



**AUTOMATED + CONNECTED VEHICLES:
IMPLICATIONS FOR VANCOUVER & NEXT STEPS**

5th Avenue, NYC



1900: All horses.



1913: All cars.

Impact to cities could be as significant as the invention of the car.

Policy decisions will determine their impact.

Utopian vision: Automated vehicles complement active transportation and mass transit, radically reduce the total number of cars, increase safety and mobility options, and free up public space currently used for parking

Nightmare vision: Automated vehicles induce longer commutes and sprawling development, compete with walking and cycling, and reduce investment in high capacity mass transit.

Potential Benefits

- Improved safety
- Increased mobility options
- Fewer cars overall = More space for walking, cycling, transit, public realm
- Decreased emissions
- Complement mass transit with flexible, on-demand shared service
- Improved transportation planning tools through better data
- Increased productivity during commute time

Potential Risks

- More driving: Longer commutes and induced sprawl
- Worsened health: Decreased walking and cycling
- Reduced investment in mass transit
- Hacking & cybersecurity threats
- Loss of privacy

Uncertainties

- Regulations at all levels
- Public acceptance
- Insurance & liability implications
- Safety benefits in complex urban areas
- Ethics
- Transition period
- Shifting employment landscape



TECHNOLOGY PRIMER

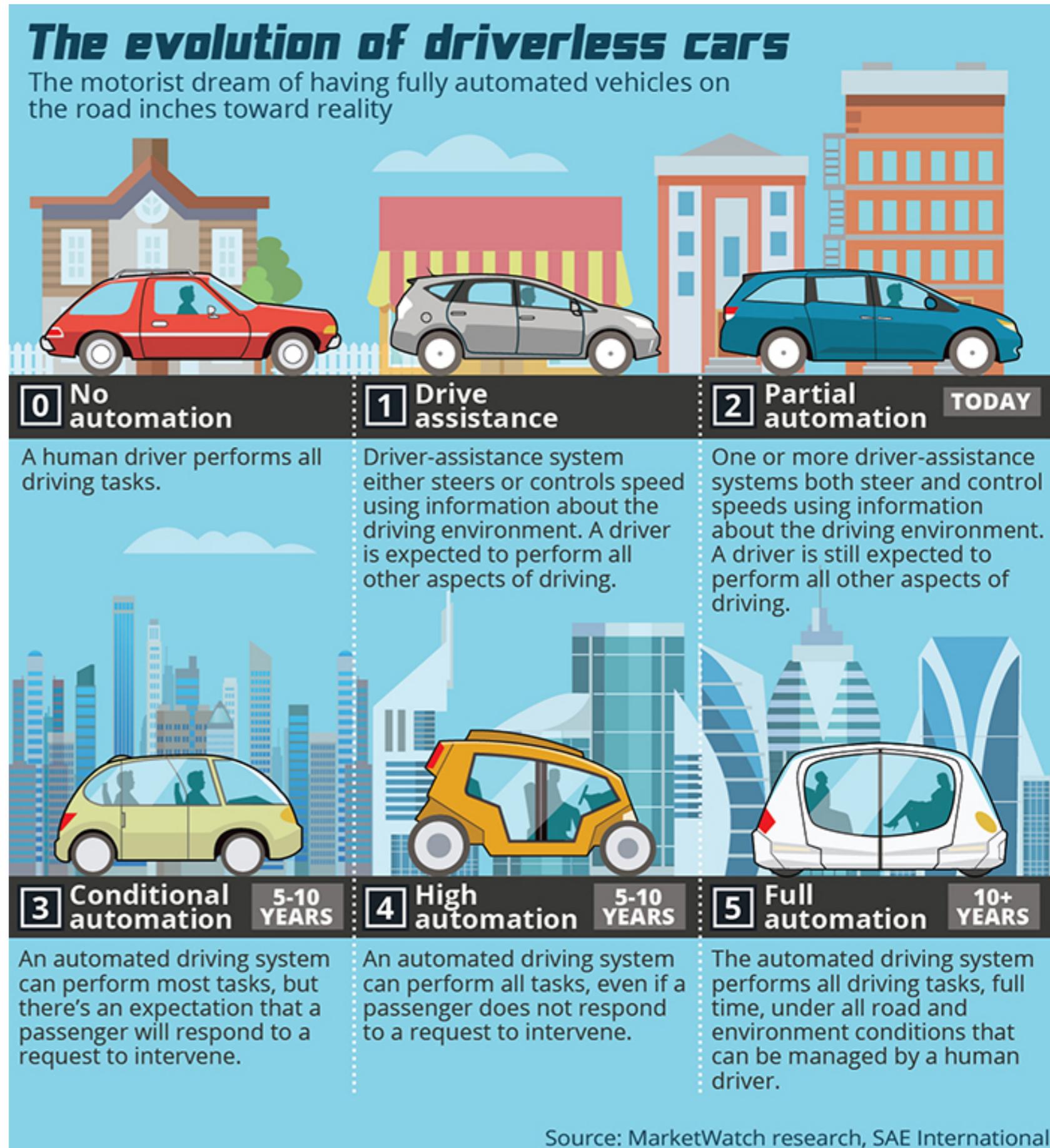
AUTO INDUSTRY MEGATRENDS

- Automated
- Connected
- Electric
- Shared



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Source: MarketWatch research, SAE International

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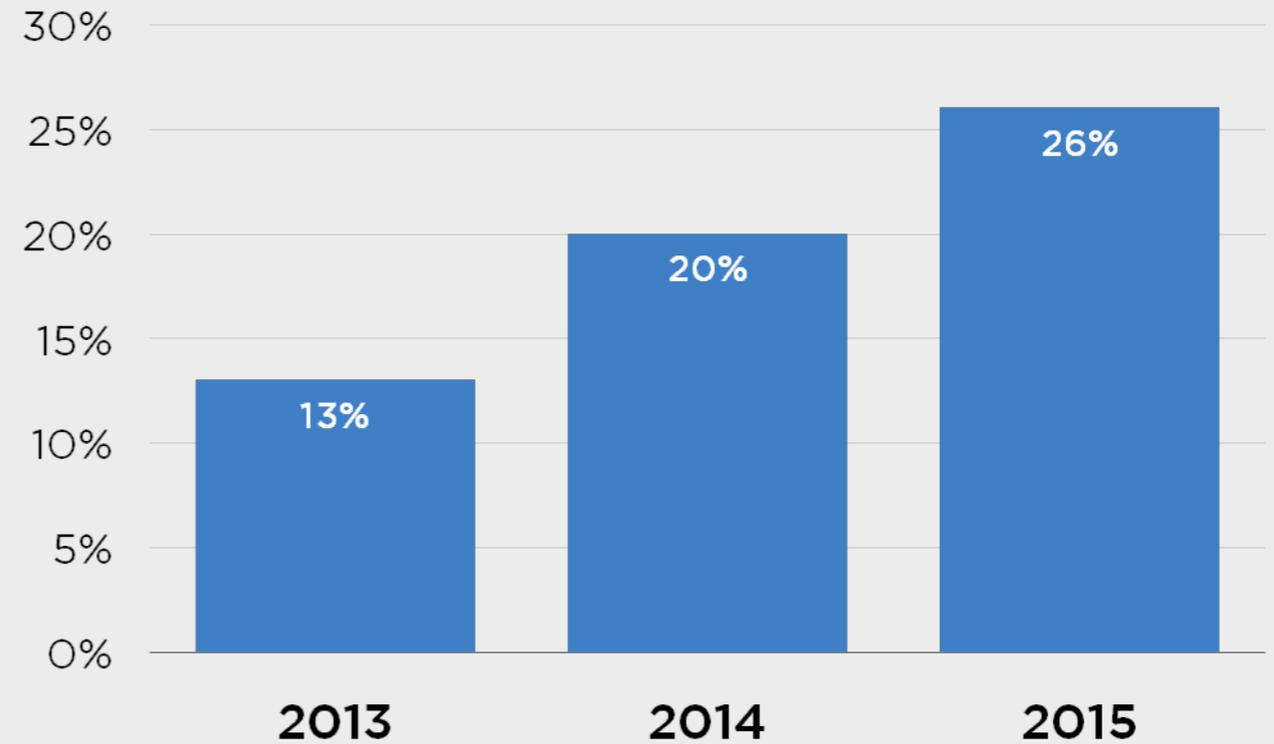


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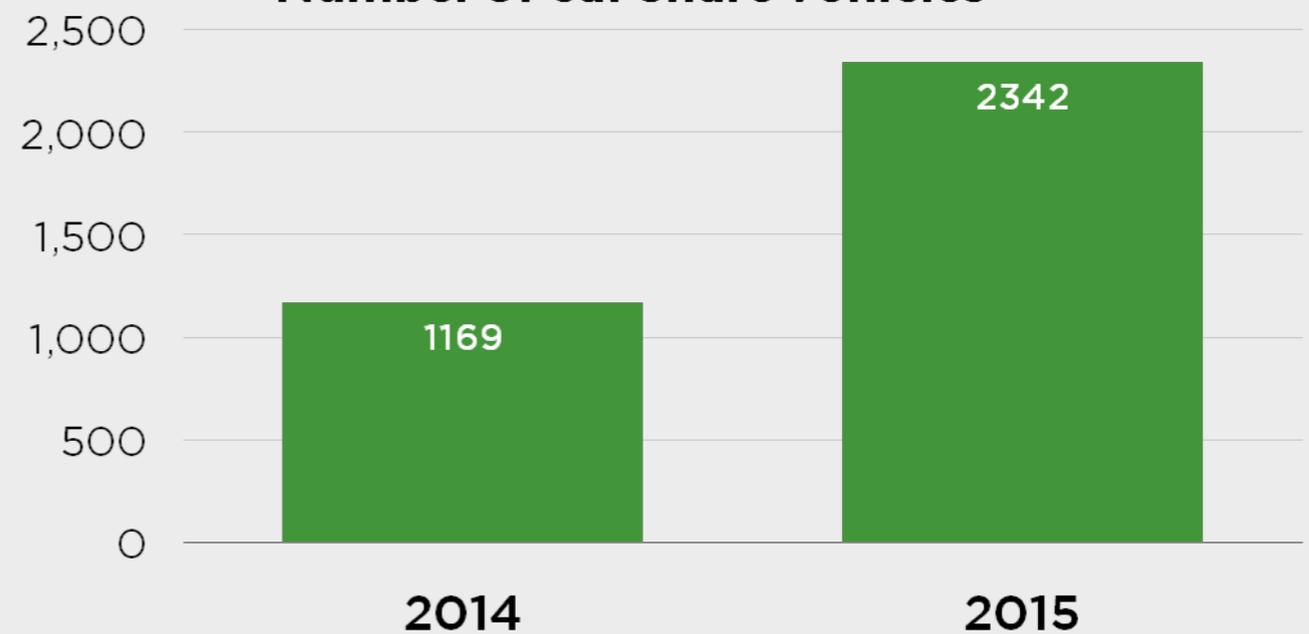
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Growing car share in the City of Vancouver

% of adults who are car share members



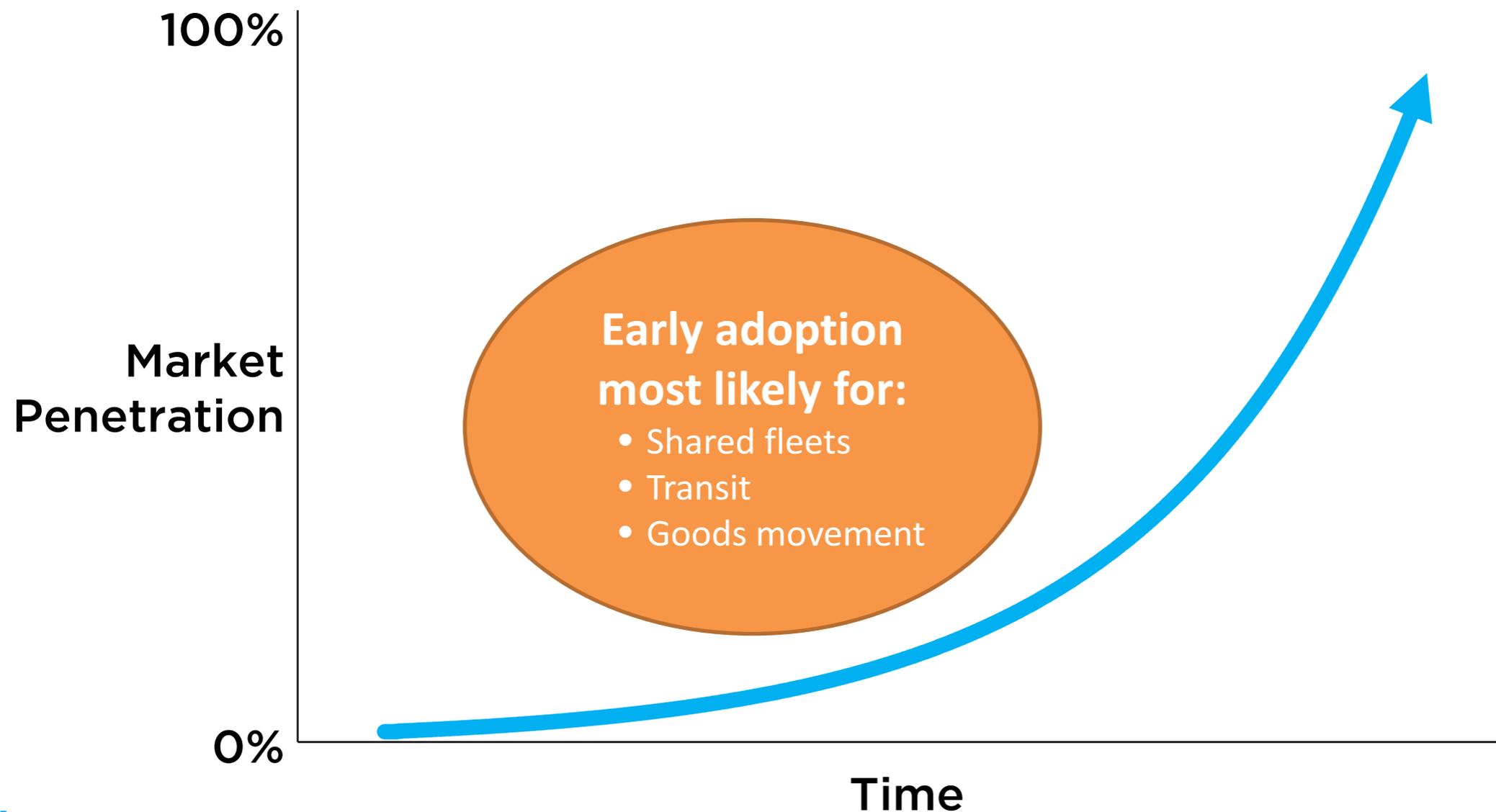
Number of car share vehicles



Source: 2013-2015 Panel Surveys. City of Vancouver.

Timeframes for emergence & adoption

- Predictions vary widely
- Level 5 vehicles could be available in 5 years... or they could be decades away
- Early adoption most likely for shared fleets, transit, goods movement
- Many potential benefits will require significant levels of adoption to be realized.



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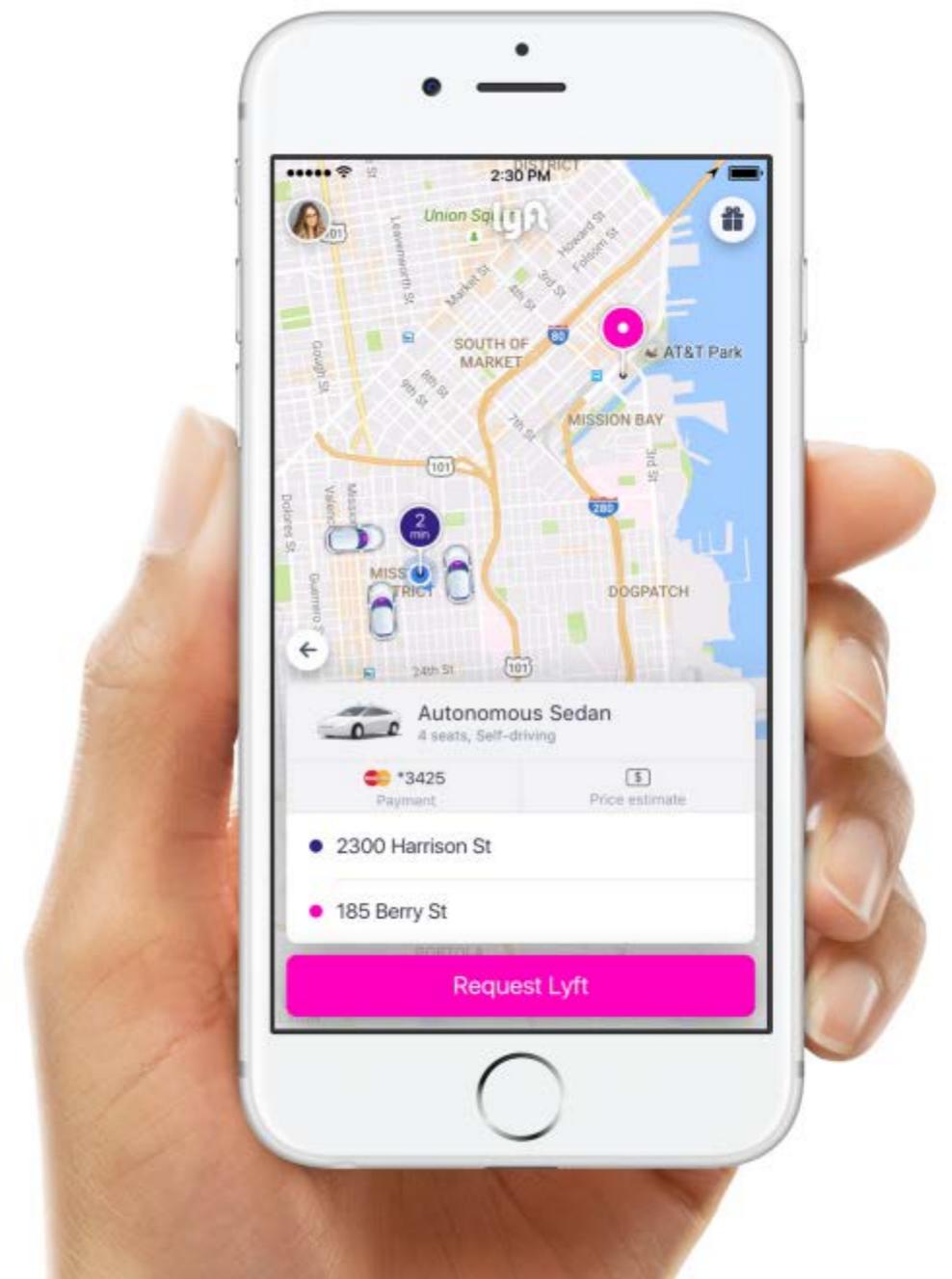
KRONE

PNO

RECENT DEVELOPMENTS

Mobility as a Service (MaaS)

- Driverless shared fleets = Micro-transit on demand
- Increasingly blurred lines between ride sourcing and public transit



TRANSIT

- **2016:** Mercedes tested driverless bus technology in complex urban environment in the Netherlands
- **Near term real world:** Driver-assistance technology
 - Platooning
 - Safety warnings
 - Precision docking at stops



The Evolution of Ride Sourcing

- Today: Driverless taxis being tested in U.S., Europe, and Asia
- **Near future: Uber, Lyft, Ford, GM + intend to deploy large fleets of shared driverless vehicles within 5 years**
- Potential to reduce private car ownership, replace suburban transit routes, complement high capacity mass transit



Tesla Announcement on October 19th 2016

- New vehicles will come with necessary hardware for complete autonomous function
- Functionality will depend on existing software validation and regulatory approval
- Plans to allow Tesla owners to participate in for-profit Tesla Network (ride sourcing) – details to be released next year





November 2016: Self-driving beer truck completes 120 mile trip

In the U.S., trucking is a \$700B industry and roughly a third is driver compensation.

Federal & State/Provincial Policy

In the U.S.

- Comprehensive federal policy issued September 2016; will be updated annually
- Includes direction on safety, data sharing, privacy
- Establishes jurisdictional boundaries and includes model state policy

“Safer, more accessible driving. Less congested, less polluted roads. That’s what harnessing technology for good can look like. **But we have to get it right.** Americans deserve to know they’ll be safe today even as we develop and deploy the technologies of tomorrow.”

- Barack Obama



U.S. Transportation Secretary Anthony Foxx with Google Car

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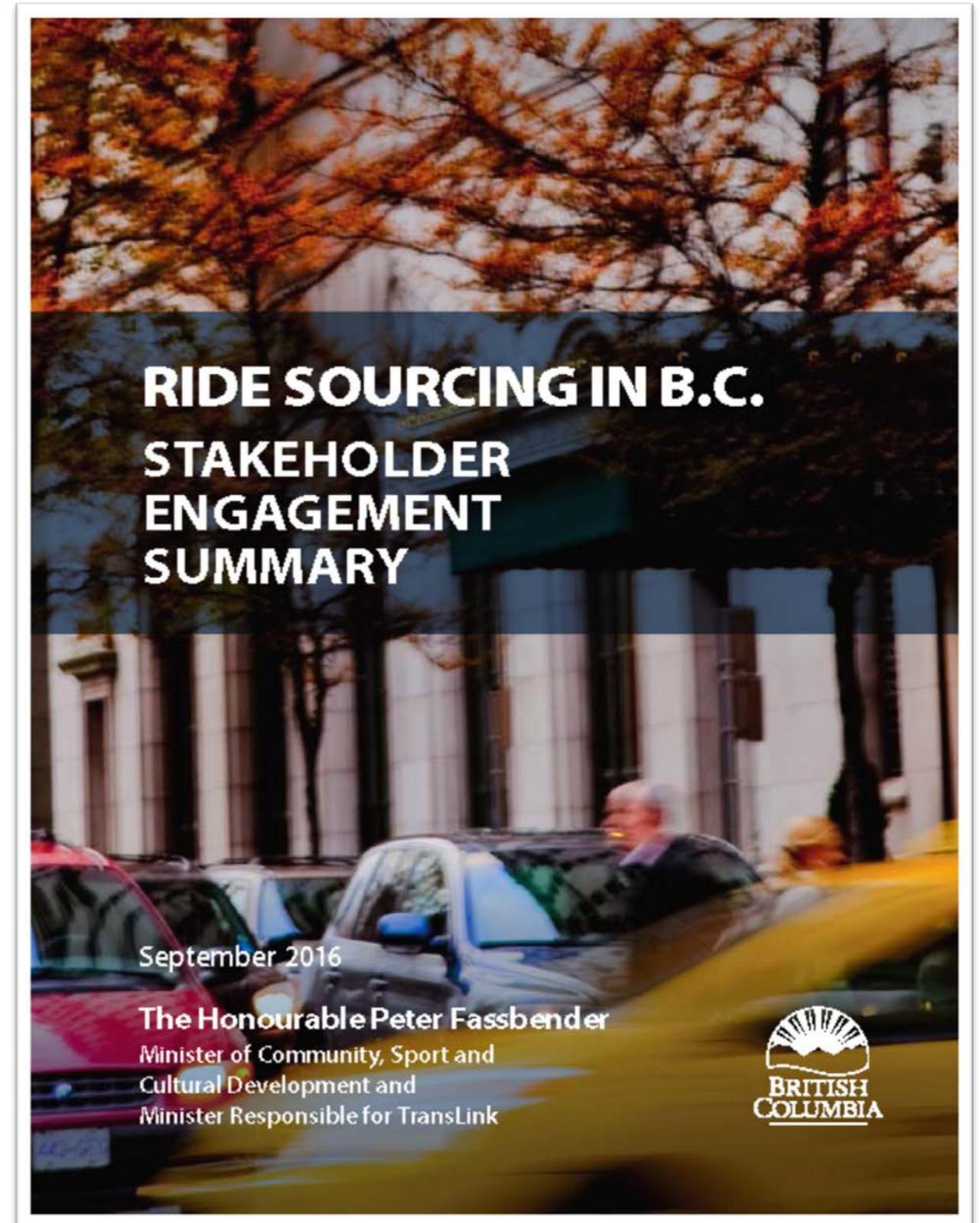
In Canada

- 2016 Federal budget approved \$7.3M over two years to support development of national regulatory framework for emerging vehicle technologies
- 2015 Canada Transportation Act Review: recommends harmonizing Canada's approach with U.S. legislation with respect to testing and operation on public roads
- Province is waiting for federal legislation, supportive of further regional discussion

Provincial approach to ride sourcing

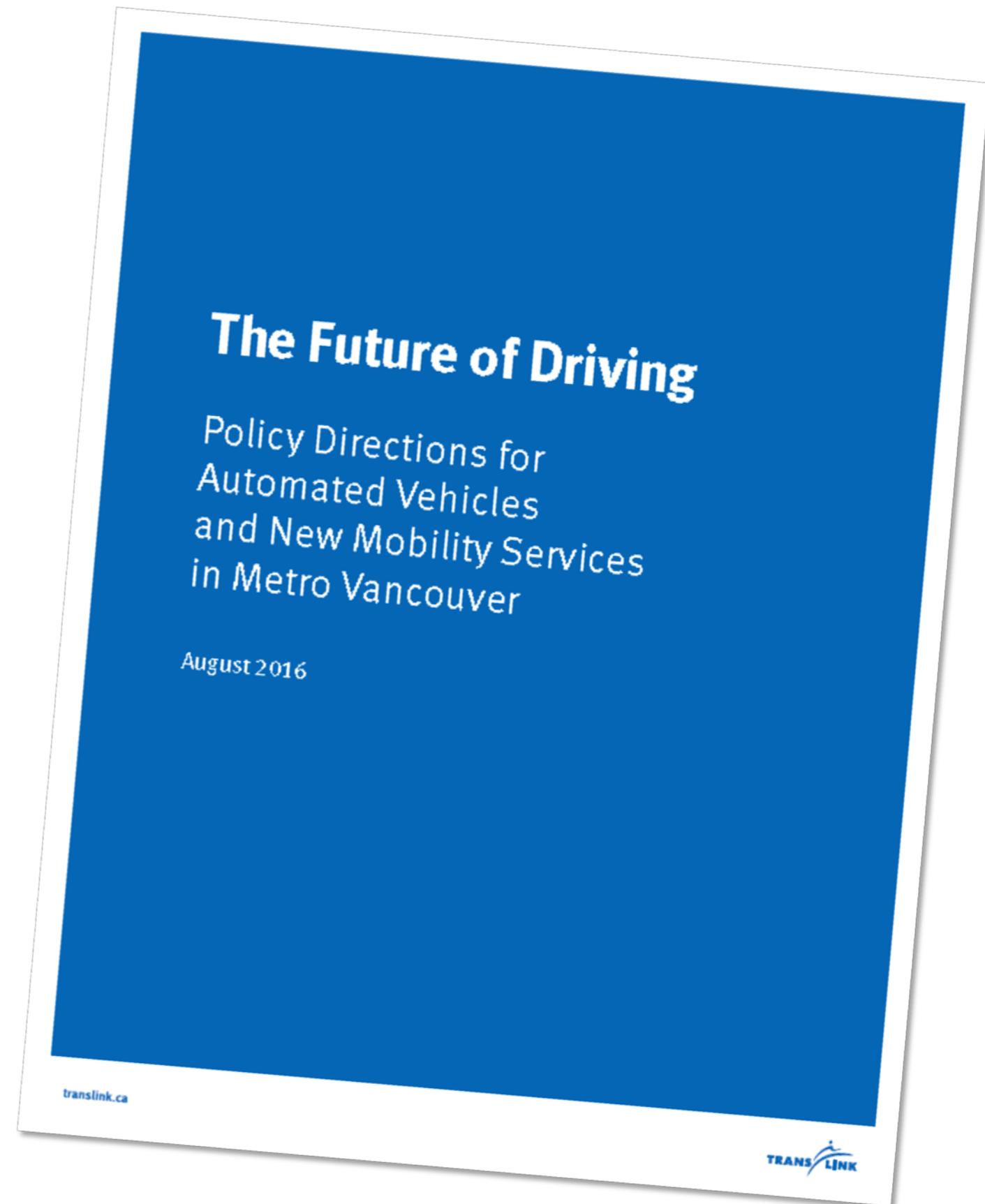
Emerging Principles

1. Ensure passenger comfort and vehicle safety
2. Meet consumer demand
3. Guarantee accessibility
4. Ensure a fair and level playing field
5. Build a streamlined and modernized passenger transportation sector



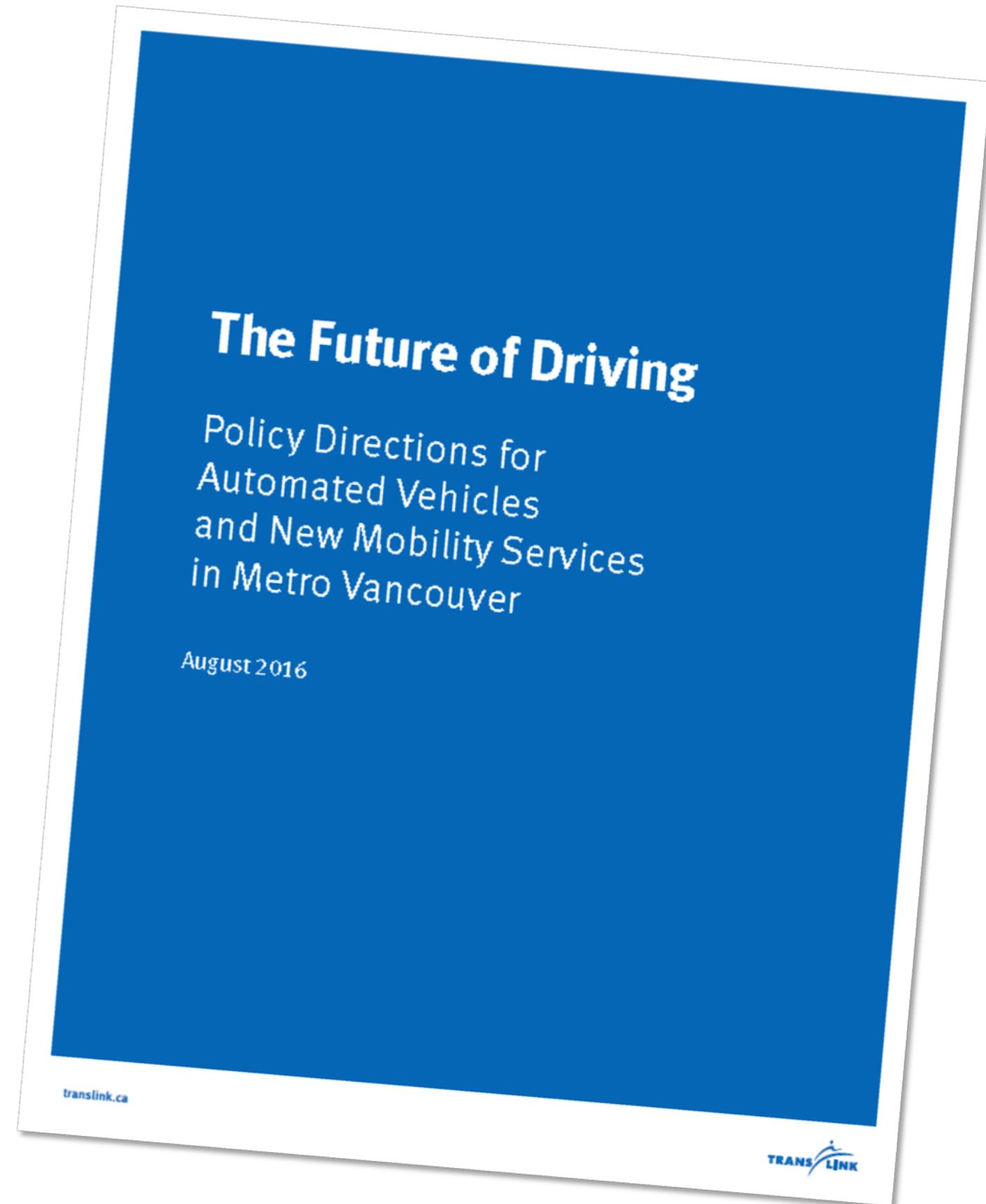
Regional Objectives

- Increase walking, cycling, transit
- Reduce need to own car
- Reduce distances driven
- Improve regional accessibility
- Ensure safety
- Reduce reliance on fossil fuels
- Support compact urban area



Preferred regional scenario

- comprehensive road pricing
- vehicle sharing policies
- integrated payment



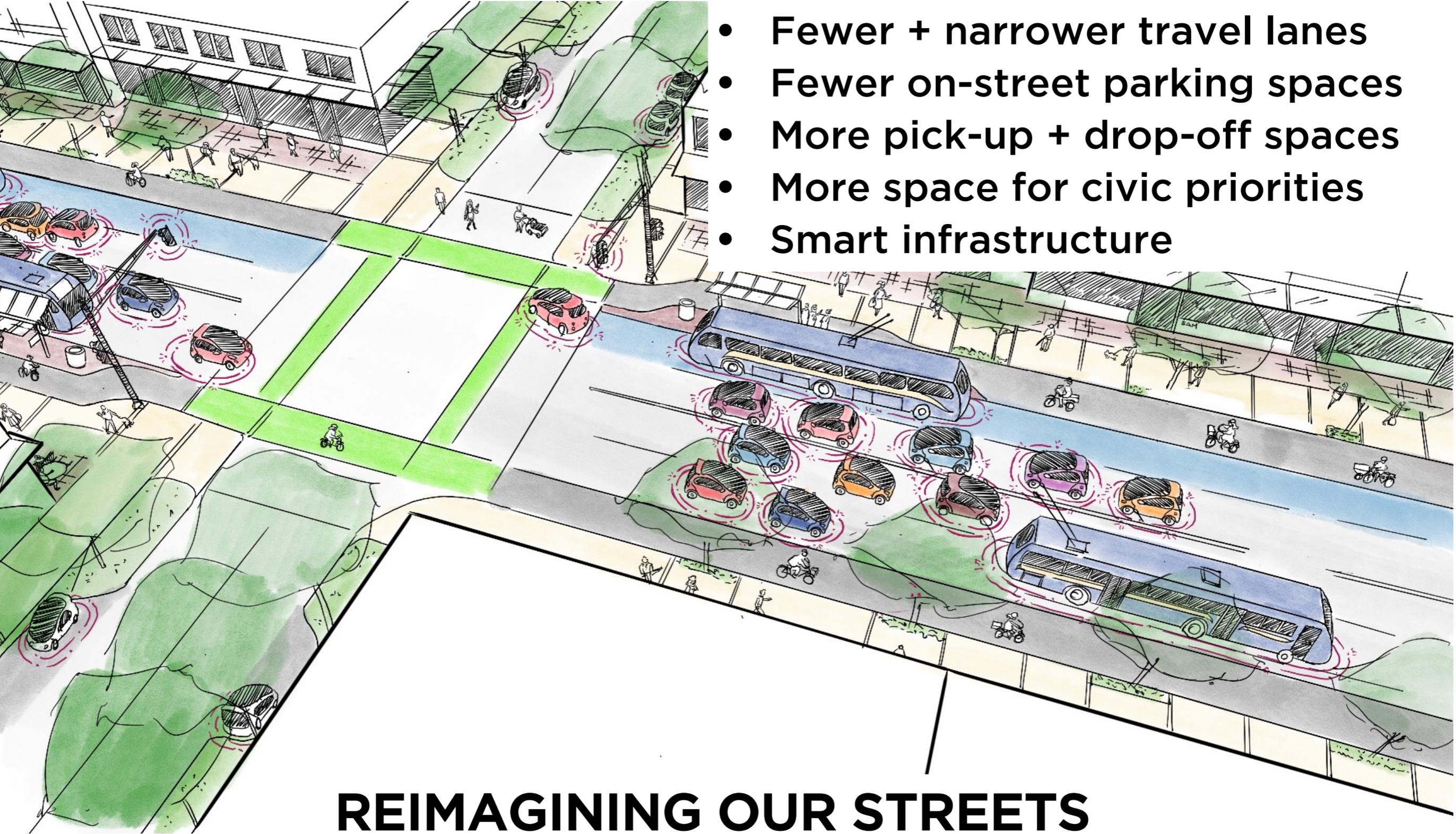
City of Vancouver Automated Vehicle Near-term Work Plan

- 1. Work together** to share information and develop coordinated policy as technology evolves
- 2. Explore and test innovative ideas** that support mobility and safety goals
- 3. Future-proof** parking and other civic infrastructure (e.g. transportation, utilities, digital/wireless)
- 4. Plan for a resilient economy** that can respond to a changing job market
- 5. Encourage shared approach** that supports municipal and regional objectives , e.g.
 - Mobility pricing
 - Shared mobility
 - Road space reallocation



REIMAGINING OUR STREETS

Re-allocate road space as automated, connected, electric, & shared vehicles become real



- Fewer + narrower travel lanes
- Fewer on-street parking spaces
- More pick-up + drop-off spaces
- More space for civic priorities
- Smart infrastructure

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