

Emerging Technology, Electric and Autonomous vehicles

July 9th,

Starts at 2 PM ET



Clean Air Partnership



Agenda

1. **Intro** (3 min)
2. **Overview of EVs from municipal/fleet perspective** – (5 min)
3. **Andy Ike, Envision Solar – Portable, Solar EV Charger** (20 min)
4. **Overview of AVs in Canada** (7 min)
5. **Fahad Shuja, Ontario Good Roads Association & MACAVO - Municipal Alliance for Connected and Autonomous Vehicles in Ontario** (30 min)
6. **Fahad Khan, City of Toronto - Automated Shuttle Trial project** (15 min)
7. **Q&A** (10 min)

Automotive Industry Investment/Commitment

- Global cumulative over \$200B (Jan 2019)
- VW \$40B w/ 50 full electric models making up 20-25% of sales by 2025
- Ford \$11B w/ 40 electrified (EV, PHEV and Hybrid) models by 2025
- GM 20 different EV models by 2023
- Hyundai \$17B to electrify most new models by 2025

Electric Vehicle Benefits

- Performance and reliability
- Efficiency (EV 90% vs. ICE 25%)
- Lower maintenance (brakes, fluids, no exhaust system, no starter, no transmission, no spark plugs. . .)
- Low operating costs
- Zero tail pipe emissions
- Energy independence
- Fuel diversity



Electric Vehicle Challenges

- **Cost Budget**
- **Vehicle Model Availability**
- **Concern About Limited Range**
- **Charging Infrastructure**



Envision Solar - EV ARC™ 2020

- Solar-powered EV chargers are sold in 90 municipalities in 20 states and 4 nations – one in Richmond, BC, Canada
- Transportable, solar-powered, EV charging station that operates completely off the power grid
- Charging six vehicles at the same time
- Fits in a standard parking space and can be easily deployed
- Used to power up COVID testing Center in City of Oakland, USA
- Zero construction or permitting to install



Autonomous Vehicles (AVs), Canada

Legal framework

- **Transport Canada** – responsible for setting safety measures & identified key roles: municipality, province)
 - [Testing Highly Automated Vehicles in Canada: Guidelines for Trial Organizations](#)
 - [Canada's Safety Framework for Automated and Connected Vehicles](#)
 - [Canada's Vehicle Cyber Security Guidance](#)
 - [Safety Assessment for Automated Driving Systems in Canada](#)

Autonomous Vehicles (AVs), Canada

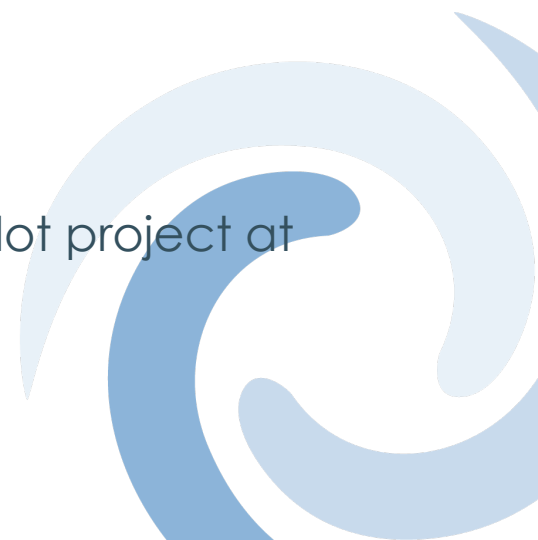
Legal framework

- **Provinces & Territories** – responsible for vehicle registration, driving license, etc.
 - [Ontario's Automated Vehicle Pilot Program](#) (2016; extended 2019)
 - [Quebec – regulatory framework](#)
 - [Manitoba – legislation to allow safe testing of AVs](#) (March 2020) (Policy driver is to push support agriculture sector)

Autonomous Vehicles (AVs), Canada

Legal framework

- **Municipalities** - responsible of proper deployment of solutions: parking, by-law for local roads, and etc.
 - Windsor-Ottawa Preferred Corridor – MACAVO project
 - Ottawa leader in R&D
 - Toronto –
 - [Automated Vehicles Tactical Plan](#)
 - [Automated Shuttle Trial](#) - 12 month shuttle pilot project at Rouge Hill Go Station (City + TTC + Metrolinx)



Autonomous Vehicles (AVs), Canada

- **Non-passenger AVs**

- The City of Grand Prairie in Alberta, Canada, has added an autonomous snow-clearing and ice-control robot to its fleet for use on the city's network of trails.
- Canadian Automated Snow Plow Initiative (CASPI)



Autonomous Vehicles (AVs) & COVID-19

The pandemic has crystalized what autonomous solutions can offer to solve problems

- drone applications (spraying disinfectants – UK, France , Spain, USA)
- delivery medical supplies and testing
- 5G power robots in hospitals to support those affected from COVID -19



OGRA & MACAVO

Authoritative Road Information for all Ontario public roads

Ontario Road Information Exchange (ORIE)

- Central mechanism to plug -in data both way
- Municipal Road Construction During COVID-19: LIVE UPDATES

Windsor-Ottawa pilot project

- Ontario Municipalities Create World's Longest, Preferred Corridor for Testing of AVs and Related Technologies

OGRA & MACAVO

Authoritative Road Information for all Ontario public roads

- Reduced road information communication costs for municipalities.
- Reduced road infrastructure damage for municipalities, railways and others.
- Reduced emergency response call times for emergency responders.
- Reduced delivery times for industry.
- Reduced vehicle damage for all travelers.
- The advancement of connected and autonomous vehicles.



Toronto Automated Shuttle Trial

Wednesday, July 9, 2020

Prepared for: Clean Air Partnership
Emerging Technology Webinar

Prepared by:

Fahad Khan
Transportation Services, City of Toronto
Fahad.Khan@Toronto.ca



Questions?



Clean Air Partnership

Thank You!



Clean Air Partnership