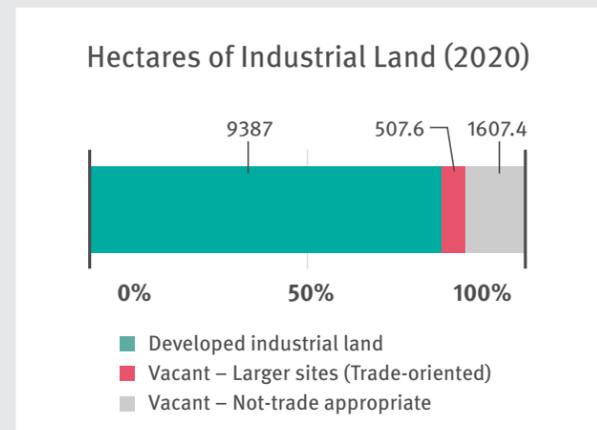
Source: Metro Vancouver, "The Metro Vancouver Housing and Transportation Cost Burden Study", 2015, <http://www.metrovancouver.org/services/regional-planning/PlanningPublications/HousingAndTransportCostBurdenReport2015.pdf>

Supporting Economic Prosperity

Challenges

A lack of available industrial land and our worsening congestion is making our region a less and less attractive place to do business.

The pandemic's impact on our national, provincial, and regional economy is putting additional pressure on our region's financial capacity to deliver needed regional transportation investments.



Opportunities

Protecting and optimizing industrial land and applying meaningful solutions to reduce congestion can support productivity growth and business competitiveness.

Focusing on the most cost-effective transportation solutions to deliver more transportation value to the public for less money can keep taxes and fees lower.

Providing more convenient and reliable transportation connections for people and goods can help foster job growth and economic development across the region and beyond — connecting workers with access to more jobs, and connecting businesses with more markets and access to a broader labour force.

Reducing Greenhouse Gas Emissions and Preparing for Climate Change

Challenges

With transport being the largest single source of carbon pollution in the region, we need to act urgently and with bold moves if we are to meet our climate action targets and avoid the worst impacts of a destabilized climate.

Even if we are successful in reaching our emissions-reduction targets in this region, global greenhouse gas (GHG) emissions to date will still lead to future climate impacts. We must prepare for a future of more weather-related extreme events and climate disruptions.

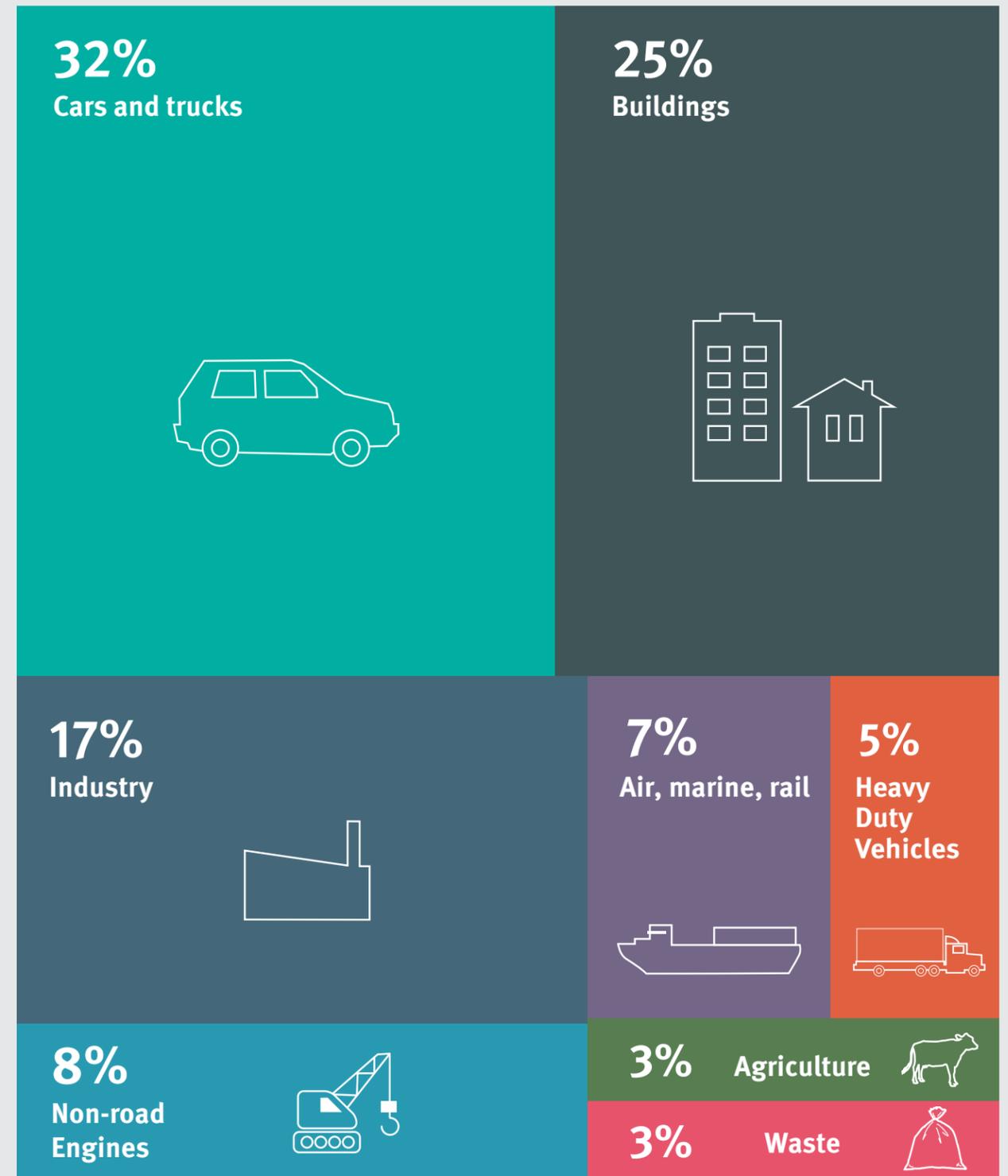
Opportunities

With a shared agenda for low-carbon mobility, local, regional, provincial, and federal governments have committed to aggressive GHG reduction targets.

Metro Vancouver's near-100% renewable energy grid will be an asset in reducing our reliance on imported fossil fuels.

Preparing for the intensifying impacts of climate change will contribute to a more resilient transportation system.

Figure 2: Regional Greenhouse Gas Emissions by Source Sector



Source: "Emission Inventories and Forecasts", Metro Vancouver, December 21, 2021, <http://www.metrovancouver.org/services/air-quality/about/emissions/emission-inventories/Pages/default.aspx>

Key Challenges and Opportunities for the Regional Transportation System

Accommodating Growth to Advance Livability and Sustainability

Challenges

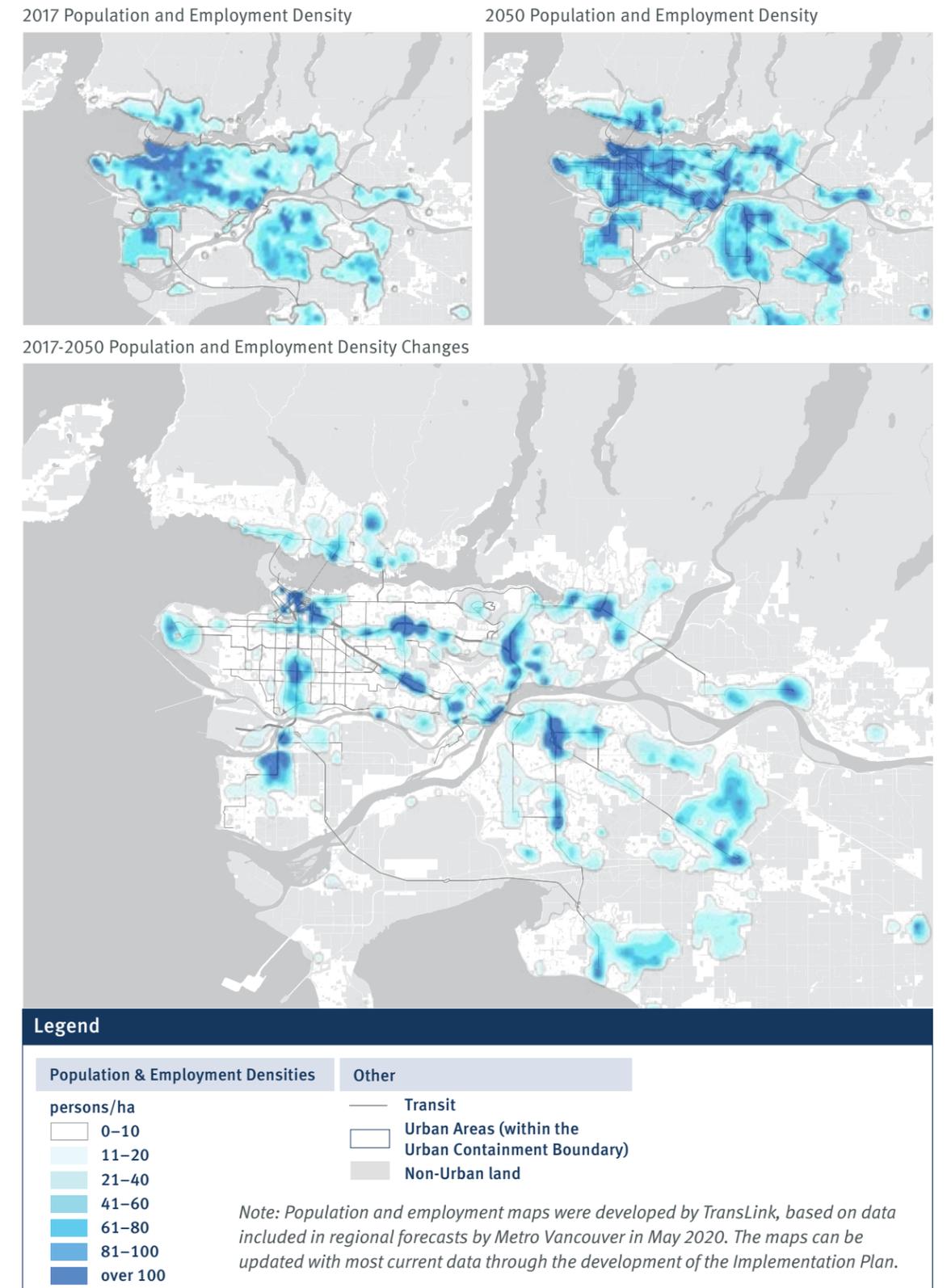
The region is set to welcome about a million new residents by 2050; this growth will add pressure to a transportation system that's already strained.

Opportunities

We have an opportunity to strengthen our region's long-standing commitment to compact, transit-oriented growth as described in Metro 2050. Directing most homes and jobs to within a short walk of major transit will help generate the ridership demand needed to support a thriving regional transit system with fast, frequent, and reliable service to most parts of the region.



Map 3: Existing and Future Projected Population & Employment Density, Indicating Areas Where Travel Demand Is Expected to Grow



Providing People With Access to a Diverse Selection of Transportation Options

Challenges

One of the main reasons that people choose to own a personal car is they don't have good walking, biking, rolling, transit, or shared vehicle options close to where they are — or where they need to be. Or, for many people, these choices may be available, but they don't meet their accessibility needs, such as for people with disabilities.

Opportunities

We can build on unprecedented levels of senior government funding for transit infrastructure and a pandemic-related resurgence in public interest in and support for walking, biking, or rolling.

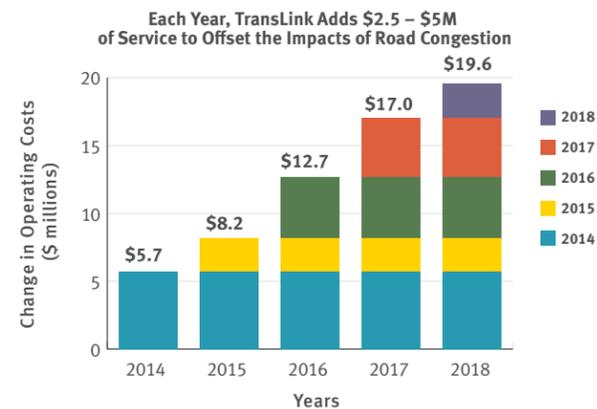
Reducing Road Congestion and Improving Travel Time Reliability

Challenges

Traffic volumes strain road capacity in many parts of the region. This leads to unreliable travel times for people and goods, with some areas experiencing congestion all day.

Opportunities

By leveraging demand management tools and new technologies, and by prioritizing more road space for transit, we can deliver a regional transportation system that makes moving across the region more efficient and reliable, for every mode on the road.



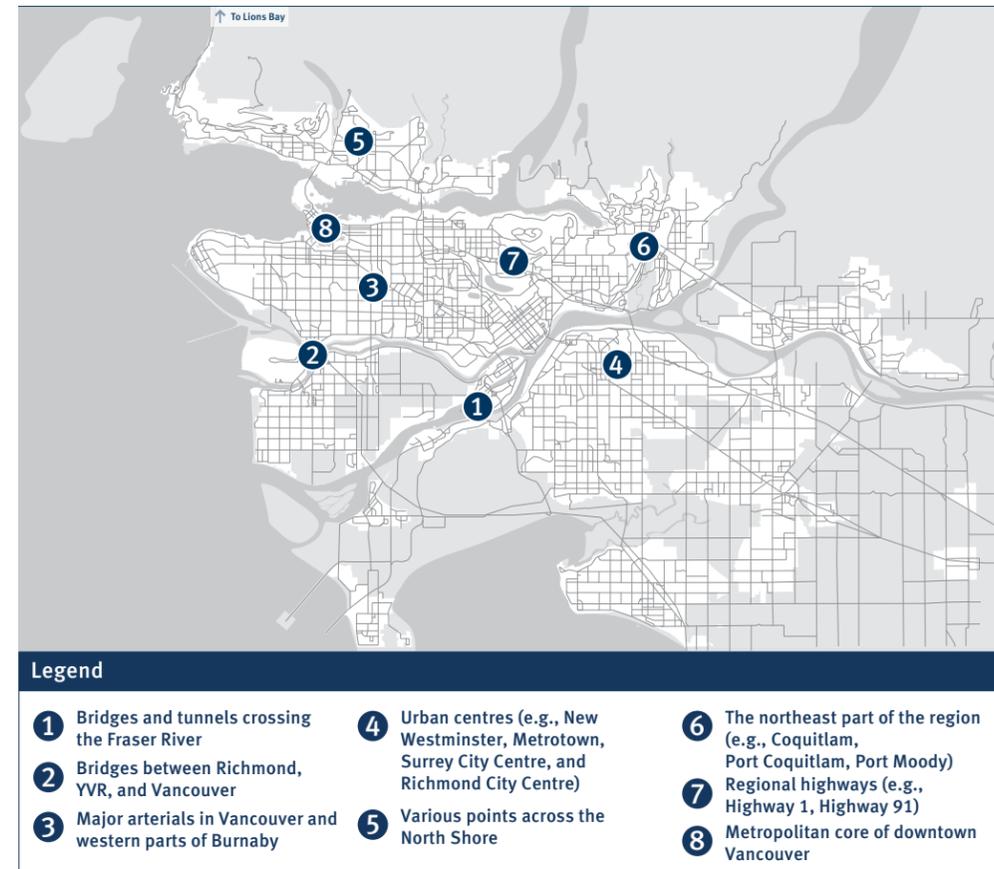
Improving Traffic Safety

Challenges

For the past five years, an average of 100 people have died in traffic crashes on our region's roads every year — 40 of whom per year were walking or biking when they were killed.

Opportunities

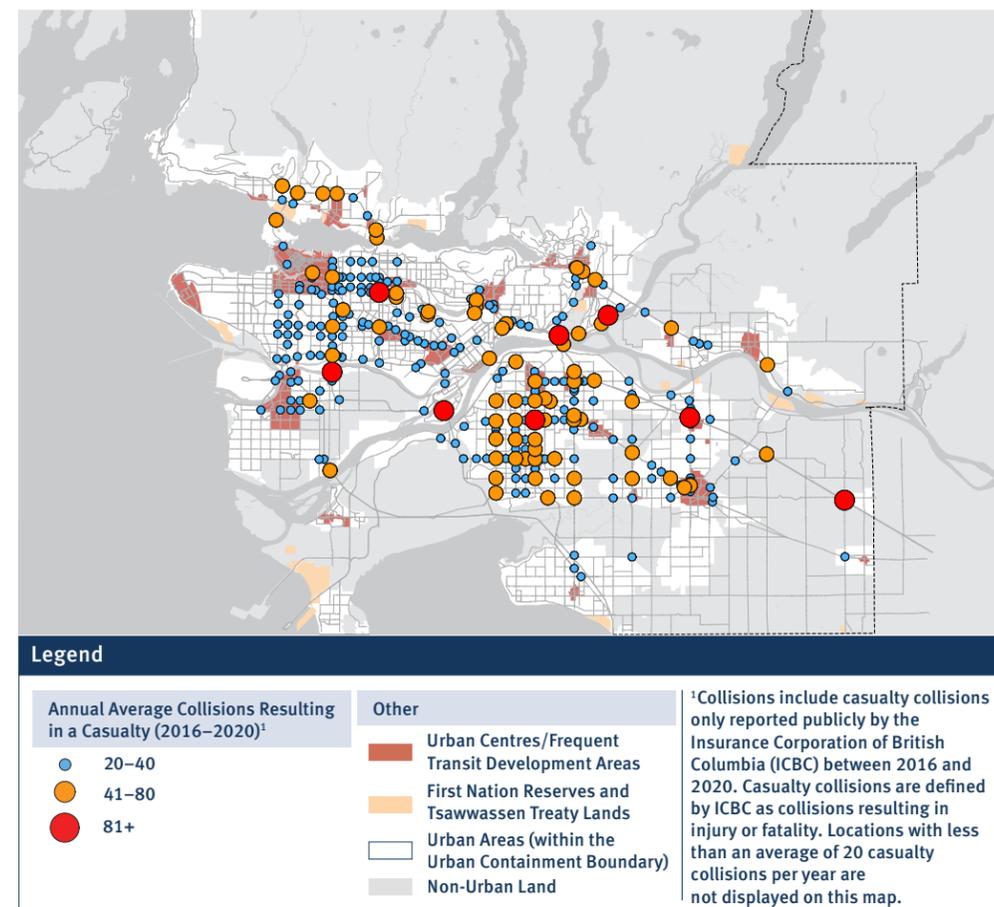
By separating different road users according to speed, by reducing overall traffic speeds, and by leveraging the potential of automated vehicles, we can make our streets safer for everyone.



Map 4: Congestion in Metro Vancouver

We experience congestion in many different ways across the region. Congestion is not confined to areas like downtown, metro cores, or urban centres. It is also not confined to commute trips at certain times of day. Congestion occurs on our bridges and tunnels, highways, and main arterial roads, as well as in our local communities. The areas to the left show how congestion can manifest itself in these different ways across different parts of the region, affecting different trip types and trip purposes as a result. More and more, we see that it also occurs outside of traditional peak times during rush hours, where it also impacts evening and weekend trips.

Map 4 Source: Mobility Pricing Independent Commission, "Moving around Metro Vancouver: Exploring new approaches to reducing congestion", October 2012, <https://www.translink.ca/plans-and-projects/strategies-plans-and-guidelines/managing-the-transit-network#mobility-pricing>



Map 5: High Collision Locations on Roads in Metro Vancouver

Map 5 Source: "Lower Mainland Crashes (2016 to 2020)", Insurance Corporation of British Columbia, December 21, 2021, <https://public.tableau.com/app/profile/icbc/viz/LowerMainlandCrashes/LMDashboard>

Key Challenges and Opportunities with New Transportation Technology

Transport revolutions throughout history have quickly and dramatically changed how we move — and they promise to continue to do so into the future.²

Looking back, the arrival of the streetcar in the late 1800s and the automobile in the early 1900s each had transformative impacts. Within a span of two decades, they each in turn reshaped our cities, the nature of housing and commerce, and how most people and goods moved around.

Looking ahead, the convergence of four trends — automation, connectivity, electrification, and sharing (or ACES) — promises to fundamentally reshape transportation once again.

On their own, these trends are already transforming vehicles, business models, and habits. But together, ACES could enable the next transport revolution — the automated vehicle revolution — with the potential to transform the region for the better, if it is managed well.

Throughout history, the costs and benefits of transport revolutions have not been evenly distributed, with specific groups being left out or bearing a disproportionate share of the burdens.

In future revolutions, we need to make sure that costs and benefits are fairly distributed and that no one gets left behind. History has also shown that how we respond to transport revolutions can

come with unintended consequences that are only evident years later.

For example, the automobile is a remarkable invention that has made it easy to travel farther, faster. For those who can afford a car, it has also opened access to employment, social, and recreational opportunities. However, following the widespread adoption of the car, most urban regions also saw a rapid rise in traffic congestion, air pollution, and traffic fatalities as governments at all levels prioritized automobiles through investments and urban design.

At the same time, for the most exposed road users, such as people on foot or bicycles, the automobile revolution has brought harm. These groups are more likely to be impacted by traffic collisions or by tailpipe emissions. And for those without a car who live outside urban areas, the relative gaps in access to employment, healthcare, recreation, and inclusion in society have widened.

One of the key tasks of Transport 2050 is to anticipate the challenges and opportunities that are likely to arise from coming transport revolutions. In this way, we can act to leverage the benefits while reducing the risks.

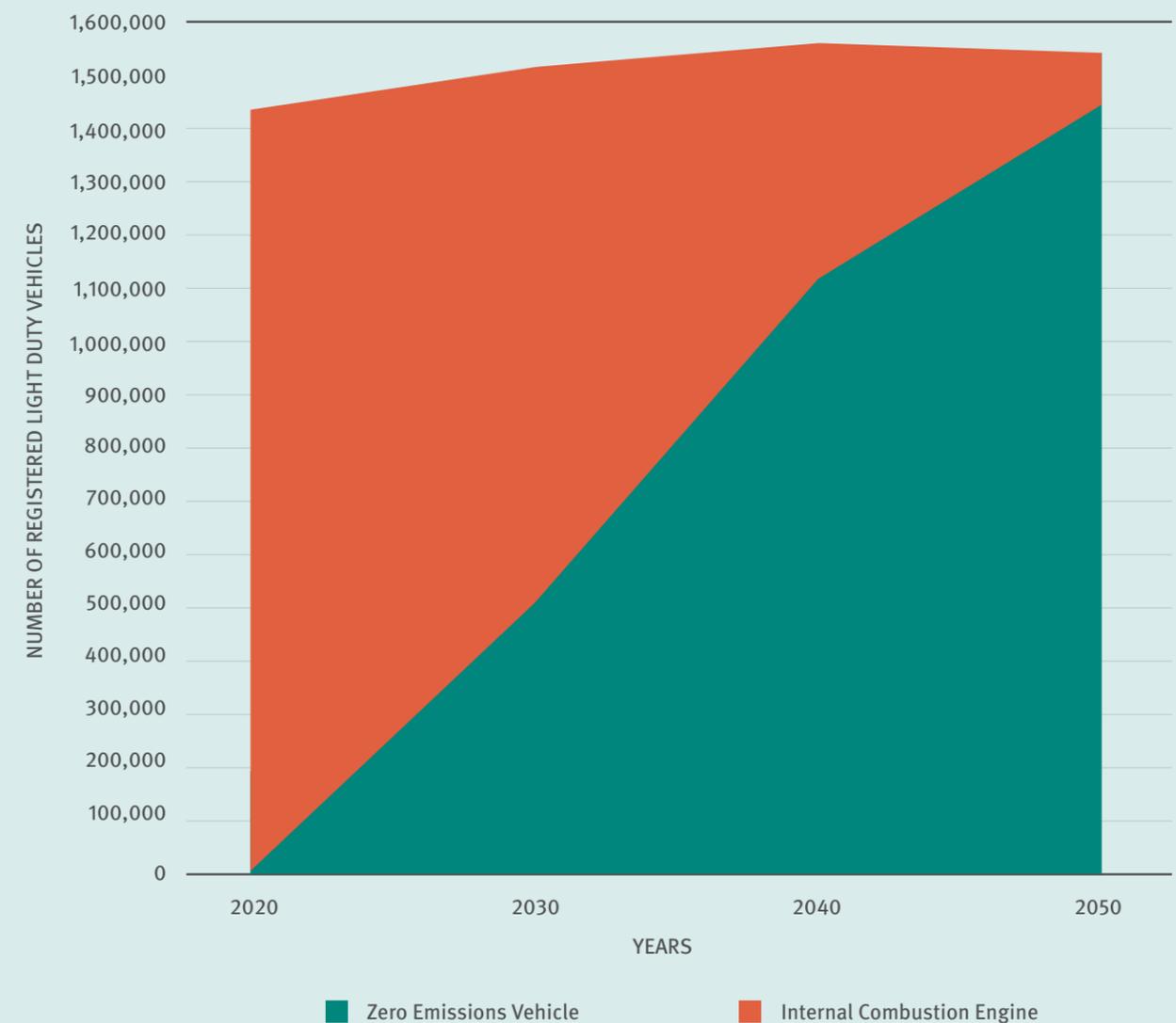
It’s up to us to ensure that coming transport revolutions are managed carefully so that we can realize the vision of *Access for Everyone*.

² In their book, *Transport Revolutions: Moving People and Freight Without Oil*, Anthony Perl and Richard Gilbert define a transport revolution as “a substantial change in a society’s transport activity that occurs in less than 25 years”. And they define “substantial change” as a shift in which “something that was happening before increases or decreases dramatically, say by 50 percent; or a new means of transport becomes prevalent to the extent that it becomes a part of the lives of ten percent or more of the society’s population”.

“The future is already here — it’s just not evenly distributed.”

— William Gibson (1992)

Figure 3: Forecasted Passenger Light-Duty Vehicle Stock in Metro Vancouver



Source: Licker Geospatial Consulting Ltd., “Carbon Neutral 2050: Policy & Modelling Report”, July 2021, http://www.metrovancouver.org/services/air-quality/AirQualityPublications/LGEO_MV_CNS_ModelingReport_July2021.pdf

Revolutions in Transportation Technology

Humans have always been on the move. But over the past 130 years, we've developed new technologies that significantly increased our travel speeds and hence the distances we travel. Two key technological changes in particular — the streetcar and automobile — have, within the span of a decade, fundamentally transformed how we move and live in cities.



Human Power

People relied on human- and animal-powered transportation for most of history. This limited the distance that people typically commuted to about 2–3 kilometres, and similarly limited the size of most cities.



The Streetcar Revolution

The streetcar era, which was launched around the end of the 19th century, allowed humans to travel up to three times faster than walking. This extended commuting distances and led to the rise of streetcar suburbs on the periphery of many major urban centres.



Streetcar image courtesy of Joan Tyldesley

The Automobile Revolution

The automobile revolution enabled travel up to 10 times faster than walking for those who could afford a car. However, rather than reducing the amount of time spent travelling, people travelled longer distances. So, many regions responded by building new highways, bridges, and lower-density automobile-oriented suburbs that were far from jobs.



Traffic image courtesy of Pugstem Publications

What's Next?

Further electrification and automation of vehicles will reduce the financial cost and time burdens of commuting, and may encourage people to travel even farther. Proactive management can help shape how these new technologies are implemented and adopted in ways that support, rather than hinder, progress towards our regional goals and targets.



What Are Automated Vehicles (AVs)?

Automated vehicles (AVs) put safety-critical controls, such as steering, throttling, or braking, outside direct driver control. Six levels of vehicle automation describe how much responsibility a computer takes on — versus a human driver. AVs are already here, as Level 2 and 3 vehicles that include advanced driver assistance systems are now commonplace in new vehicles.

Level 3 automation poses particular traffic safety risks. Automation aids can increase the risk of distraction or inattentiveness when driver attention is required at all times for a safe trip.

It's only a matter of time until more vehicles with higher levels of automation enter the market. Fully automated driving occurs where a steering wheel and driver are no longer required in well-mapped and defined cities and regions (level 4) or in any condition (level 5). For the purposes of this Strategy, the automated vehicle “transport

revolution” begins with the arrival of Level 4 automation. While Level 5 automation may still be many years away, experts believe that Level 4 automation is likely to be commercially available within the decade and widespread by 2050.

The gradual transition of the entire fleet will also bring challenges over coming decades, as vehicles of various degrees of automation learn to share the roads with each other and other road users. This includes people walking, biking, or rolling, whose movements are less predictable to machine intelligence.

Automation has applications for all transportation (beyond personal vehicles), including ride-hailing, transit, and freight. These technologies will need to be closely monitored to ensure that potential negative impacts — such as safety impacts, increased congestion, worsening inequality, and potential job losses — are addressed fairly and proactively.

Opportunities

With most traffic crashes today occurring due to human error, automation promises to enhance safety and reduce collisions. It can also provide better mobility for people who don't or can't drive, such as people with disabilities, seniors, or those without driving licences.

Shared fleets of automated vehicles (AVs) could accommodate all urban trips with a small fraction of today's vehicle fleet. And because there could be fewer cars on the road, cities could repurpose road and parking space for other uses.

Challenges

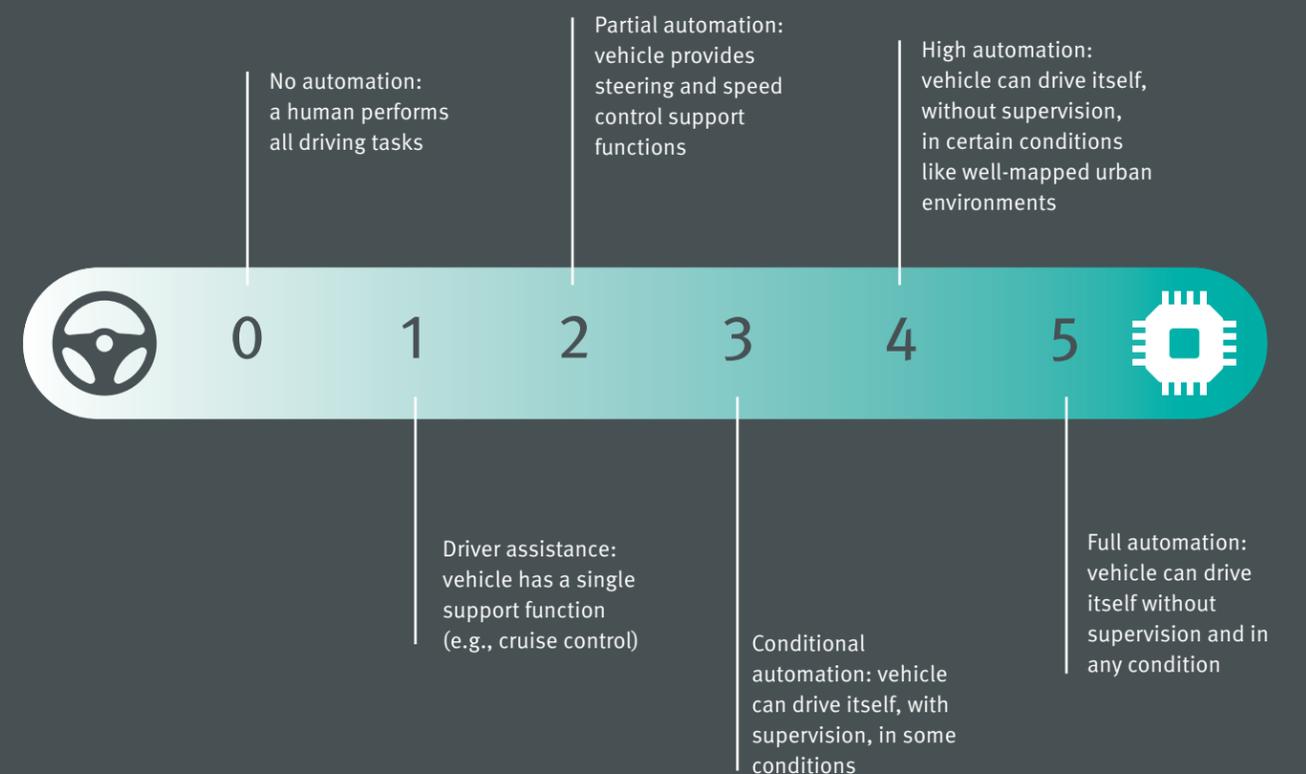
By reducing the time costs associated with driving, and by enabling zero-occupant vehicle trips, the transition to AVs could lead to significant increases in driving, resulting in congestion, greater transportation energy use, more pressure for urban sprawl, and a rise in physical inactivity.

Additionally, the transition to full automation (Level 4 or higher) creates challenges, particularly with Level 3 automation, which creates a high risk of driver distraction and complacency, resulting in risky behaviour. The transition of the entire fleet will also bring challenges over the next few decades, as vehicles of various degrees of automation share the roads with each other and other road users.

We only need to look to history to learn that transport revolutions can be sudden, rapid, and disruptive. For example, just two decades after the arrival of the Ford Model T, 60% of US households owned a car, up from a baseline of nearly zero.



Levels of Driving Automation *Adapted from the Society of Automotive Engineers, 2021*





Shared Mobility

Opportunities

Advances in digital technology are enabling more convenient vehicle sharing and on-demand trips. From scooters to bikes to cars, more people are moving from owning their own vehicle to paying for the use of a car for a few minutes or a few hours at a time.

In just five years, the number of carsharing vehicles in the region has grown from 1,000 to over 2,500. Displacing as many as 30,000 privately owned cars, shared mobility platforms offer an opportunity to make it more attractive to move and live in this region without needing to own a car.

Reducing the need to own a personal automobile can help reduce congestion, improve safety, and achieve our climate action objectives.

Challenges

If not managed carefully, app-based ride-hailing, and the automated robo-taxis that are to come, can lead to significant increases in driving and traffic, especially in the most congested parts of the region.

In the same way, shared micromobility systems (e.g., shared bikes and scooters) can lead to clusters of scooters and bikes blocking sidewalks and entrances at key destinations, causing particular challenges for people with disabilities.

Digital and Connected Mobility

Opportunities

The internet is reshaping how we connect to opportunities — allowing people to access work, medicine, learning, and shopping without needing to travel — which significantly reduces demands on our transportation system.

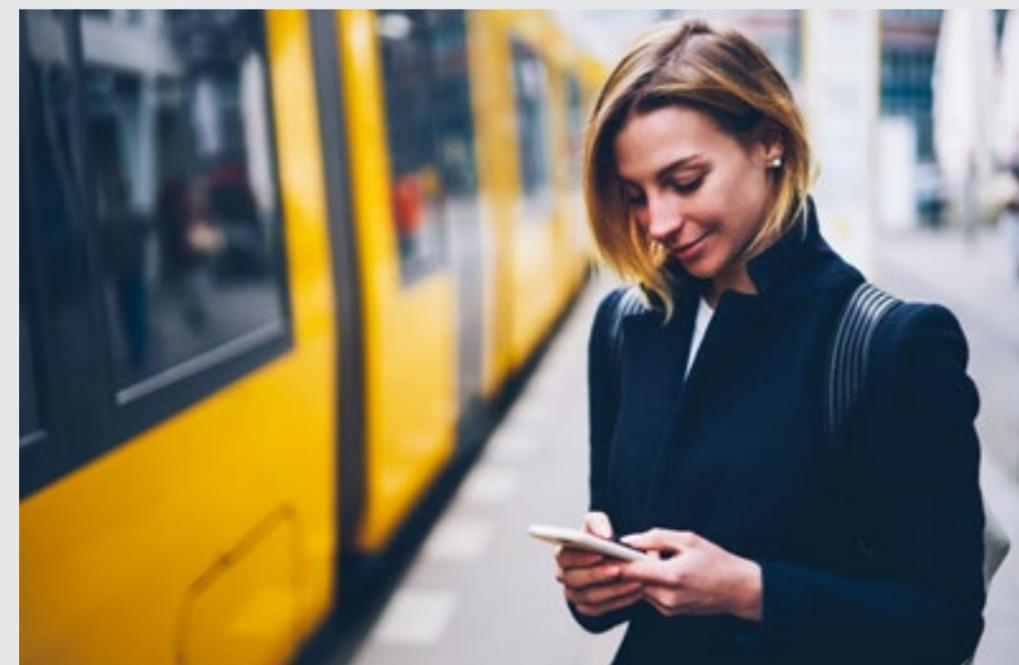
By 2025, it is expected that all new road vehicles will be capable of communicating with the internet, with each other, and with street infrastructure.

This connectivity will enable more accurate, personalized, and up-to-the-minute customer information, and more seamless connections between modes and services. It will also enable improved traffic safety and reliability, and more effective asset maintenance.

Challenges

As digital access becomes increasingly important to function in society, people without easy access to the internet fall further behind. Without explicit programs to support universal basic internet access, the digital divide will continue to widen.

As more devices, vehicles, and transportation assets rely on digital connectivity to function, the entire transportation system becomes more vulnerable to cyberattacks and power outages. Substantial investments in redundancy, backup power systems, and cybersecurity will be needed to safely leverage the opportunities of an increasingly connected mobility system.



Nine out of 10 Canadians own smartphones, opening up new opportunities for digital integration with transport



Electric Vehicles

Opportunities

Driven by government policy and by advances in batteries and hydrogen fuel cells, zero-emission vehicles (ZEVs) are becoming more popular. Already, nearly one in 10 new vehicles sold today is electric.

Both federal and provincial governments now require that, beginning in 2035, all new light-duty vehicles sold in BC produce zero emissions at the tailpipe.

These vehicles are becoming more affordable and, within the decade, a market for used electric vehicles (EVs) will become more robust, making them even more affordable. For vehicles that are driven often, such as working vehicles (e.g., fleet, urban freight, and ride-hailing), transitioning to zero emissions represents a cost saving; therefore, we can expect these sectors to transition quickly.

The electric vehicle revolution will be critical to achieving our regional and provincial GHG and air quality targets, given that light-duty vehicles are currently the single largest source of GHG emissions in our region.

Challenges

Currently, battery manufacturing generates significant GHGs. Until the entire supply chain is decarbonized, we cannot rely on the transition to ZEVs alone in the fight against climate change.

The substantial increase in demand for electricity to power an all-electric vehicle fleet will demand new electricity-generating capacity across the province, which will require creative solutions as well as substantial new investment.

Assuming that electricity remains as abundant and affordable as today, electric vehicles will continue to have operating costs of roughly one-third that of comparable gas or diesel vehicles. This will make it cheaper and more attractive to drive more frequently — which could lead to more traffic and congestion.

All personal vehicles — whether powered by electricity or fossil fuels — occupy scarce urban space and are the main culprits behind nearly all traffic fatalities and injuries, especially involving vulnerable road users.

The personal benefits of EVs also accrue to those who can afford them — further exacerbating inequalities.

Meanwhile, the regional fuel sales tax that has historically funded about a third of regional transportation needs will decline and ultimately disappear. A new transportation-based revenue tool will be needed to replace it.

Urban Air Mobility

Opportunities

As advances in electric propulsion, miniaturization, and automation drive the commercialization of electric vertical takeoff and landing vehicles (eVTOLs), we anticipate private sector interest in offering new air transit services targeting short- to medium-length trips. These vehicles could provide very fast connections between destinations within the South Coast region and with neighbouring regions.

Challenges

Expensive and exclusive air transportation services could accelerate inequalities and would likely increase transportation energy consumption.

There is a greater risk of serious injury or fatality in the event of malfunctions or operator errors. And for those on the ground, there could be noise, stress, discomfort, and privacy concerns associated with being under a flight path.



Urban air mobility could become a reality in the coming years, promising to reduce road congestion; the challenge will be safe and equitable introduction of this technology

Image courtesy of Wikipedia

In this era of rapid change, we need to collectively manage these challenges and channel these unprecedented opportunities in order to advance our shared goals and help build a region that delivers access to opportunity for everyone.

By putting our values first, we can shape the future we want. Being clear about those values and aspirations is the topic we now turn to in Part C.

