CUTRIC National Smart Vehicle Demonstration Project

Canadian Urban Transit Research and Innovation Consortium (CUTRIC)

Consortium de recherche et d'innovation en transport urbain au Canada (CRITUC)

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CUTRIC Vision & Pillars of Innovation

To make Canada a **global leader** in **low-carbon smart mobility technology innovation** across light-duty and heavy-duty platforms, including advanced transit, transportation, and integrated mobility applications.

Pillar #1

Zero-emissions & low-carbon propulsion systems with fueling & charging system integration

Pillar #2

“Smart” vehicles and “smart” infrastructure

Pillar #3

Big data advanced mobility

Pillar #4

Cybersecurity in mobility

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Project Overview

The National Smart Vehicle Demonstration Project will integrate fully autonomous, connected, low-speed, electrified vehicles shuttles (e-LSA) in up to 12 Canadian municipal jurisdictions

- First-mile/last-mile applications
- Standardized V2V and V2I communication protocols
- Standardized cybersecurity protocols
- Interoperability of e-LSA manufacturer equipment

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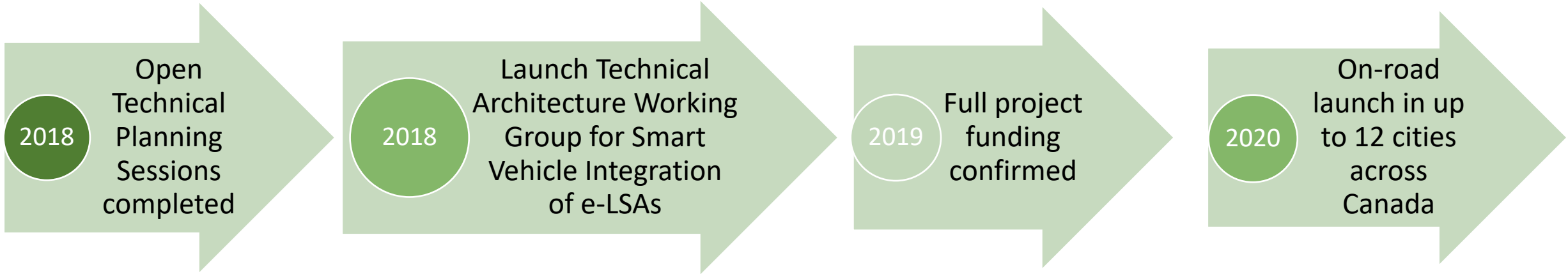
Project Timeline



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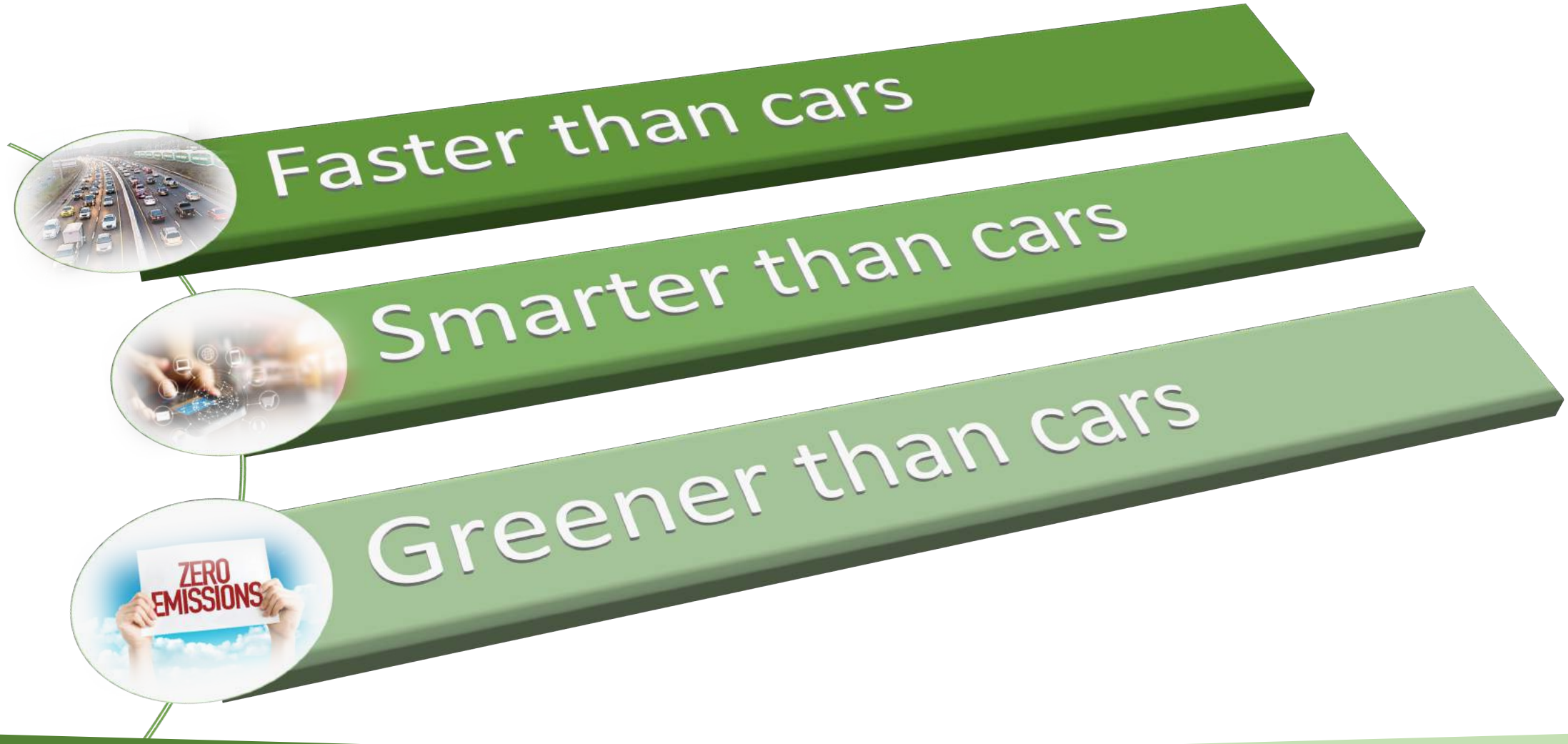
Smart Mobility is Shared Mobility

Not always “transit”, but should be more frequently than not



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So, what's the purpose of a municipally-led AV/CV trial?

Is the City trying to improve <u>shared mobility</u>?
- **Reduce congestion?**
- **Improve productivity?**
- **Reduce emissions?**

Or, is the City inadvertently (or explicitly) supporting the launch and integration of luxury car products without a focus on 21st century urban design challenges?

Discombobulated policy goals and often <u>no feasible technology innovation goals</u> are driving municipal and (sometimes) provincial policy making vis-à-vis AV-CV technologies across Canada

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Project Scope & Vision

- **Twelve Cities:**
  - Vancouver, Calgary, Edmonton, Winnipeg, York Region, Burlington, London, Windsor, Toronto, Montreal, Trois-Rivières, Halifax

- **Cost per city:** $1.5 million - $2 million
- **Number of vehicles per route**: 3 e-LSAs
- **Number of OEMs:** Minimum 2 OEM products per route
- **Route length:** ~1 km
- **Transit service option:** No current bus services

Total project cost is estimated at **$30-40 Million (2019-2021)**

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AV Systems and Solutions

NAVYA - COGNITIV

- Computer that merges data from sensor architecture:
  - Lidars
  - Cameras
  - Radars
  - GPS RTK
  - IMU
  - Odometry

EASYMILE Fleet Management Software

- Drives up to 45 km/h
- Carries up to 15 passengers
- In-built access ramp
- Fixed or on-demand route
- Supervised by EasyMile's fleet management software
- Requires no additional road infrastructure

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AV Systems and Solutions

2GetThere – Automated People Mover Shuttle

- 24 passengers
- Speeds of 60 km/hr
- Can serve short connections (<1.5 km) or long connections (<12 km)
- Costs 50-70% of traditional APM systems

FP Innovations – PIT Group

- Developed a four season mini-transit autonomous shuttle
- Opportunity charging system
- Fully integrated with mass transit
- V2V & V2I communication

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General Project Goals

1) Position transit within the development of **Smart Cities**

2) Explore opportunities for **public transit** as they relate to **technology-enabled mobility services**

3) Support the **adaptation of policies and regulations** for the testing and deployment of “smart” vehicles and e-LSAs in dedicated laneways

4) **Demonstrate GHG reduction** (not GHG augmentation) from “smart” vehicle integration in municipal communities

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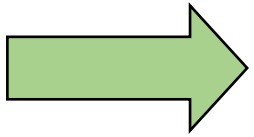
Specific Project Goals

1) Consolidate fragmented ad hoc municipal “smart” vehicle pilots; **coordinate municipal goals**

2) Focus on **shared mobility** and generate first/last-mile solutions for transit stops 400m < x < 1 km from the final destination

3) Integrate **standardized communications protocols** to support competitively manufactured vehicle systems

4) Integrate a **standardized cybersecurity protocol** across all cities engaged in the project



CUTRIC-led National Technical Architecture Working Group for Smart Vehicle Integration of e-LSAs Across Municipal Jurisdictions (2018-2019)

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Current Industry Stakeholders

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Municipalities & Academic Members

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Academic Members (Academic Advisory Committee)

Concordia

UQTR
Université du Québec à Trois-Rivières

UNIVERSITY OF WATERLOO

UBC

UNIVERSITY OF TORONTO

EST. 1877
UNIVERSITY OF MANITOBA

Carleton UNIVERSITY

Queen's UNIVERSITY

University of Windsor

UNIVERSITY OF ALBERTA

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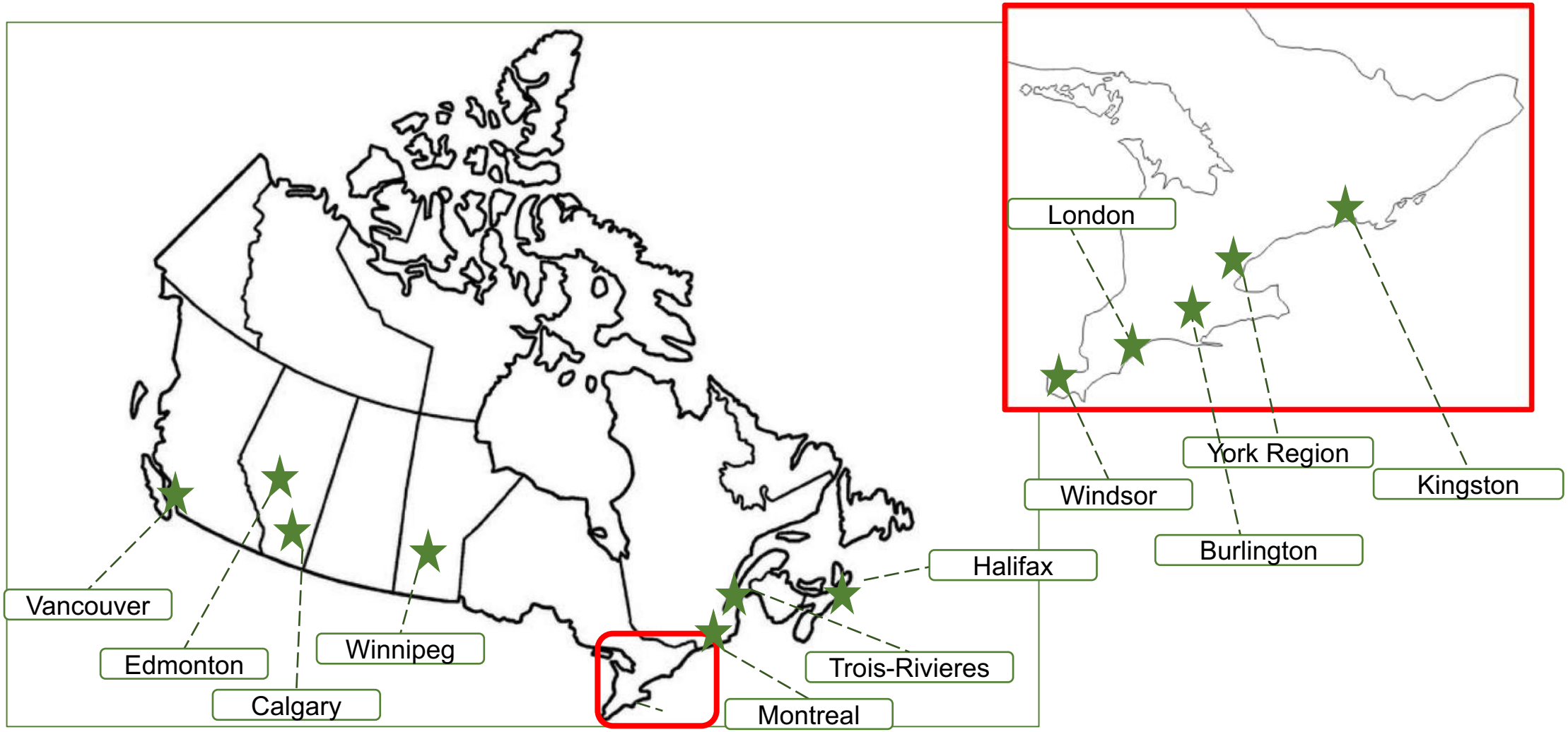
Possible Demonstration Sites in Canada



Next Steps

Technical Planning Session 5

Wednesday, June 20th, 2018 (ABB, Montréal)

*Only open to CUTRIC members

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