Shocking Realities: Trends in Electrifying Transportation

RIDE THE WAVE UBCM 2024

Zero Emission Fleet Transition

UBCM Workshop

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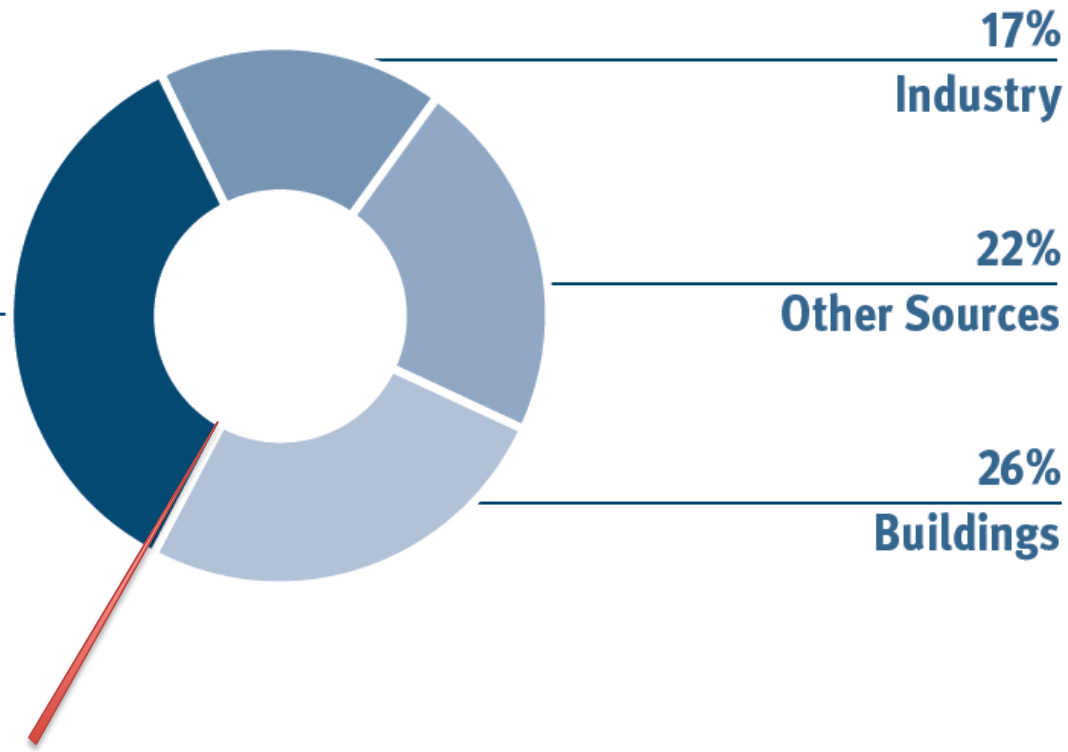
19 September 2024

How We Move Has Big Impact on GHGs

In Metro Vancouver, the largest single source of carbon emissions is on-road transportation.

35% of regional GHGs come from on-road transportation

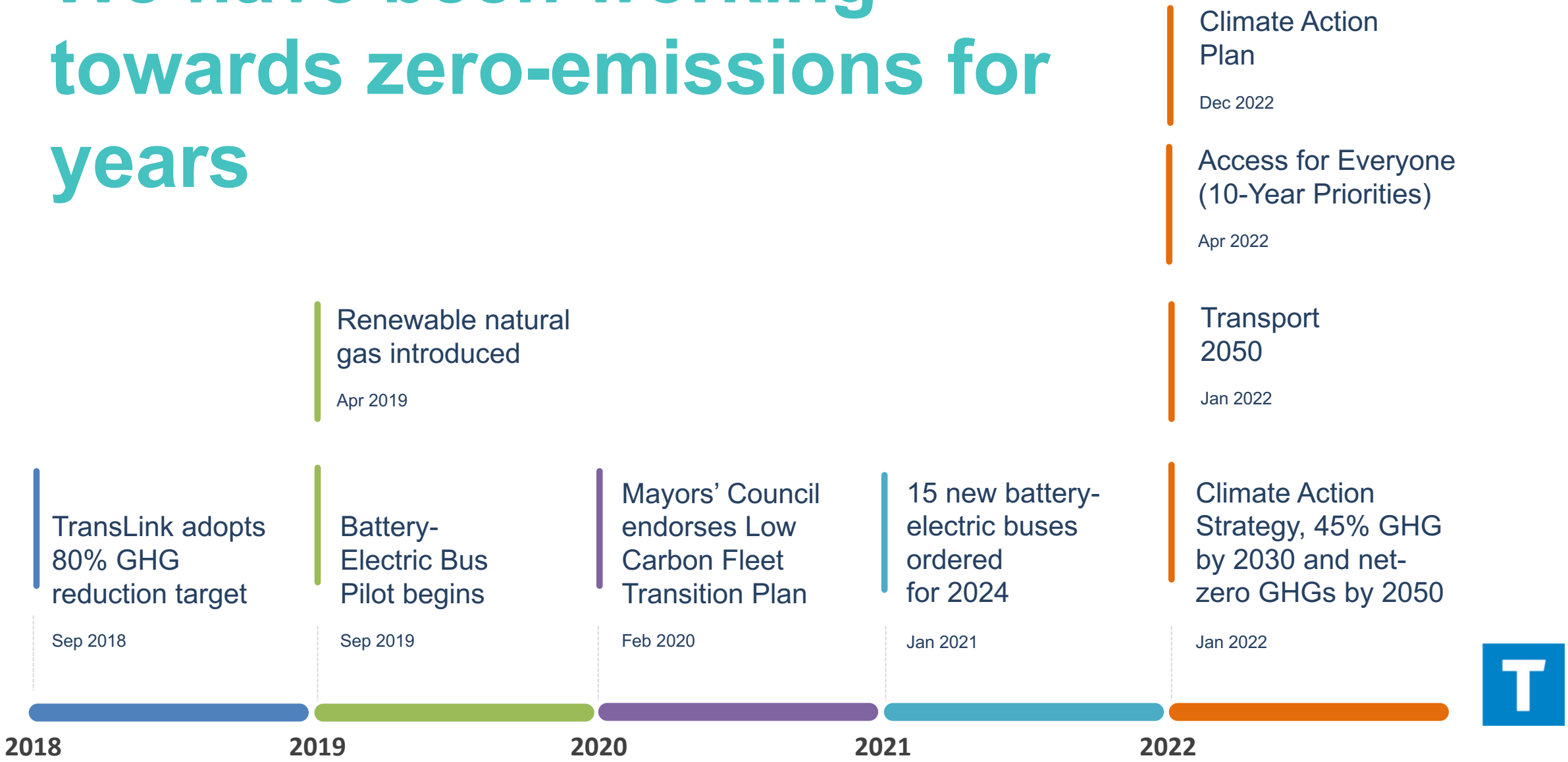


1% of regional GHGs come from TransLink

TransLink is already providing low carbon transportation

- 65% of the total passenger kilometers travelled in 2023 were on the all-electric SkyTrain and trolley bus networks
- Early adopter of natural gas and hybrid-diesel buses
- Second largest electric trolley fleet in North America
- Move 300-500k people everyday

We have been working towards zero-emissions for years



We’re not alone in our zero emissions journey

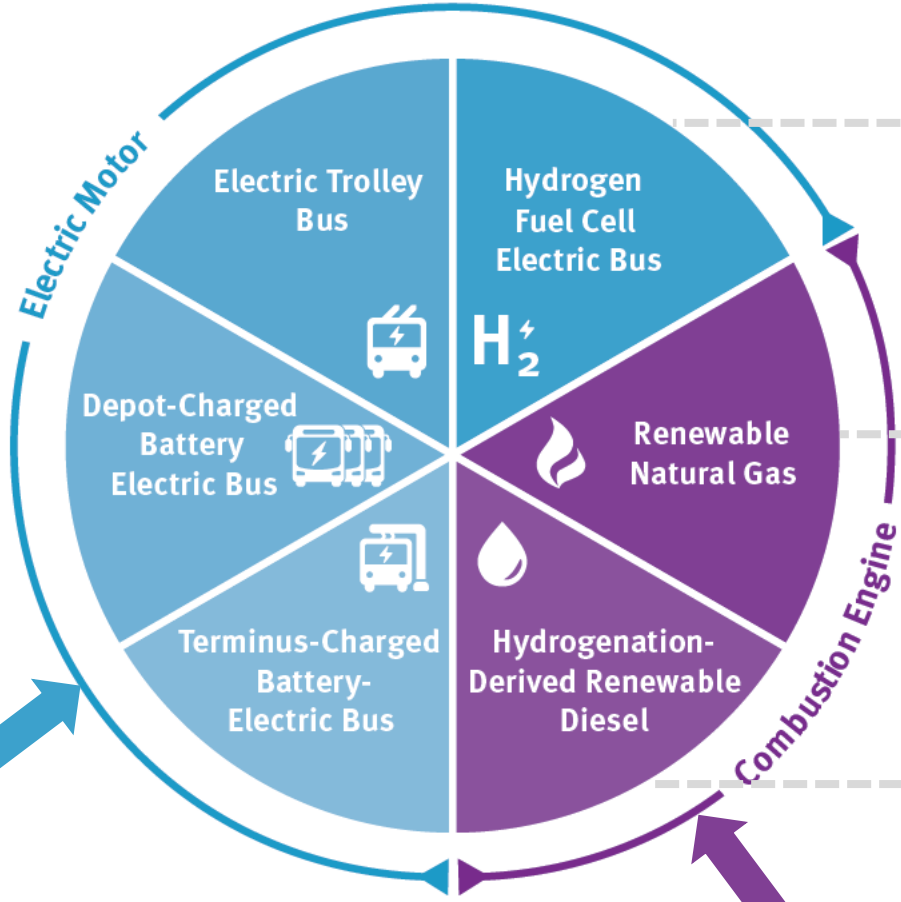
- Zero emission policies, regulations, and funding are driving industry change
- Technology choices influenced by regional factors
- Everyone is learning

Agencies working toward a 100% Zero Emission Fleet by:				Other:
2030	**2035**	**2040**		**-**
• Foothill Transit (Los Angeles) • Berlin • RVK (Cologne, Germany)	• King County Metro (Seattle) • LACMTA (Los Angeles) • Transport for London • Munich • Dusseldorf	• **TransLink (Metro Vancouver)** • TTC (Toronto, 2037) • STM (Montreal) • MBTA (Boston) • NYMTA (New York)	• TriMet (Portland) • SEPTA (Philadelphia) • AC Transit (San Francisco)	• Sound Transit - 2050 • Régie autonome des transports parisiens (Paris) - Renewable fuels 2025

Reducing emissions from buses takes two forms:

Switching Technology and Switching Fuels

GHG reductions compared to diesel



93% GHG Reduction

80% GHG Reduction

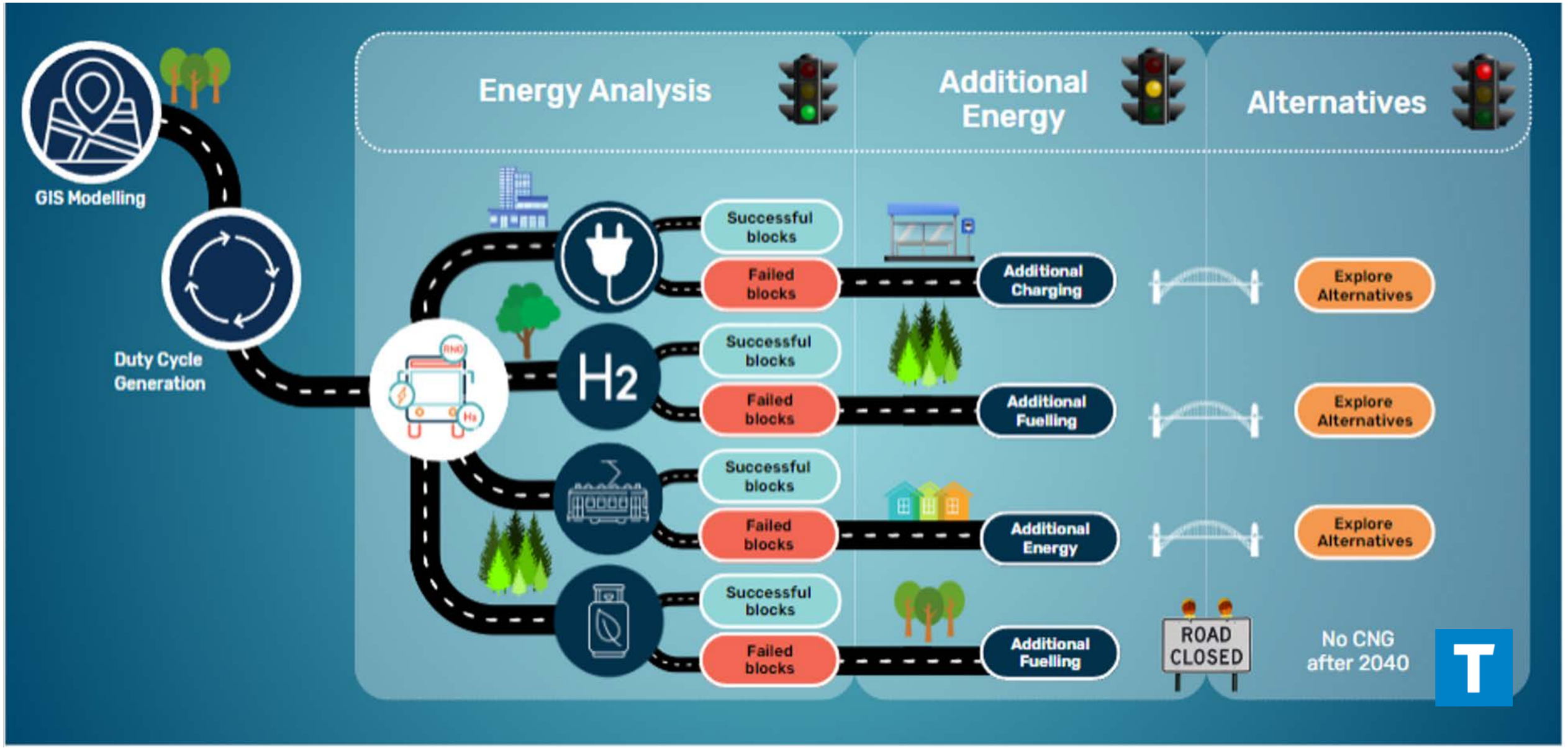
85% GHG Reduction

65–85% GHG Reduction

Replacing end of life buses with zero-emissions technologies

Changing to renewable fuels to decarbonize the existing fleet

GIS Driven Energy, Transit Centre and Service Evaluation



Transition to Electric

- **2024: Electric Route 100**
  Hamilton Transit Centre Plug-In Chargers, In-Route Charger, 15 Battery Electric Buses

- **2027: Port Coquitlam Transit Centre**
  Phase 1: 57 BEBs w. infrastructure,
  Phase 2: Infrastructure for up to 64 BEBs (unfunded)

- **By 2030, 34% of diesel buses will be replaced by Battery Electric**

Marpole Transit Centre

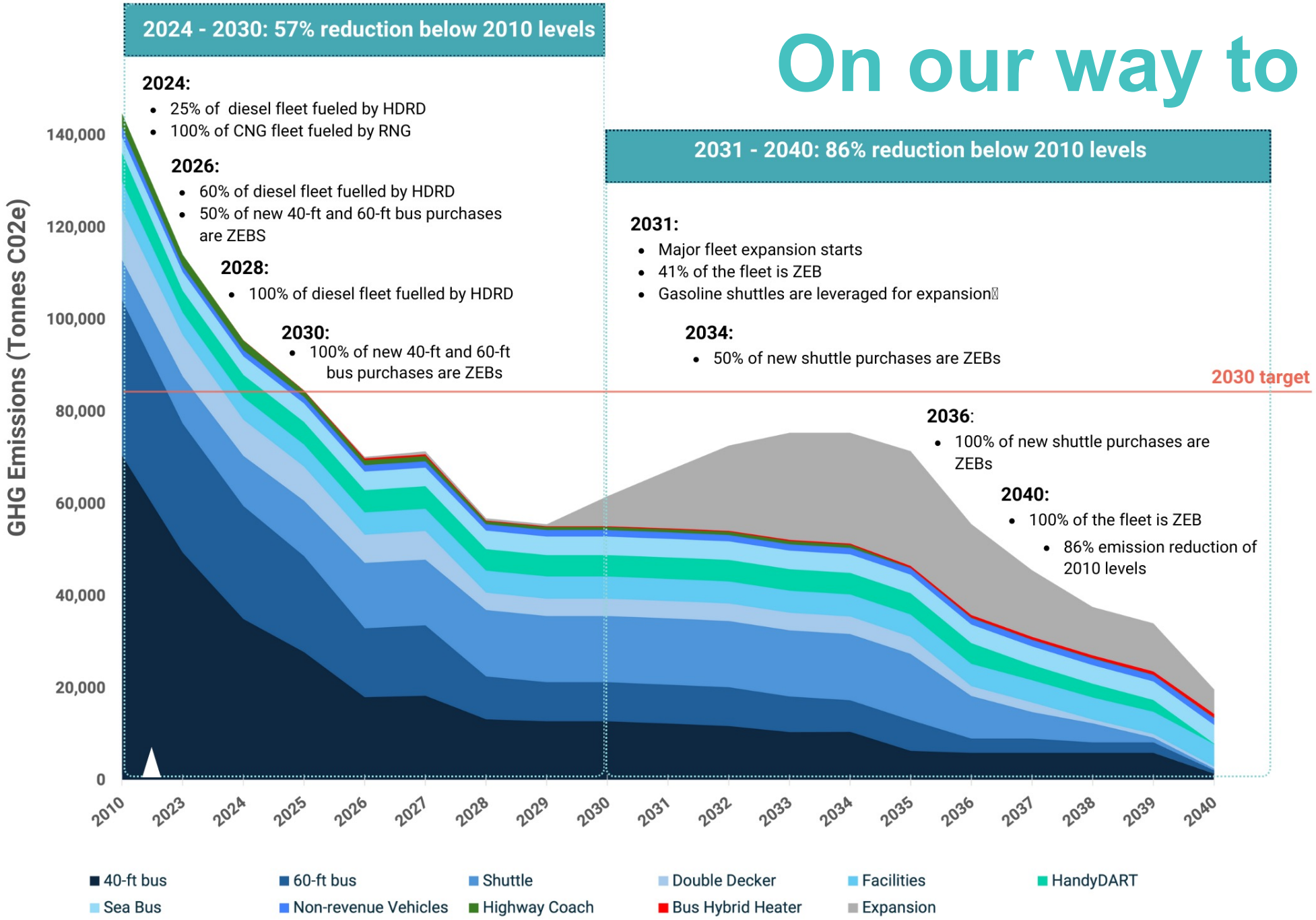
- Fully electric transit centre with 2027 completion
- 3-storey Garage with:
  - Level 1 - Bus Storage
  - Level 2 - 22 MVA / 60 kV / 15 kV Electrical Substation and Bus Charging Equip.
  - Level 3 - Operations Building and Employee Parking
- 2-storey Maintenance Building, Bus Wash Building, Wastewater Treatment Plant, Fuel Building, and Vault Pull
- Constructed phases will accommodate 350 battery electric buses

Located in City of Vancouver, adjacent to BC Hydro Substation

Leveraging Renewable Fuels

- 100% RNG purchasing to offset emissions from CNG fleet (25% of our fleet)
- Rollout of Renewable Diesel between 2024-2028
- Provincial and Federal Fuel Regulations make renewable fuels cost neutral

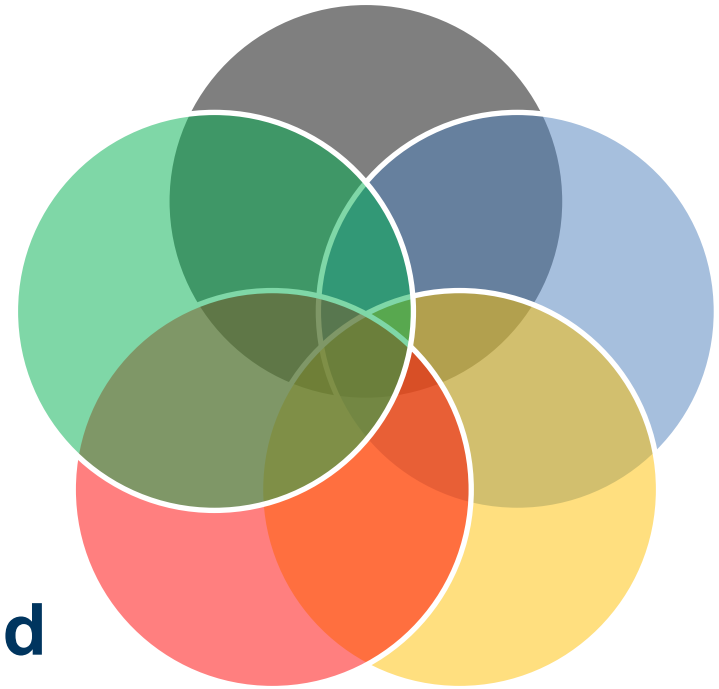
On our way to 45% by 2030



A 16-year transition is risky

Funding

Electricity



Regulations

Permits and Approvals

Supply Chain

Thank you

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RIDE
THE
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UBCM 2024

Creating a Zero Emission Fleet

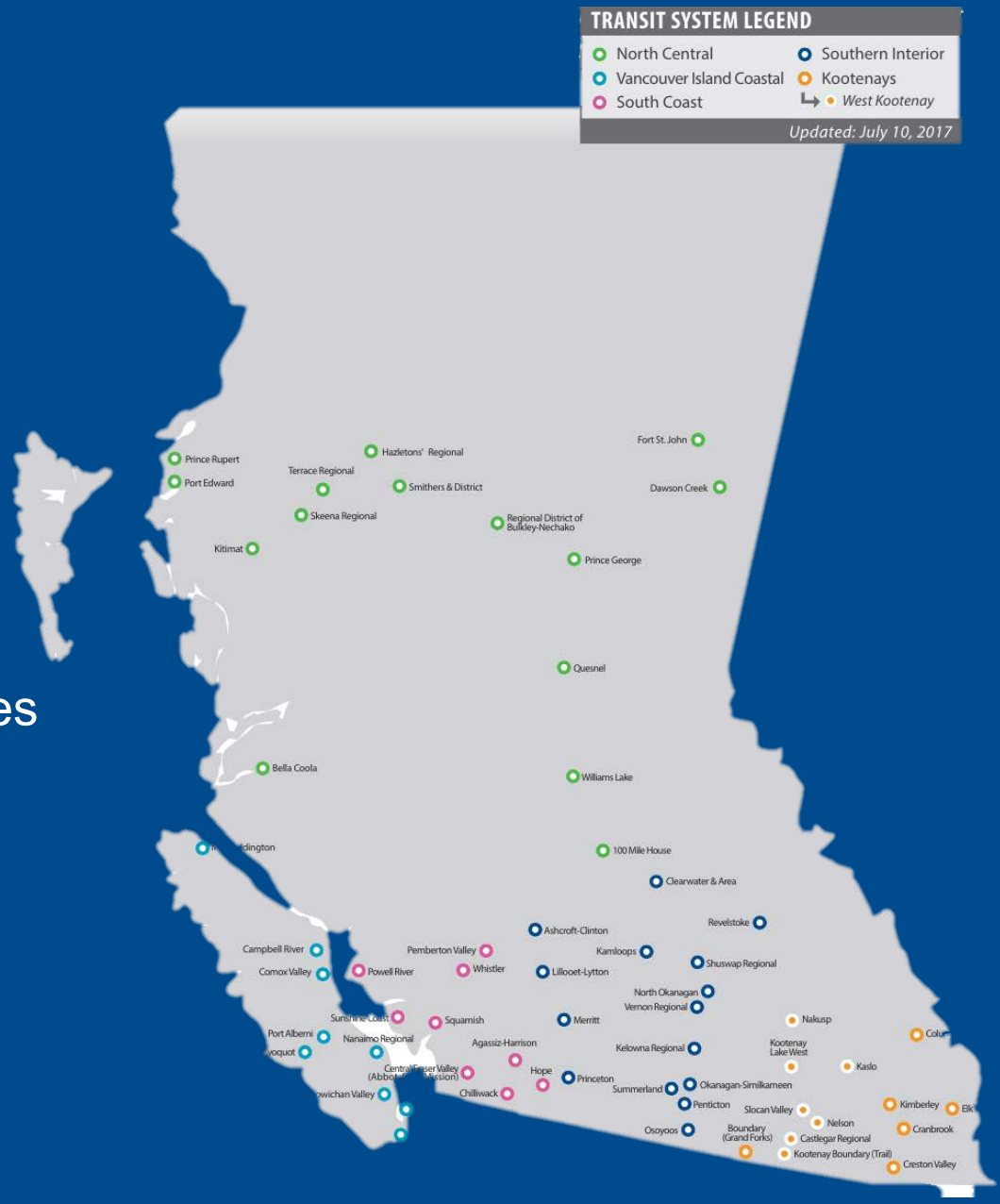
Chad Berndt, P.Eng.
Director, Electrification Program
September 2024

BCTransit

BC Transit’s Electrification Plans

BC Transit

- Serving 1.8 million people across 130+ communities
- Fifty-eight local government partnerships



Fleet Transition Strategy

Phase 1 "Starting the Transition"

2023-2027

- ❑ Refits for existing aging buses
- ❑ New combustion buses for expansion
- ❑ New electric buses
  - ➢ Large quantity of HD BEBs (125)
  - ➢ Trial HC BEBs (10)
  - ➢ Trial LD BEBs (6)
- ❑ Renewable fuels to meet 2025 CleanBC targets

Phase 2 "Transition and Scale"

2028-2032

- ❑ Transition away from combustion bus purchases where possible to do so
- ❑ Add more charging infrastructure (depots and opportunity charging)
- ❑ Add more electric buses
- ❑ Renewable fuels to meet 2030 CleanBC targets

Phase 3 "100% Electric"

2033-2040

- ❑ Fulfill replacements and expansions with electric buses
- ❑ Phase out combustion buses from the fleet
- ❑ Phase out compressed natural gas and fuel infrastructure
- ❑ Phase out renewable fuels

Phase 1 Deployment Projects

2023-2026/27

Fleet Type	Scope	Locations
 **Heavy Duty** (40' Conventional)	**125** Electric Buses **~145** Charging Points	<u>Larger Deployments (10+ Buses)</u> Victoria, Kelowna, Nanaimo, Kamloops, Whistler <u>Smaller Deployments (~1 to 2 Buses)</u> Chilliwack, Nelson, Powell River, Sunshine Coast
 **High Capacity** (Double Decker)	**~10** Electric Buses **~12** Charging Points	Langford
 **Light Duty**	**~6** Electric Buses **~20** Charging Points	Victoria handyDART

Note: Chargers are universal, not specific to a bus vendor

Heavy Duty BEBs Coming in Phase 1

Nova Bus LFSe+

New Flyer Xcelsior Charge NG

Phase 1 Deployment Locations

- Kamloops
- Chilliwack
- Kelowna
- Nelson
- Nanaimo
- Powell River
- Victoria
- Sunshine Coast
- Whistler

Charging Infrastructure

Utility Power

Electric Bus

Distribution Equipment → Charging equipment

Transformer

Switchgear

Charger Cabinet

Charger Dispenser

Why electrify public transit?

GHG Reduction **Targets**

- 16% by 2025
- 40% by 2030
- 60% by 2040
- 80% by 2050

Fueling & Facilities

Emissions & Pollution Reduction

Solution Scalability

Economic Investment & Cost Certainty

In-house Expertise

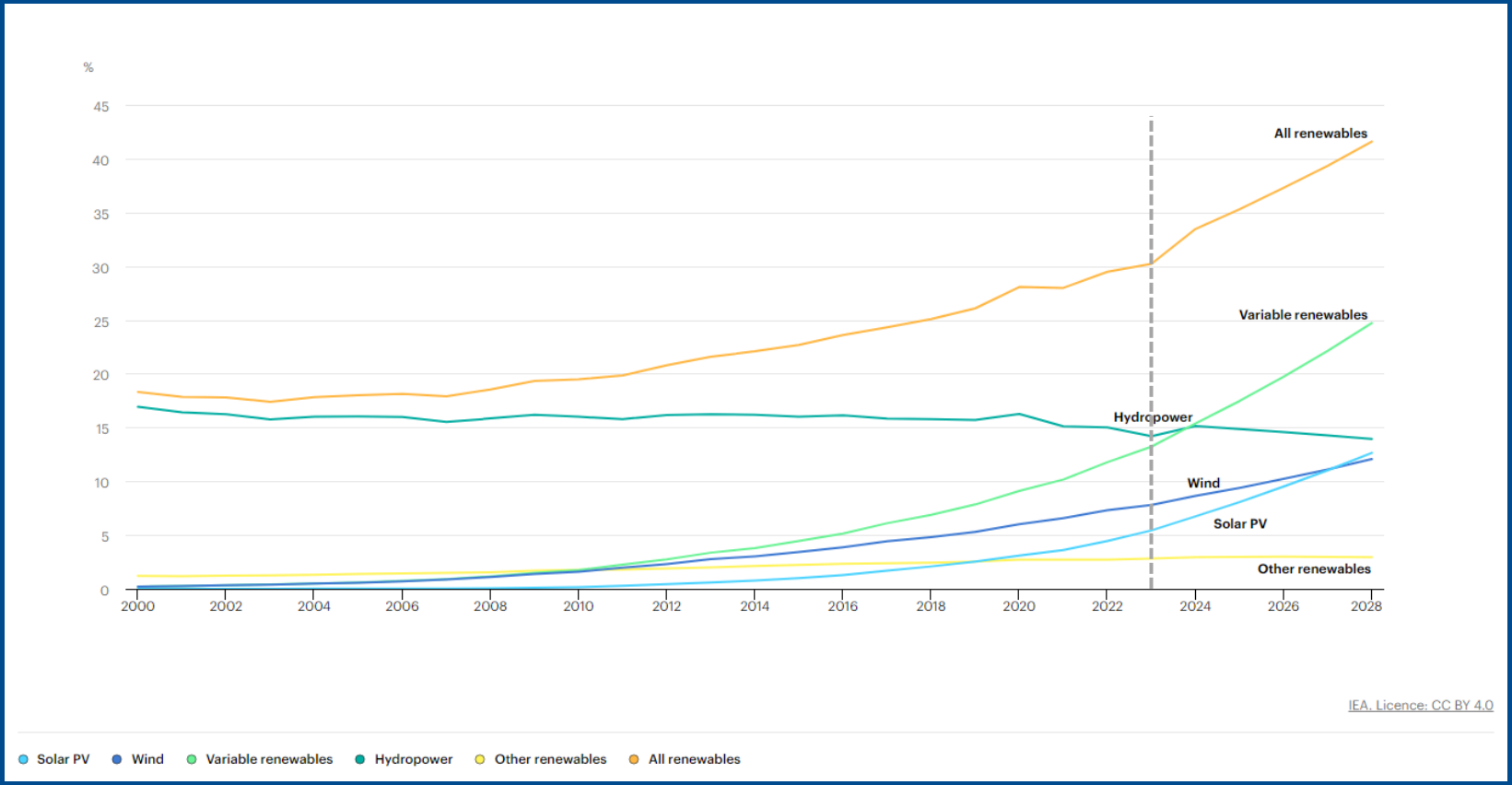
CUTA

Transit Agency Network Effect

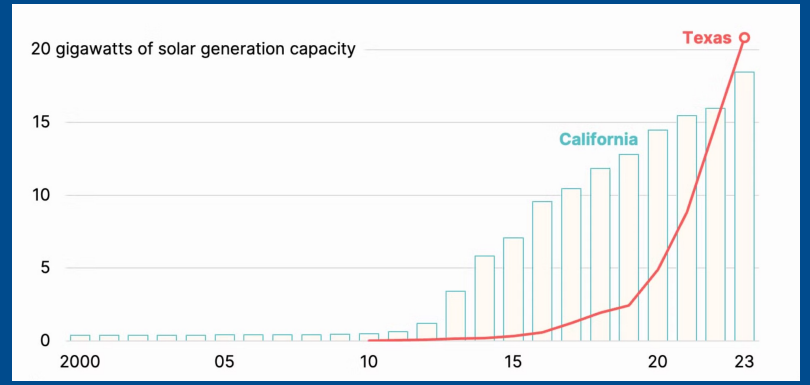
Massive Network of Agencies

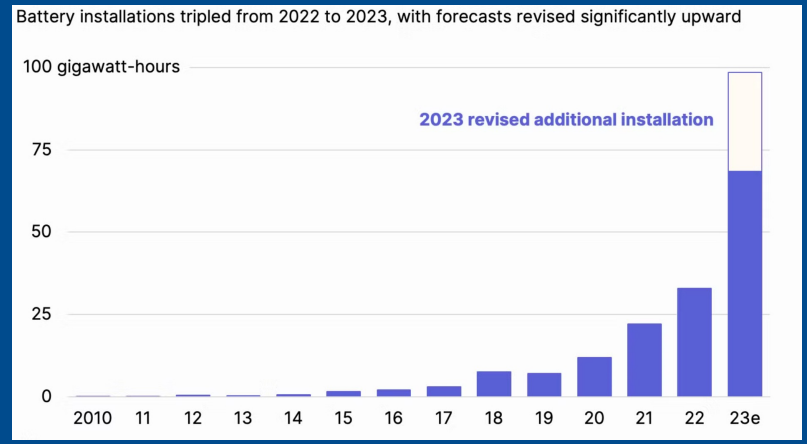
Just some of the Canadian agencies targeting Zero Emissions by 2040 or earlier

An Energy Transition is Underway….



International Energy Agency

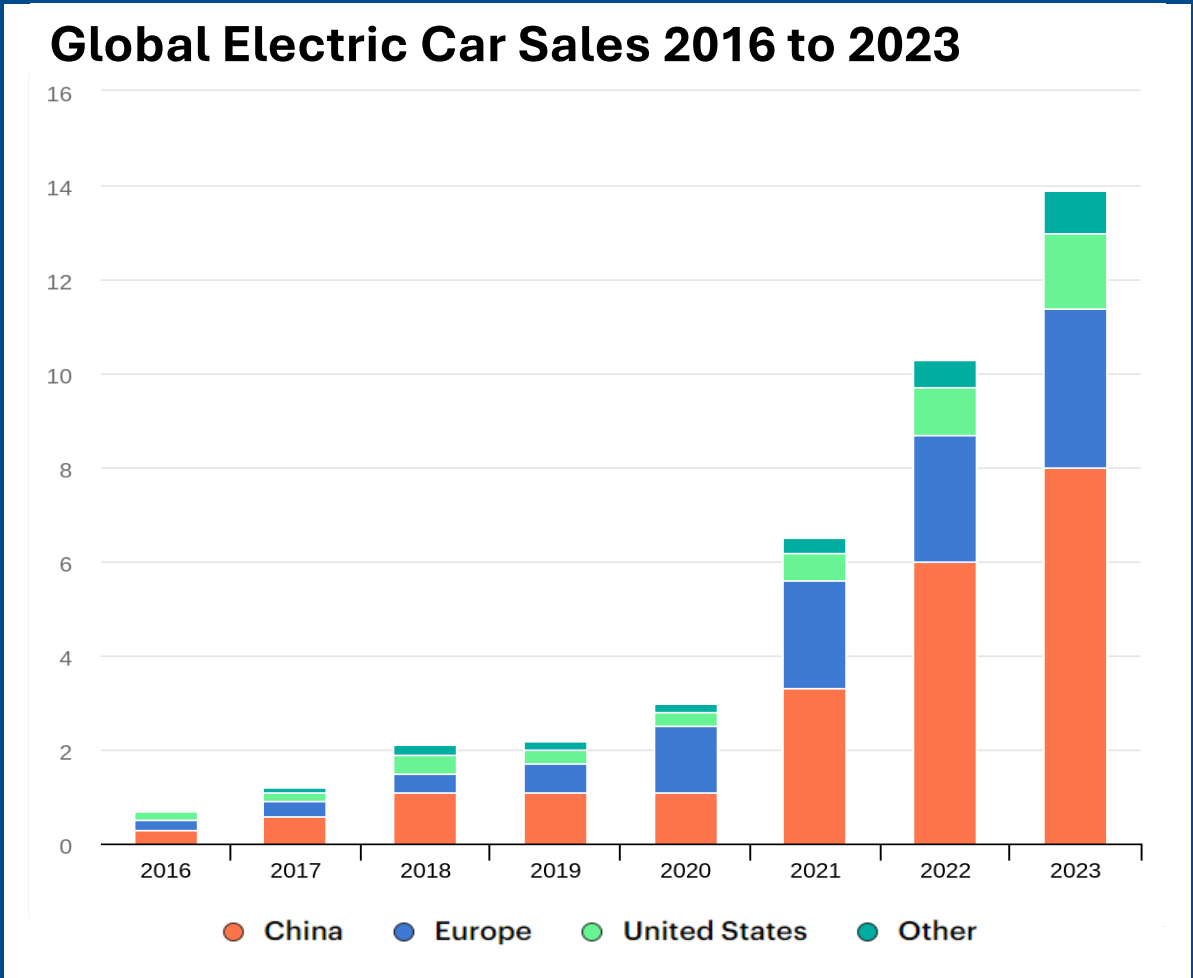




Nat Bullard Consulting

…for Transportation

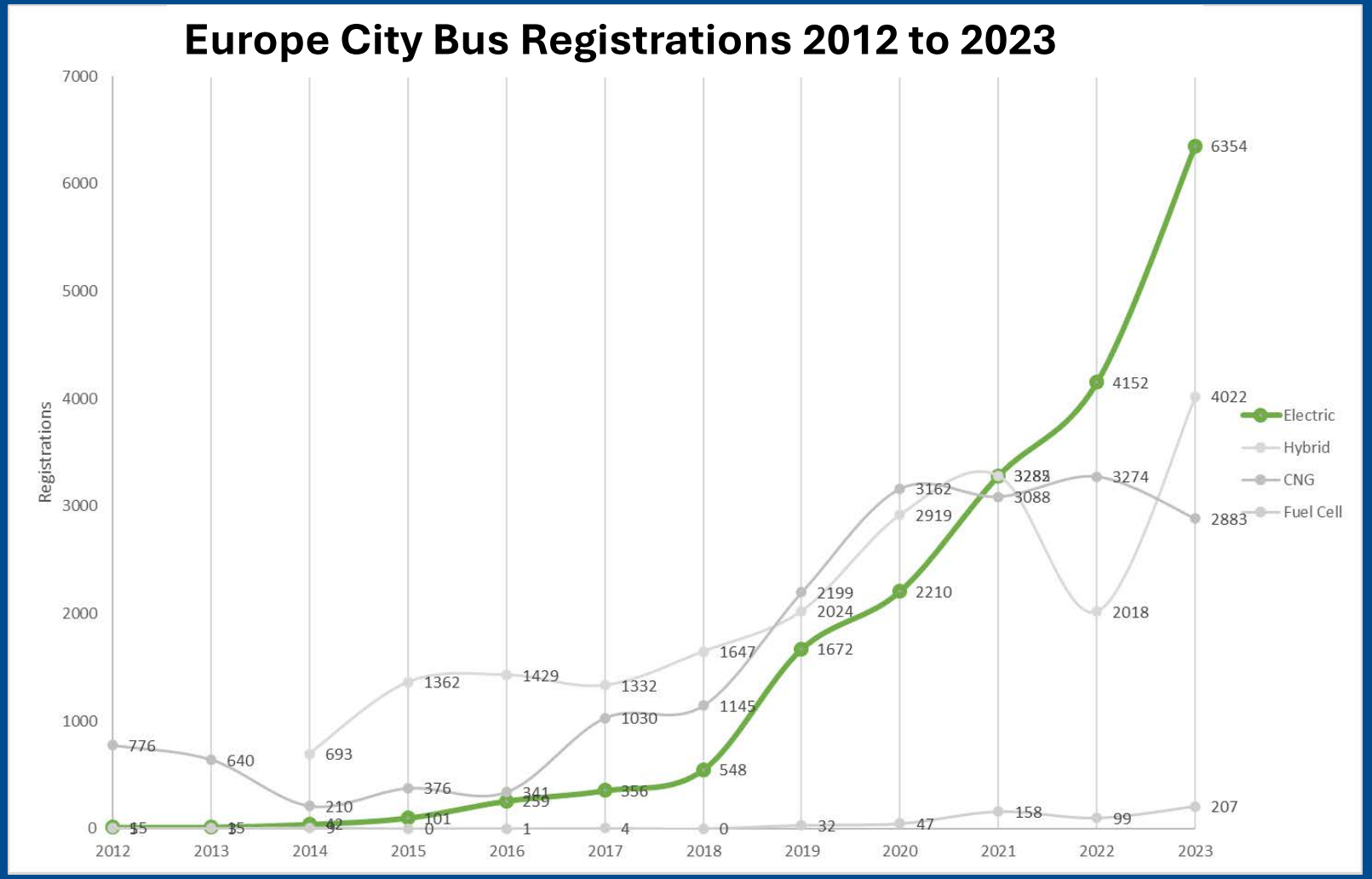
…for Passenger Vehicles



Bloomberg New Energy Finance 2024 Electric Vehicle Outlook

Electric car sales continue exponential growth

…for Public Transit



Data from Chatrou CME Solutions

Electric Bus Registrations:

- **North America 13%**
- **Europe All Buses 18%**
- **Europe City Bus 42%**

What stops public transit from going faster?

- Capital Costs & Funding
- Building Charging Infrastructure
- Technology Maturity & Standardization
- Vehicle Production
- Expertise & Training
- Alternatives that are limited and less scalable

Thank you!

BCTransit

Big Brothers Big Sisters of Canada

In appreciation of our speakers today and with thanks for your contribution, UBCM has made a donation to the Big Brothers Big Sisters of Canada. Big Brothers Big Sisters of Canada has been championing the health and wellbeing of youth. They provide direct service to children by matching volunteers with youths in quality mentoring relationships to overcome adversities, helping them to do better in life.