The Future of E-Bikes

Why and How to Encouraging E-Bike Travel

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Bike HUB

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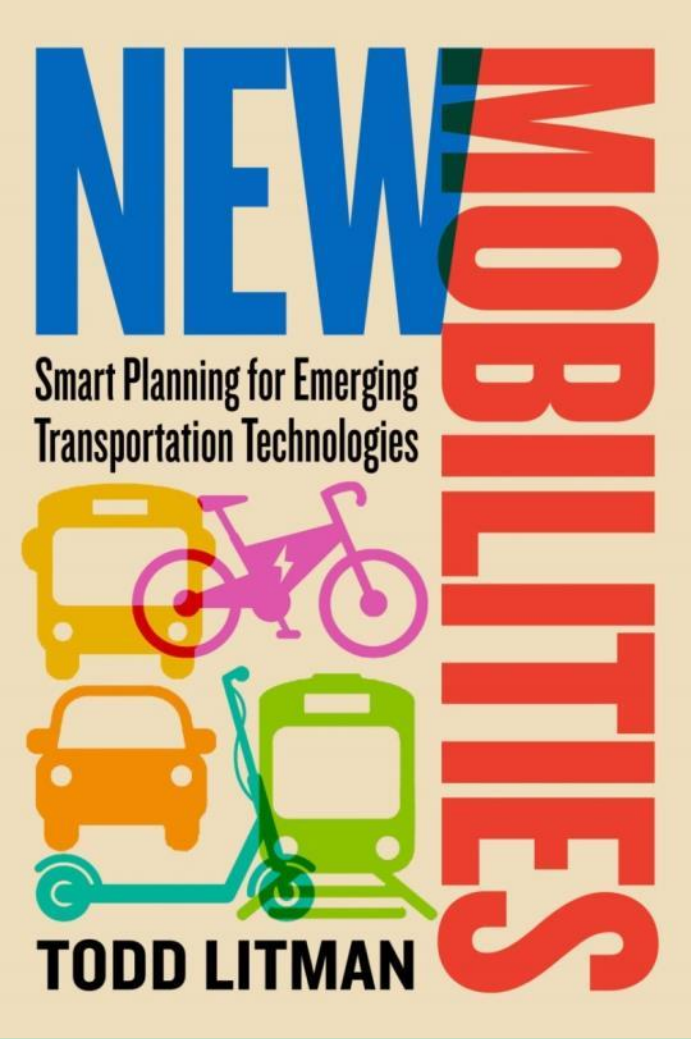
New Mobilities



New Mobilities: Smart Planning for Emerging Transportation Technologies

New Mobilities have tantalizing potential. They allow people to scoot, ride, and fly like never before. They can provide large and diverse benefits. However, they can also impose significant costs on users and communities.

Decision-makers need detailed information on their impacts.

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Active and Micromodes

Active & Micro Modes

Bike-sharing

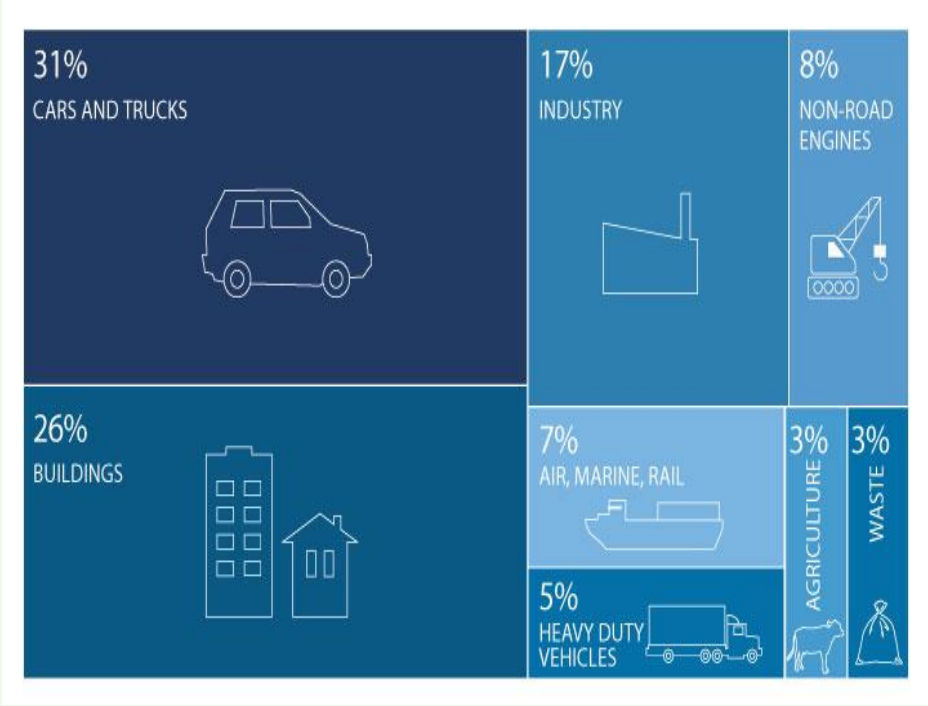
Cargo Bikes

Many Potential Benefits

Improved Travel Options ➔	More Non-Auto Travel ➔	Reduced Auto Travel ➔	More Compact Communities
• Improved user convenience and comfort • More independent mobility for non-drivers, which supports equity objectives • Option value • More attractive public realm • Higher property values • Increased safety and security	• User enjoyment • Improved public fitness and health • More local economic activity • Increased community cohesion (positive interactions among neighbors, improved security)	• Reduced traffic and parking congestion • Road and parking facility cost savings • Consumer savings • Reduced chauffeuring burdens • Reduced crashes • Energy conservation • Pollution reductions • Local economic development	• Improved accessibility, particularly for non-drivers • Transport cost savings • Reduced sprawl costs • Openspace preservation • More livable communities • Higher property values • Increased security

Targets (examples)

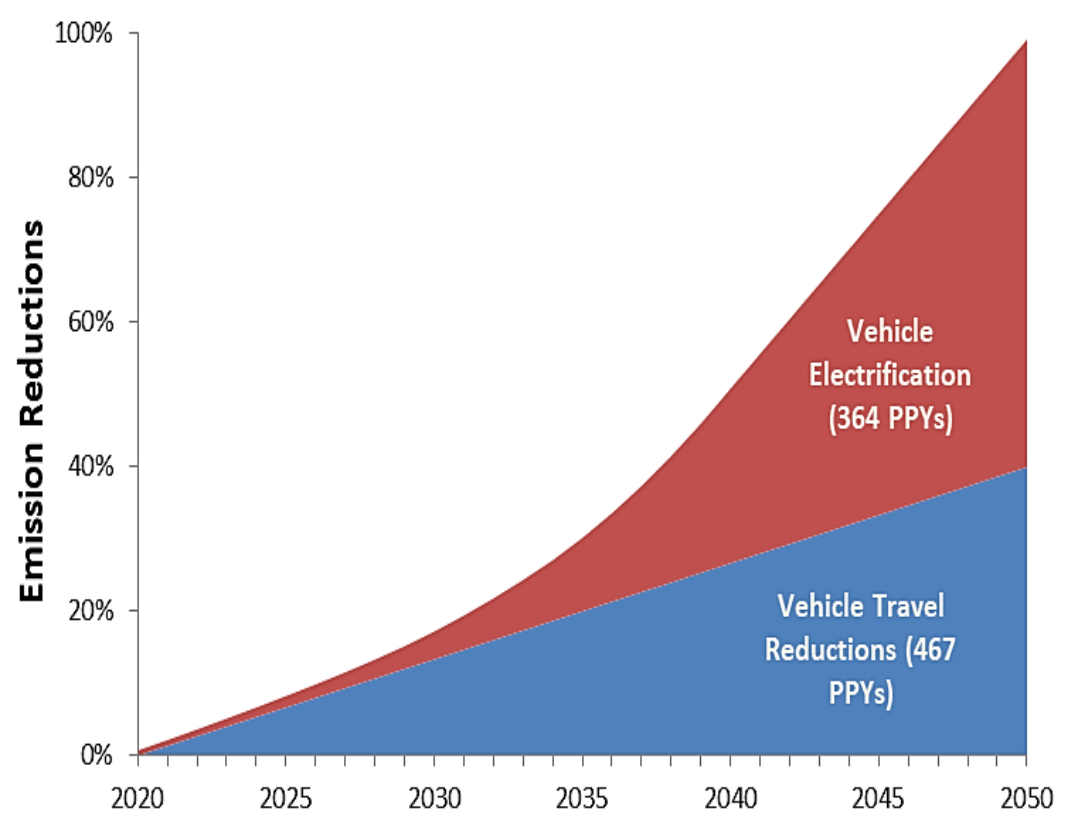
- **Vancouver:** reduce emissions 33%, reduce per capita vehicle-kilometres by 20%, and increase walking, bicycling and public transit mode shares to 66% by 2040.
- **British Columbia:** reduce emissions 40% by 2030, 60% by 2040 and 80% by 2050, and double active mode shares by 2030.



Emission Reductions

Vehicle electrification is unlikely to achieve climate emission reduction targets.

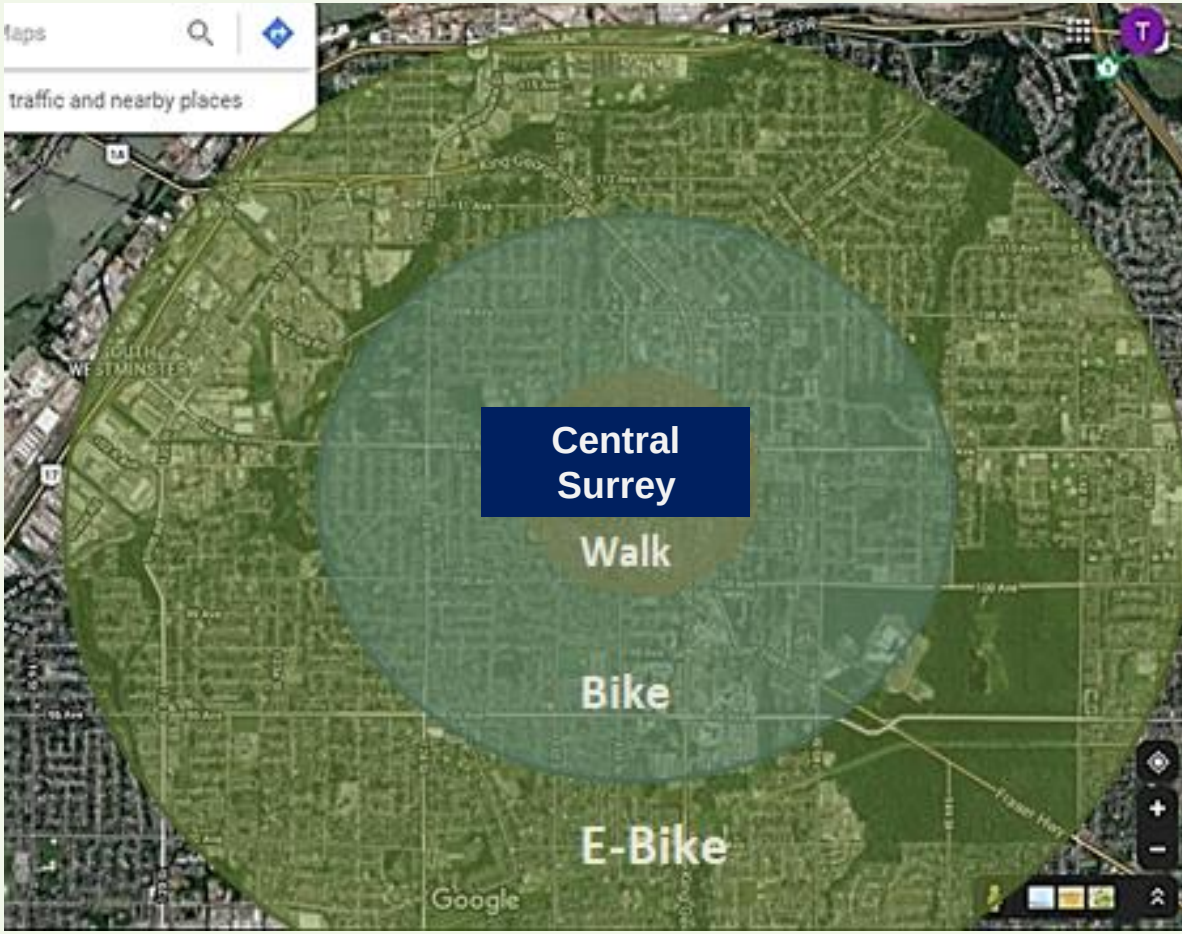
Vehicle travel reductions are actually more important.



PPY = Percentage Point Years

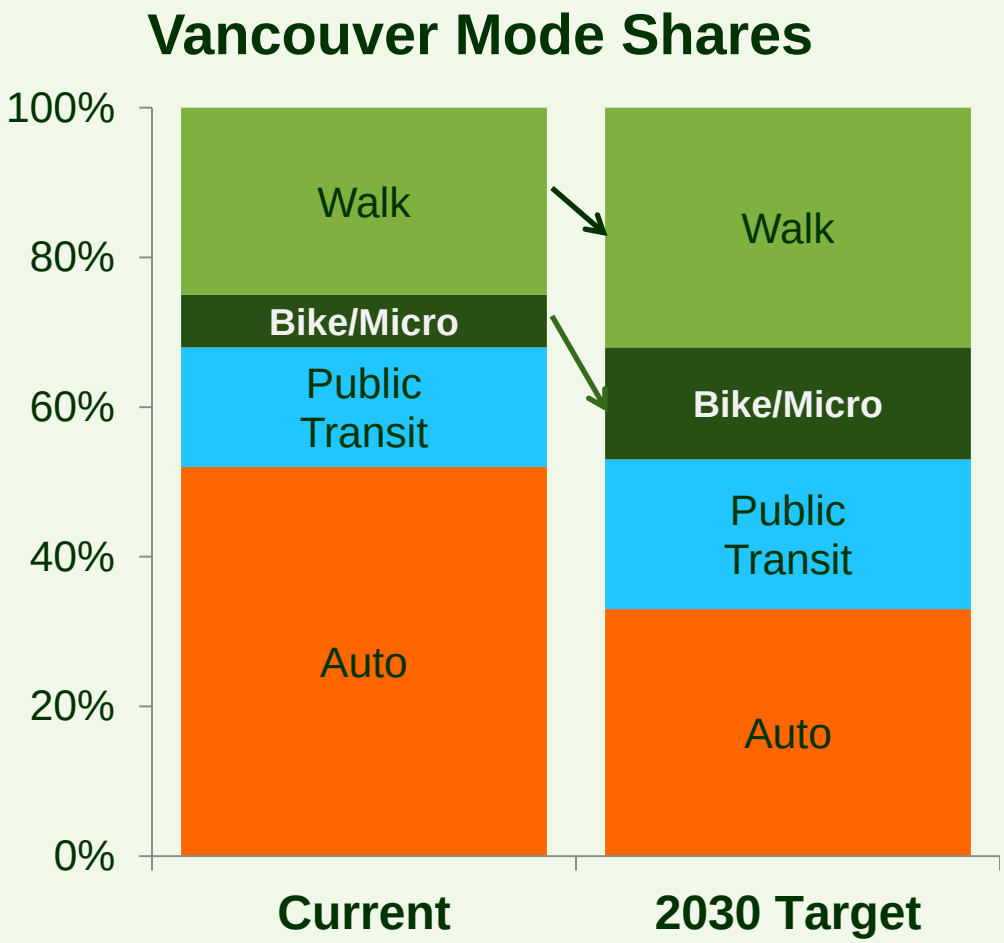
Potential Destinations

In 15 minutes a 4 kph pedestrian can reach about 3 square kilometres of area, a 12 kph bicyclist about 30 square kilometres, and a 22 kph e-biker about 100 square kilometres, or most of a typical city.



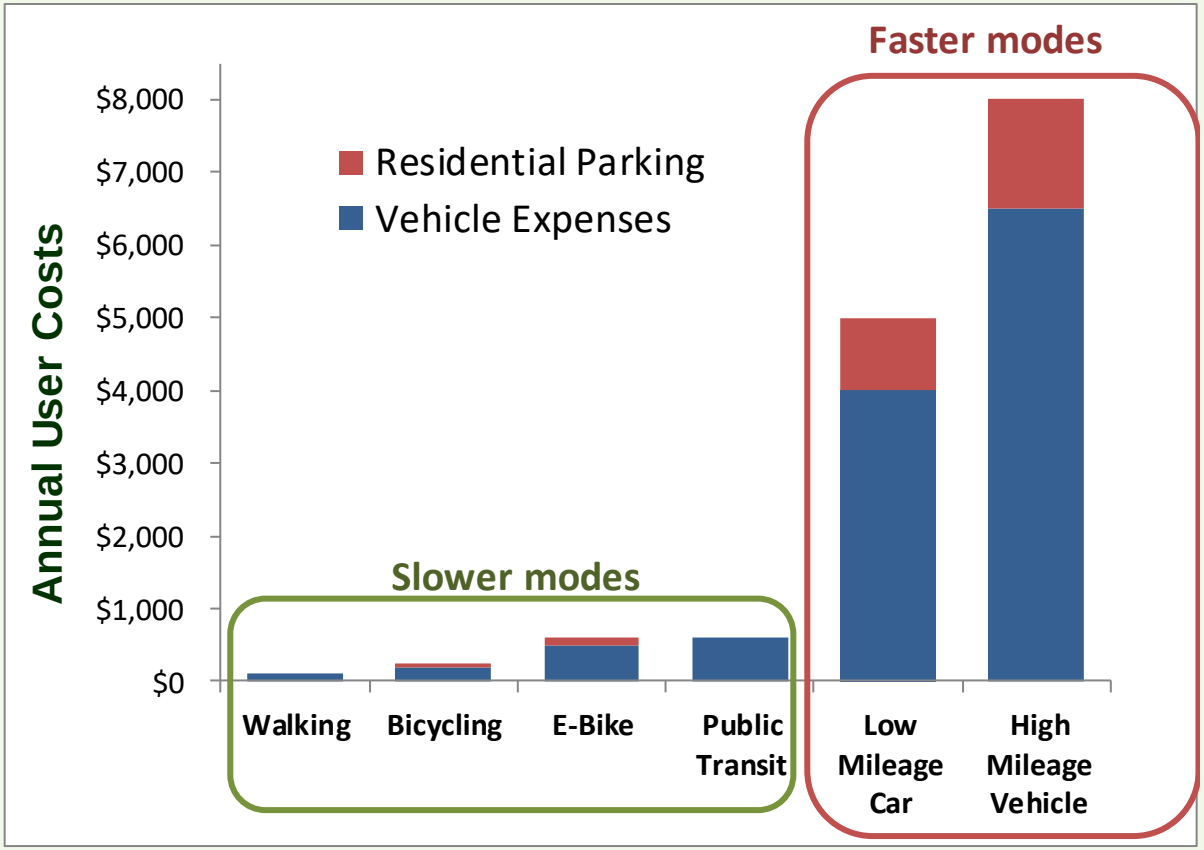
Mode Share Potential and Targets

- Major studies estimate that improving bicycle and e-bike conditions could increase urban bicycling mode shares from the current 6% up to 17% in 2030 and up to 22% in 2050.
- They can also increase transit ridership up to 9% by improving access to stops and stations.
- A Dutch survey found that e-bike purchasers significantly increase bicycling and reduce their car travel about 10%.
- Bicycling improvements have a high return on investment.



Typical User Costs

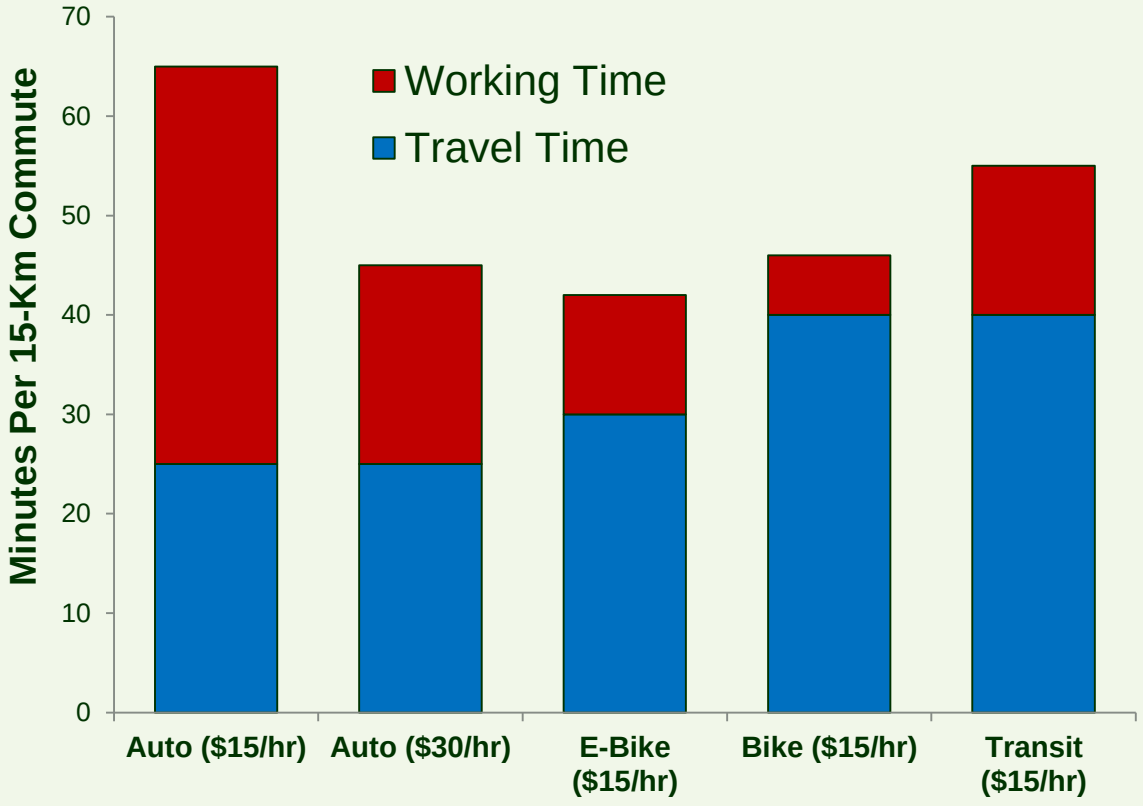
Walking, bicycling, micromodes and public transit are far more affordable than automobile travel.



Nominal Versus Effective Speed

Nominal speed refers to travel distance divided by time spent travelling.

Effective speed considers travel time plus time spent earning money to pay travel expenses. Measured this way, automobile travel is slow for lower-income workers and therefore regressive.



Comparing Public Costs

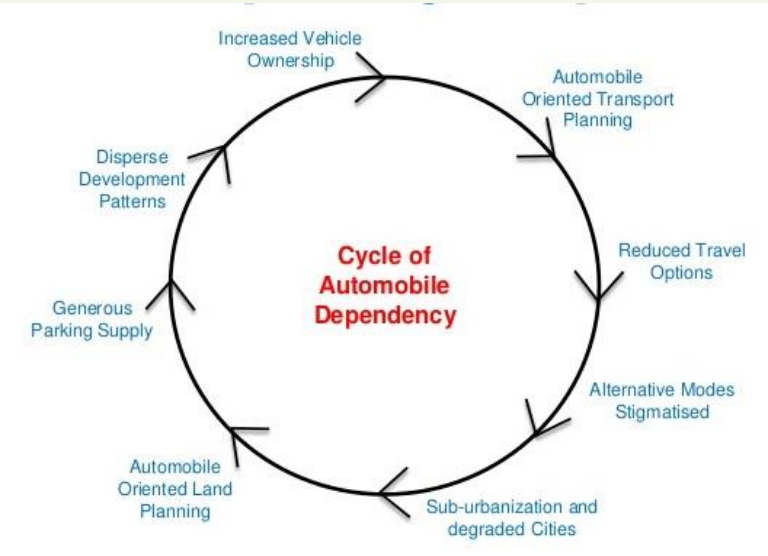
When people purchase a vehicle they expect governments to provide roads and businesses to provide off-street parking facilities for their use.

Walking, bicycling and public transit have far lower costs. As a result, people who drive less than average tend to subsidize motorists' facility costs, and urban residents subsidize local road and parking facility costs of non-resident motorists.

Current Planning

Policies favoring automobiles over resource-efficient modes:

- Dedicated highway funding. Minimal provincial funding for active and micromodes.
- Roadways designed to maximize traffic speeds.
- Subsidized parking required in zoning codes.
- Public facilities located for automobile access.
- Zoning codes that limit compact infill development, resulting in sprawl.
- Fixed vehicle insurance and registration fees.



Efficient and Fair Transportation

Valuing Multi-Modalism

An efficient and equitable transportation system is diverse so users to choose the best mode for each trip:

- Walking and cycling for local errands
- High quality public transit when travelling on busy corridors
- Automobile travel when it is truly most efficient, considering all impacts

Current planning does a poor job of valuing this diversity.

"A developed country is not where the poor drive cars, it is where the rich use public transportation"

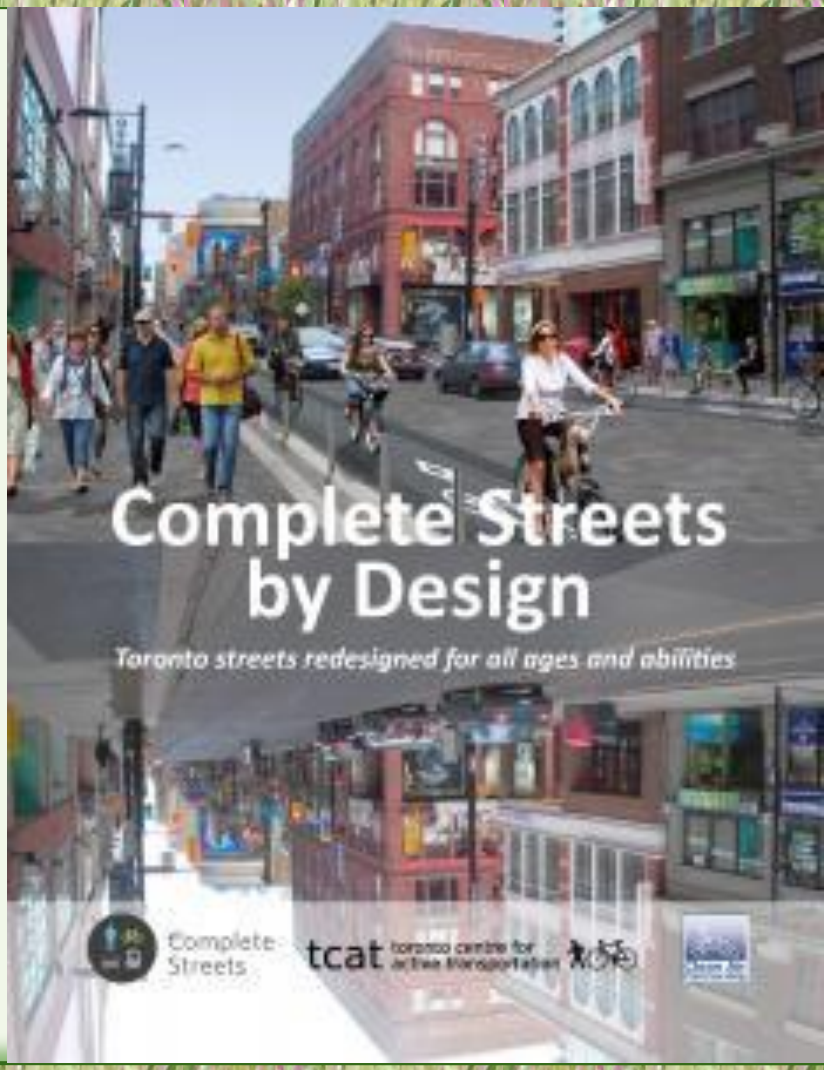
- Enrique Peñalosa, Bogota Mayor

Recipe for Multi-Modalism

Improved Mobility Options	Mode Shift Incentives	More Accessible Land Use
• Complete streets roadway design • Improved walking and cycling conditions • High quality public transit services • Ridesharing, ride-hailing and taxi services • Car- and bikesharing	• Efficient road and parking pricing • Fuel price increases • High Occupancy Vehicle (HOV) priority • Commute trip reduction programs	• Compact and mixed development • More connected road networks • Transit-Oriented Development (TOD) • Reduced parking requirements

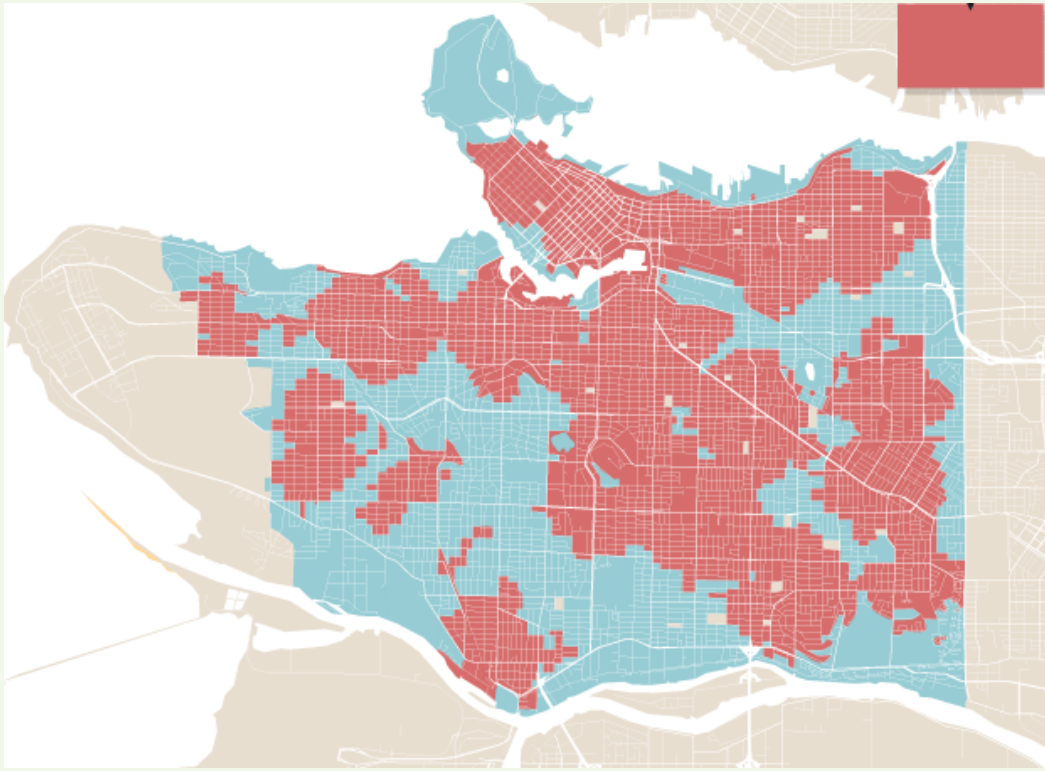
Complete Streets

A Complete Street is designed for all activities, abilities, and travel modes. Complete Streets provide safe and comfortable access for pedestrians, cyclists, transit users and motorists, and a livable environment for visitors, customers, employees and residents in the area.

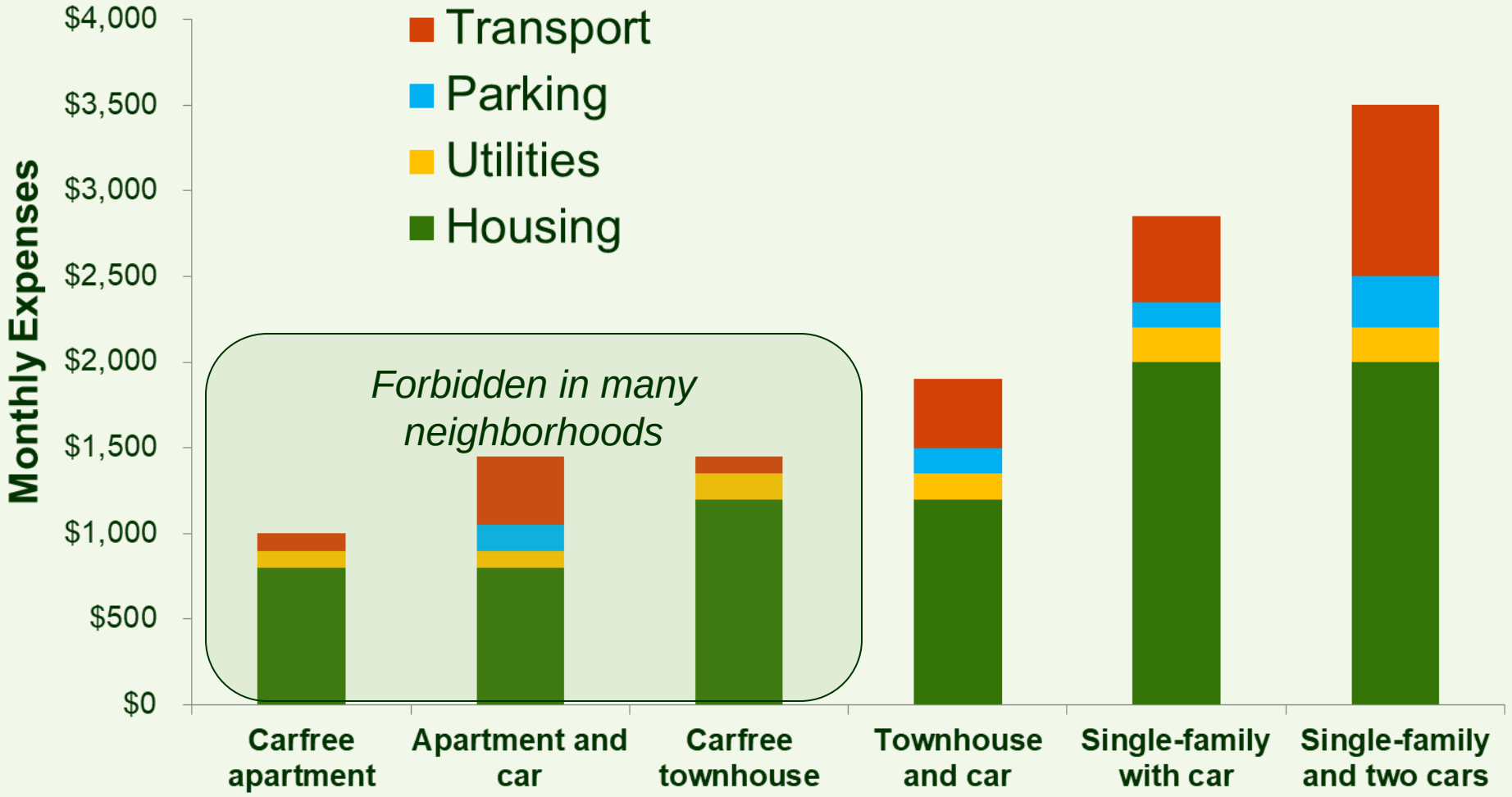


15-Minute Neighborhoods

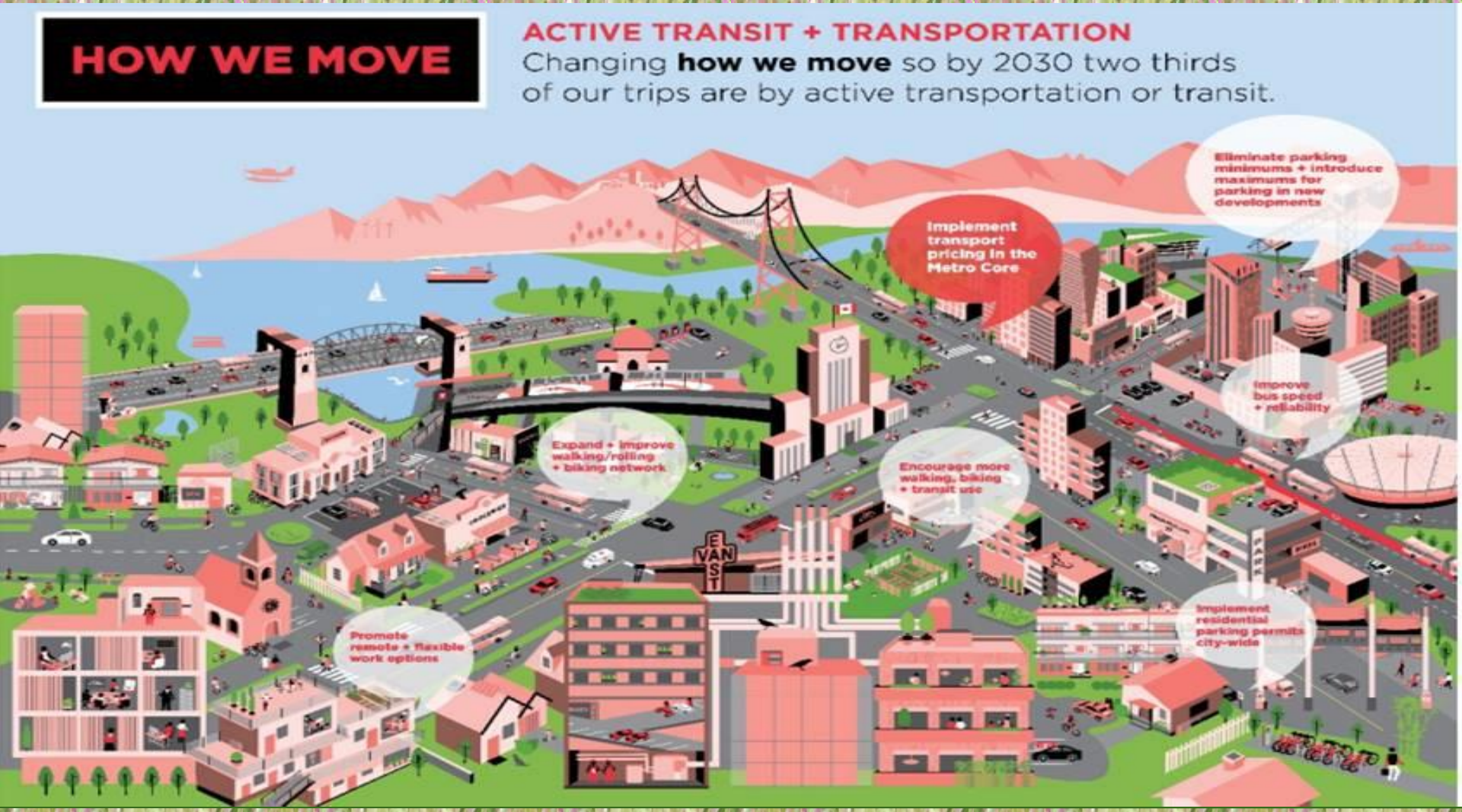
15-minute neighborhoods, New Urbanism, Smart Growth and Location Efficiency all refer to compact, mixed-use, multimodal communities where it is easy to reach common services and activities without driving.



Total Costs Compared



Success Stories



Key References

Torsha Bhattacharya, Kevin Mills, and Tiffany Mulally (2019), *Active Transportation Transforms America: The Case for Increased Public Investment in Walking and Biking Connectivity*, Rails-to-Trails Conservancy (www.railstotrails.org); at https://bit.ly/3oXG3cI.

Dominik Bucher, et al. (2019), "Energy and Greenhouse Gas Emission Reduction Potentials Resulting from Different Commuter Electric Bicycle Adoption Scenarios in Switzerland," *Renewable and Sustainable Energy Reviews 114*; at https://bit.ly/2CTCPFa.

M. Ensor, O. Maxwell and O. Bruce (2021), *Mode Shift to Micromobility*, Research Report 674, NZ Transport Agency (www.nzta.govt.nz); at https://bit.ly/3Bh4tVC.

Aslak Fyhri and Hanne Beate Sundfør (2020), "Do People Who Buy E-bikes Cycle More?" *Transportation Research Part D,* Vol. 86 (https://doi.org/10.1016/j.trd.2020.102422).

ITDP (2019), *The Electric Assist: Leveraging E-Bikes and E-Scooters for More livable Cities*, Institute for Transportation and Development Policies (www.itdp.org); at www.itdp.org/publication/electric-assist.

ITF (2021), *Micromobility, Equity and Sustainability*, International Transport Forum (www.itf-oecd.org).

Jacob Mason, Lew Fulton and Zane McDonald (2015), *A Global High Shift Cycling Scenario: The Potential for Dramatically Increasing Bicycle and E-bike Use in Cities Around the World*, ITDP (www.itdp.org); at https://bit.ly/3jbzPnS.

Michael McQueen, John MacArthur and Christopher Cherry (2020), "The E-Bike Potential: Estimating Regional E-bike Impacts on Greenhouse Gas Emissions," *Transportation Research Part D*, Vo. 87 (https://doi.org/10.1016/j.trd.2020.102482).

Kevin J. Krizek and Nancy McGuckin (2019), "Shedding NHTS Light on the Use of "Little Vehicles" in Urban Areas," *Transport Findings* (https://transportfindings.org); at https://bit.ly/3r1tHT3.

Polis (2019), *Macro Managing Micro Mobility: Taking the Long View on Short Trips*, POLIS (www.polisnetwork.eu);.

“Comprehensive Transport Emission Reduction Planning”

“Win-Win Transportation Emission Reduction Strategies”

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