



## Catching the Bus

# How Smart Policy Can Accelerate Electric Buses Across Canada

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# A Note About COVID-19

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When Clean Energy Canada set out to work with public transit agencies and experts to inform how Canada transitions to electric bus fleets, we were working in a different world. Canadian transit agencies were enjoying steady and increasing ridership levels.<sup>1</sup> Electric bus pilots and programs were underway in many cities or being seriously explored in others. And as we uncovered through interviews and research, many more agencies across Canada were keen to start electrifying their fleets—or ratchet up current efforts—but were facing shortfalls in financing for planning and infrastructure. Agencies were onboard with electrification because, not only does it reduce carbon pollution and improve air quality, it also has cost savings over and above anything a diesel bus could ever offer. What's more, we have electric bus manufacturers right here in Canada.

The arrival of the novel coronavirus in Canada has led to unprecedented times and challenges for transit agencies. While electrification is still praised for its opportunities to cut costs and pollution, more immediate needs are front and centre. Transit agencies are hurting, and they need immediate relief.

This pandemic has demonstrated how essential transit is to our cities, whether it's helping essential workers get to their jobs or helping Canadians get to supermarkets or pharmacies. But this essential service is facing extreme challenges as efforts to contain the virus mean more people are working from home. Agencies have seen severe declines in ridership—over 80% in some areas—that they rely on for 40% to 70% of their revenue.<sup>2</sup> The impacts of the pandemic are likely to be felt by transit agencies for months, if not years, as ridership gradually returns to pre-pandemic levels.

In other words, a conversation about electrification can't begin without addressing the acute needs of transit agencies: immediate relief to prevent layoffs and maintain adequate levels of service.

As part of its \$2 billion stimulus package, the United States made an historic emergency allocation of \$25 billion available to transit agencies to “support capital, operating, and other expenses generally eligible under those programs to prevent, prepare for, and respond to COVID-19.”<sup>3</sup> This funding is meant to provide transit agencies across the U.S. with the immediate relief they need to make up for steep ridership declines and lost revenue from COVID-19.<sup>4</sup>

While Canada has yet to announce immediate relief for transit agencies, the Canadian Urban Transit Association has called

for \$400 million a month to cover the dramatic losses in ridership and revenue that transit agencies have experienced. This money would help them maintain liquidity and also pay for cleaning and protective gear.<sup>5</sup> In late April, the Federation for Canadian Municipalities echoed CUTA's call when it asked the federal government to step in with \$2.4 billion in funding for municipalities that operate transit systems.<sup>6</sup> Clean Energy Canada views these requests for urgent relief as the first priority for the government.

**At the time of writing this report, we remain hopeful that the immediate crisis period will pass for Canada, and we can begin to consider how we build a stable, resilient economy for the future. Investments in public transportation that support high-quality, electrified transit are an essential component in Canada's economic recovery package.** Transit agency procurement cycles run approximately 12 to 18 years, meaning **the investment decisions we make today will last for decades.** It is here where we find a once-in-a-lifetime opportunity to reshape our public transportation systems, making them both safer and less polluting.

Modernizing and electrifying bus fleets will help ensure Canadians continue to see transit as a clean, safe and reliable way to get around. It will also support the hundreds of thousands of Canadians working in the public transportation sector and ensure our electric bus and battery manufacturers remain global leaders. What's more, electrifying our bus fleets will improve the quality of commutes for millions of Canadians and help transit agencies save on fuel and maintenance costs. And finally, with zero-tailpipe emissions, it will create healthier communities and get Canada on a path to achieving net-zero emissions by 2050.

As both the World Bank<sup>7</sup> and the World Resources Institute<sup>8</sup> agree, electrification is an opportunity not to be missed, and this report outlines the necessary policies and programs needed to ensure we are not left behind. We believe the contents of this report—informed and supported by a coalition of public transit stakeholders from across Canada—will provide important insights for the federal government on advancing electrified public transportation. Clean Energy Canada looks forward to working with signatories and the federal government on this important topic.

Our thanks to Julian Griggs for his facilitation expertise and for helping shape what was originally conceived as an in-person event into a series of virtual gatherings.



# Introduction

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Transit agencies around the world are transitioning away from diesel buses to electric. There are currently more than 425,000 electric buses<sup>9</sup> on the road worldwide. The vast majority of these are in China, but the rest of the world, including the U.S. and the E.U., is adding more electric buses every year. This trend is set to accelerate as the cost of battery technology falls.



Photo credit: Edmonton Transit Service

Our experts were in agreement: electric buses tick all the boxes. They reduce pollution, improve the air quality and health of our communities, and visibly demonstrate climate action in motion. They offer cost savings over their lifespan because the electricity used to power them costs much less, and they have fewer maintenance needs than a diesel-powered bus. In places like Canada, they provide an additional economic benefit thanks to manufacturers that serve local and international markets.

While there are still relatively few electric buses on the road in Canada, momentum is growing. Last year, the Government of Canada signed the international Drive to Zero pledge, a commitment to support zero-emission commercial vehicles including buses and trucks.<sup>10</sup> The federal government then

built on this pledge with a commitment to get 5,000 zero-emission school and transit buses on the road in the next five years.<sup>11</sup>

On the ground, transit authorities from Vancouver to Edmonton and Toronto to Laval have ordered e-buses and have plans to stop purchasing diesel buses by 2025 or earlier.<sup>12</sup> Meanwhile, Brampton Transit is set to take the centre stage with the largest global deployment of interoperable battery electric buses and high-powered overhead chargers.<sup>13</sup>

**Transit agencies and experts see the electrification of public transit as a solid path forward. They just need the right support to accelerate the transition.**

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## Our Process

Clean Energy Canada brought together a group of public transit experts to conceive a roadmap for accelerating the deployment of electric transit buses across the country.

Experts and stakeholders were convened for two meetings. In advance of and between the meetings, Clean Energy Canada:

- performed a literature review on electric buses;
- interviewed transit experts to understand their perspective on accelerating electric bus deployment in Canada, including barriers faced by transit agencies and policy opportunities for the federal government;
- produced a white paper detailing policy and program options for discussion;
- developed an assessment criteria to guide experts in their ranking of policy and program options and gathered commentary on the effectiveness of the options presented; and
- worked with experts to shape agendas and facilitation approaches for the two virtual meetings.

The first virtual gathering in March was a success. The experts that attended expressed an interest in continuing to work on a package of policy and program recommendations for formal submission to the federal government. Following the March gathering, Clean Energy Canada staff worked with participants, often one-on-one, to further the conversation and produce a set of recommendations.

These recommendations are focused solely on transit buses and their electrification. We acknowledge that other technologies, including hydrogen, exist and that transit agencies are best positioned to decide which technology works best for them given the carbon intensity of their grids and specific community needs.



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## Individuals and organizations who participated in this process:

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# Challenges on the Road to Electrification

For Canada to accelerate the deployment of electric transit buses, we need to change our current approach. Understanding the challenges that currently stand in the way, and how we tackle them, is the necessary first step.



**Replacing a diesel bus with an electric one is not as simple as moving the playing pieces on a chess board. It requires a complete system change—a whole new board game.** It requires bus depot and facility overhauls, a new operating model and software systems, new relationships with utilities, and growth of staff expertise and capacity. In acknowledging these challenges, experts underscored the importance of funding and government support for electrification plans, not just bus purchases.

Experts felt it was critical that the government understands the challenges public transit agencies and communities face so that they can work to alleviate the pressure and put change in motion.

## 1. Cost

Experts agree that the upfront costs of fleet electrification is the top barrier to electrification and emphasized the need for financial support. The sticker price of an electric bus is about two times that of a comparable diesel bus. And **bus purchases themselves make up a relatively small portion of the total suite of costs to electrify fleets. Charging infrastructure, depot construction or retrofits, route-planning, and civil and electrical work on grid connections add up.** Several experts cited numbers in the \$1 billion to 1.5 billion range for facility upgrades alone (of course, specific

## STM Bellechasse Electric-Ready Bus Depot

Canada will soon be home to North America's first underground, electric-ready bus depot. Société de transport de Montréal (STM) is a leader in fleet electrification. It purchased its first electric bus in 2016 and plans to buy only e-buses by 2025. STM is currently constructing the Bellechasse bus depot located in the heart of Montreal. The centre is set to open in 2022 and will be built to house 250 buses. By 2025, STM hopes to have 75 articulated electric buses (think those long accordion-like buses) running out of this depot, mixed in with its diesel and hybrid fleets.

Building a bus depot is no small feat, and adding electricity to the mix increases complexity. In planning ahead, STM offered this advice to agencies:

- 1. Choose wisely:** Select the charging technology to best meet the service needs of your community. Charging equipment is no small investment and will be in place for years to come. Based on their fleet analysis, STM chose in-depot charging with inverted pantographs, allowing them to keep all their charging equipment in one depot, while managing peak demand with the appropriate software.
- 2. Prepare for power:** When preparing for increased electricity demand, engage with your utility provider early and often and factor this need for power into your design and construction.
- 3. Plan ahead:** Do you plan to add more buses over time to meet rider demand? Ensure this growth is factored into your depot configuration. The Bellechasse depot is being built to receive roughly 15 megawatts of power—enough to charge the equivalent of 250 forty-foot buses.
- 4. Money matters:** Ensure you have the financing in place to cover the full costs of an electric-ready depot, from the charging equipment to the necessary software and everything in between. The total cost of the Bellechasse depot is \$254 million, with an additional 40% to cover the costs of electrification.



dollar amounts will depend on the size of the fleet and scale of the project). Overall, the scale of these costs is said to be underestimated or poorly understood by decision makers.

### Revenue Streams for Transit

Provincial gas tax revenues are a critical contribution to some transit agency budgets. But less fuel used will mean less tax revenues collected and smaller contributions to transit agency budgets. What will this mean in a zero-emission bus world? Transit revenue streams must evolve so that agencies can continue to provide the level of service and operations they are known for.

Electric buses are known for delivering cost savings once in operation, but these savings may take time to unlock as agencies transition their fleets. There are still some unknowns in cost calculations. For instance, transit agencies may need to increase service hours or have more e-buses running along a given route to account for lost time while e-buses charge up. Charging equipment and software system maintenance also adds costs.

While some financial support for fleet electrification and charging infrastructure exists, current program amounts are inadequate to overcome the scale of these financial challenges. **On top of the wide funding gap, experts were clear that current federal program designs do not meet their needs.** They are administratively burdensome to access, short-term in nature, and often require participation from three levels of government. This results in delays and lost construction years for transit agencies that require funding to plan for the long-term.<sup>14</sup>

## 2. The Need for Infrastructure

Like all buses, electric buses don't exist in a vacuum—they need somewhere to park and somewhere to charge their batteries. To increase the number of electric buses in Canada, experts were clear: **we need an “infrastructure first” approach to scaling up.** Charging infrastructure, “electric-ready” bus depots, new data and IT systems, and backup power and energy management systems are among the many needs transit agencies must meet to ensure success. Simply put, you can't put an electric bus on the road until you address infrastructure needs.

## 3. Staff Capacity and Expertise

Putting electric buses on the road requires people and planning from across the transit agency or municipality. Whether it's managing the complex interplay of electric systems with IT and software upgrades, or determining the best charging infrastructure for the network, **the transition away from diesel requires an “all-hands-on-deck” approach.** Many agencies only have two or three technical staff working on buses. Staff members often work on fleet electrification “off the side of their desk,” according to our experts. Agencies would benefit from being able to hire a full-time “low-carbon fleet manager” or “electric bus lead” to project manage fleet electrification and navigate new procedures—positions many don't currently have the resources to support.

Workforce skill sets and expertise are also outdated when it comes to electric buses. For instance, we heard that the licensing requirements for mechanics who work on buses don't prepare them to work on electric buses. Transit agencies need financial and technical support to ensure their staff have the skill sets needed to work on electric buses. Beyond that, colleges and trade programs will need to update their education and training programs to ensure Canada's workforce is ready for an electric future.



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## 4. The Role of the Utility Provider

Charging an electric bus is not as simple as installing an electric plug for the bus. When preparing for electric buses, depots have to be retrofitted or redesigned to factor in changes in bus weight, spacing needs, and most importantly, to ensure there is sufficient electrical capacity.

Experts underscored the importance of **engaging early and often with the local utility provider**. Transit agencies said their conversations with electric utilities are no longer simple requests to connect to the grid. Now the two must collaborate on decisions like where to build bus depots, how many e-bus chargers can the grid handle, and what type of grid upgrades are needed to power a fully electric depot. Four main challenges in particular were identified by transit agencies:

- **Rate design:** What electricity rates will the transit agency pay to charge its fleet, and how might these be different than traditional electricity rates?
- **Agency's level of priority for power supply:** How will the agency's electricity needs be prioritized in relation to other community needs, from hospitals to residential homes?
- **Relationship between agency and utility:** How will the transit agency and utility work together and how will their relationship be structured?
- **What a utility is willing to finance:** Which costs will the utility cover and which will be passed onto the agency or other electricity consumers?

## 5. Technological Considerations

Rapidly changing electric bus technology is a challenge for many agencies hesitant to lock their fleet into one approach that might be obsolete in a few years. **Purchasing decisions made by transit agencies today will still be in effect decades down the line.** It's no surprise that agencies want to feel confident that they are making the best decisions, or that they have flexibility to adapt to changing technologies and opportunities.

## 6. Interoperability of Technology

Because electric bus technology is so new, performance and safety measures are still being tested, developed, or thought out. Although testing programs, such as the U.S. Federal Transit Administration's Model Best Testing Program (commonly referred to as the Altoona rating), can measure durability and safety, there are gaps when it comes to evaluating the range and overall performance of electric buses. And when it comes to testing and evaluating charging options, opinions are mixed. The wide range of technical components needed for electrification can make purchasing decisions difficult and time-consuming. A few experts flagged that a lack of standardization in technology risks locking agencies into a specific manufacturer or supplier—or requiring further infrastructure investments if they decide to change down the road.

# Solutions to Remove Barriers and Accelerate Deployment

The solutions presented in this section provide a roadmap for addressing key barriers and accelerating electric bus deployment across Canada.



Photo credit: City of Brampton

## Government Incentives: Unlocking Financial Support

Our experts were unanimous: we can't put more electric buses on the road and meet the federal government's commitment without additional funding. While a number of funding tools were discussed among the group, two solutions emerged as the most effective and efficient way to get more electric buses on the road.

### GOVERNMENT GRANTS

Access to government funding will allow agencies of all sizes to "hit go" by tackling the top barrier of high upfront costs.

First, financial support for electrifying fleets needs to be provided **directly** to transit agencies or municipalities to save time, and then any other program requirements need to be administratively straightforward. This allows agencies to access money upfront when they need it the most and facilitates quick and easy administration on the ground.

Next up, funding must be **flexible** in its eligible expenses so that agencies can fund an electrification plan, including feasibility studies and project manager staff time, and not just a (bus) purchase. Once you've got your plan in place and are ready to "move," you need funding for the infrastructure to support the buses—not just chargers but also electric-ready depots that are prepared for future power demands. This

### U.S. Federal Transit Administration's Low or No-Emission ("Low-No") Bus Program

The U.S. Federal Transit Administration's Low or No Emission Grant Program supports states and local governments looking to electrify their transit bus fleets. Eligible project costs include bus purchases and leases, charging infrastructure and software, facility construction and retrofits, workforce training, and more.<sup>15</sup> The "Low-No" program covers up to 85% of the costs for a transit bus and 90% of equipment and facility costs, with some state-voucher programs satisfying the local match requirement.<sup>16</sup> Funding is accessed through a competitive proposals process, with \$85 million being awarded to projects in 2019 alone. State transportation departments, transit authorities, cities, and universities have received funding through the program.<sup>17</sup>

means potential grid upgrades and working with an agency's local utility provider to ensure adequate power supply can reach the depot, all of which requires financing.

Rounding out the requirements is the need for **predictable** funding. Predictability supports an agency's long-term electrification plans, which include bus depot design and construction. Experts shared that depot construction takes anywhere from four to six years to complete (from planning and design all the way to when shovels hit the ground).

## GOVERNMENT VOUCHER PROGRAM

While a government grant program that bundles funding for e-bus purchases with infrastructure and planning needs is by far the preferred approach of transit agencies, other forms of government support that could be combined with grants would also be welcome. A government voucher program is one option that could make electric bus purchases more affordable.

Voucher programs work by having registered electric bus manufacturers apply for vouchers on a first-come-first-serve basis. Vouchers are then redeemed like a coupon at the time of purchase. Often these types of programs make vouchers available to domestic and international e-bus makers, requiring that the buses purchased using the voucher operate in the state or province that offered the incentive.

### Distributing electric bus funding across Canada

If the federal government funds electric buses, some experts felt there should be clear criteria for how this money will be distributed across Canada. They were split as to the factors that should be considered. Some recommended a **ridership-based approach** where funding is allocated according to ridership, with a small portion of funding reserved for smaller agencies that could apply and make their case. Others recommended a **weighted funding formula that looks at a range of criteria**, such as fleet size, population density, ridership, formal sustainability or greenhouse gas commitments, and whether the agency already has an electrification plan in place.

This type of program offers a simple design that can help get funding out the door. It streamlines the administrative process because the federal government would work directly with e-bus manufacturers, as opposed to the many individual transit agencies and municipalities across Canada. A bonus? E-bus manufacturers are familiar with these programs and could support customer education.

Many experts expressed that the “devil is in the details” when it comes to voucher programs. Clear rules are needed around who can apply for vouchers, how vouchers are distributed, how long the program would last, and what controls are in place to avoid e-bus sticker price mark-ups. These rules would maximize voucher value and ensure that transit agencies of different sizes and stages of e-bus readiness could take advantage of the program.

Because this approach focuses heavily on bus purchases, experts felt **a voucher program must be one component of a broader electric bus incentive program. It should be paired with infrastructure funding** and must be stackable with other federal and provincial incentives.



Photo credit: Edmonton Transit Service

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## Reducing Risk, Saving Time and Driving Down Costs

In addition to government incentives, there are other solutions that can save costs, reduce technology risk, and make decision-making easier for public transit agencies looking to electrify their fleets.

### BATTERY LEASING

**Batteries account for anywhere from 25% to 50% of an electric bus's total cost**, according to one expert. Battery leasing programs (also sometimes referred to as “pay as you save”) allow agencies to purchase an electric bus for about the same price as a diesel bus and lease the battery over the bus's lifetime. Because electric buses typically cost less to fuel and maintain, these operational savings can go towards the battery lease.

#### Proterra's Electric Bus and Battery Leasing Options

Proterra launched a battery leasing program after the 2015 *Fixing America's Surface Transportation Act* permitted the leasing of batteries separate from a vehicle. More than a dozen of its customers have signed up for this option, including Park City, Utah, and MetroLink in Moline, Illinois.<sup>20</sup> Proterra also offers other financing options for electric buses and batteries, including capital leases, where the city or transit agency begins by leasing the bus and eventually works towards owning it. Another option is an operating lease, where the agency pays to use the bus and buys it out at the end of the term, much like a car lease.

Leasing programs also offer flexibility so agencies are not locked into one technology pathway. They relieve agencies from responsibilities around battery maintenance and end of life, as these would remain with the manufacturer. Agencies of all sizes can reap the rewards, especially smaller agencies that want to trial different technologies without having to commit to just one.

While experts have had limited experience with battery leasing programs to date, interest levels are high. One challenge is that purchasing an electric bus is a capital expense, while ongoing leasing costs are operational. Capital financing is much easier for agencies to access—from federal, provincial, and municipal governments—and is often available with low-

or no interest. Agencies may therefore be more inclined to borrow money to pay for the full electric bus upfront versus paying potentially higher interest rates on a lease over time.

Allowing government support to go towards battery leasing costs could change this calculation and make battery leasing programs more attractive. Similar government incentive programs in the United States, such as New York's Truck and Bus Voucher Incentive Project<sup>18</sup> and the Federal Transit Administration's Low-No grant program,<sup>19</sup> allow funding to go towards battery lease costs, in addition to bus purchases.

### BULK PROCUREMENT

**Buying electric buses in bulk can save money through economies of scale.** It can also drive down costs for electric bus manufacturers because committed, high-volume orders provide predictability to their suppliers. Transit agencies that are cautious about technology decisions may be more at ease going forward with the same technology as other agencies. Smaller agencies in particular could benefit from piggybacking on a larger process, as bulk procurement could create the opportunity to build technical knowledge and support.

But bulk procurement is not without its challenges. Bus and infrastructure requirements vary from agency to agency, and trying to meet each agency's needs can slow things down or exclude some agencies altogether. Given the potential administrative burden, some experts felt that bulk procurement would need to achieve discounts of at least 15% for the effort to be worthwhile. They estimated that bus orders in the range of 100 to 200 and charging station orders over 50 could lead to significant discounts.

Bulk procurement that allows for some level of customization could offer a solution. Still, transit agencies need to better understand how common their needs are if teaming up with other agencies. For example, would all parties to a bulk purchase need to agree on the same charging approach, battery size and range? There are also questions as to whether a bulk procurement process makes the most sense at a federal, provincial and/or regional level.

Fortunately, reinventing the wheel is not required. Experts suggested looking to Quebec and Ontario for lessons learned on bulk procurement initiatives with large and small transit agencies. Starting in 2006 with six municipalities, the Government of Ontario oversaw a joint bus procurement process. Now run by the province's regional transportation agency, Metrolinx, the Transit Procurement Initiative has grown



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to include 49 transit operators facilitating the order of nearly 1,800 buses as of early 2019.<sup>21</sup> In Quebec, group purchases are managed by ATUQ (L'Association du transport urbain du Québec) and have included diesel-electric hybrid buses since 2014. Fully electric buses are also available, and close to 50 have been acquired in group contracts to date.<sup>22</sup>

Streamlining the procurement process and getting agencies on board is a worthwhile endeavour. As one expert put it, bulk procurement for electric buses “would cost relatively little and collectively would net hundreds of millions of dollars in savings.”

### **CODES AND STANDARDS FOR ELECTRIC BUS TECHNOLOGY**

The development of Canadian electric vehicle infrastructure codes, standards and regulations could support electric bus deployment by helping transit agencies and manufacturers get on the same page.

While experts don't believe that standards will eliminate the funding challenges of electrification, they still view them as beneficial in terms of streamlining decision-making, reducing risk, and saving time. Common standards would allow for easy comparison across electric bus models, technologies, and systems. Slightly modified Canadian standards could also make it easier for international electric bus manufacturers to enter into our market and offer their bus models here too.

Multiple standards for electric bus charging are under development, but further steps are needed to make sure different electric bus and charging models are compatible with each other. Just as we want our headphones to work with our phones, computers, and other devices, transit agencies want their e-buses to work with different types and brands of chargers.

Experts would also like to see more standards and guidance on the e-buses themselves, including standards for performance, operation, inspection, and maintenance. More clarity around worker safety standards and protective equipment is also needed, especially because e-bus maintenance staff will be handling high-voltage systems. Finally, we heard that education, training, and license requirements must be updated so mechanics and other trades have the skills and tools they need to operate and repair electric buses.

## **Support for Systems Change**

The transition to a fully electrified public transit network requires technical know-how and increased staff capacity, support, and guidance along the way.

### **E-BUS WORKING GROUP**

The Canadian transit industry is collaborative by nature. It's common for a transit agency to call up their counterparts across the country or to share information via member-based organizations. These practices weigh in favour of a cross-Canada electric bus working group (or a series of working groups) for all transit agencies.

We heard that at least two types of working groups would offer benefits to agencies. A highly technical working group, focusing on specific problems and solutions. And a second, more general support group with a mix of early adopters and those interested in getting started. This second group would share information on technology, rollout, government funding, and operations. Electric utilities and manufacturers could be invited to participate to discuss grid connection solutions and new technology products.

The effectiveness of a working group will depend on factors such as size, focus area, membership base, and level of facilitation. But they remain a key component of building the knowledge and “know-how” of electrification across Canada.

### **HOW-TO GUIDE**

A short, easy-to-access “how-to” guide for fleet electrification was also identified as a helpful resource agencies would like to see. Topics such as how to conduct a feasibility study, how to calculate e-bus charging needs, how to choose and install the right charging infrastructure, and how to best work with your local utility provider will help fleets as they begin their electrification journeys. The “how-to” guide must encourage an “infrastructure-first” approach and emphasize the need to develop a plan before making purchases.

### **DATA SHARING PLATFORM**

Finally, good data leads to better decision-making. Experts agreed that a centralized, trustworthy, open-source platform where they could find data and lessons learned from other transit agencies would help them overcome technical and expertise barriers. Data on topics such as electric bus performance, charging times, route optimization, and electricity needs from other Canadian agencies would be hugely beneficial in their planning.

## Looking Forward

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By smartly supporting electric bus adoption across the country, Canada can help agencies of all shapes and sizes. Electrification is an opportunity to cut carbon and air pollution, save money, and support Canadian manufacturers. We just need the right tools, policies, and programs in place to do it.



The recommendations provided in this report are among the most important steps governments and other stakeholders can take to support electric bus deployment in Canada.<sup>23</sup> While our discussion was focused on the federal government's commitment to increase deployment of electric transit buses, we strongly support the application of these recommendations on a broader scale, including at the provincial, territorial

and municipal levels, as all governments look to tackle air pollution and climate change in their backyards.

We commend the federal government for its commitment to public transit investments and to reach net-zero carbon emissions by 2050. We look forward to contributing further ideas to the design of specific policies and programs as they take shape.

# Endnotes

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1. TransLink. (July 23, 2019.) TransLink Awarded Transit System of the Year. <https://www.translink.ca/About-Us/Media/2019/July/TransLink-awarded-Transit-System-of-the-Year.aspx>; Divyesh Mistry. "Brampton Still Has the Fastest Growing Transit System in Canada." *Bramptonist*. <https://bramptonist.com/brampton-still-has-the-fastest-growing-transit-system-in-canada/>
2. Wendy Cox, James Keller. (April 25, 2020.) "Western Canada: Transit systems formerly on track now critically damaged by pandemic." *Globe and Mail*. [https://www.theglobeandmail.com/canada/british-columbia/article-western-canada-transit-systems-formerly-on-track-now-critically/?utm\\_medium=Newsletter&utm\\_source=Western%20News&utm\\_type=text&utm\\_content=WesternNews&utm\\_campaign=2020-4-25\\_10&cu\\_id=TYmaeJJY2kunGfRSBWhmSql4VVUQLzhCYiGMf7H78dc%3D](https://www.theglobeandmail.com/canada/british-columbia/article-western-canada-transit-systems-formerly-on-track-now-critically/?utm_medium=Newsletter&utm_source=Western%20News&utm_type=text&utm_content=WesternNews&utm_campaign=2020-4-25_10&cu_id=TYmaeJJY2kunGfRSBWhmSql4VVUQLzhCYiGMf7H78dc%3D)
3. David Shepardson. (April 2, 2020.) "Trump administration awards \$25 billion in emergency transit funding." Reuters. <https://www.reuters.com/article/us-health-coronavirus-transit/trump-administration-awards-25-billion-in-emergency-transit-funding-idUSKBN21K2JW>
4. Will Houston. (April 22, 2020.) "Marin transit providers cleared for \$46M in virus aid." *Marin Independent Journal*. <https://www.marinij.com/2020/04/22/mtc-approves-46-million-in-federal-aid-for-marin-transit-providers/>
5. CUTA. (March 31, 2020.) "Public transit needs federal support now." <https://cutaactu.ca/en/news-media/latest-news/public-transit-needs-federal-support-now>
6. Federation of Canadian Municipalities. (April 23, 2020.) "Protecting Vital Municipal Services: Urgent federal recommendations to address the financial crisis in our cities and communities due to COVID-19." Page 8: <https://data.fcm.ca/documents/resources/reports/protecting-vital-municipal-services.pdf>
7. Leonard Canon Rubiano and Georges Darido. (April 24, 2020.) "Protecting public transport from the coronavirus... and from financial collapse." *World Bank Blogs*. <https://blogs.worldbank.org/transport/protecting-public-transport-coronavirus-and-financial-collapse>
8. Ben Welle and Sergio Avelleda. (April 23, 2020.) "Safer, More Sustainable Transport in a Post-COVID-19 World." World Resources Institute: *The City Fix*. <https://thecityfix.com/blog/coronavirus-public-transport-stimulus-packages-ben-welle-sergio-avelleda/>
9. Brian Eckhouse. (May 15, 2019.) "The U.S. Has a Fleet of 300 Electric Buses. China Has 421,000." *Bloomberg News*. <https://www.bloomberg.com/news/articles/2019-05-15/in-shift-to-electric-bus-it-s-china-ahead-of-u-s-421-000-to-300>
10. CALSTART. Global Commercial Drive to Zero Program. <https://globaldrivetozero.org/>
11. Office of the Prime Minister. (December 13, 2019.) "Minister of Infrastructure and Communities Mandate Letter." <https://pm.gc.ca/en/mandate-letters/2019/12/13/minister-infrastructure-and-communities-mandate-letter>
12. Plug in Canada. "E-Bus Research and Background." <https://www.plugincanada.ca/e-bus-background/>
13. Natural Resources Canada. (July 29, 2019.) "Multi-Million Dollar Investment in Brampton Electric Bus Network." <https://www.newswire.ca/news-releases/multi-million-dollar-investment-in-brampton-electric-bus-network-814958731.html>
14. Some transit agencies have been exploring the potential of public-private partnership models for project development. Such partnerships work by involving private sector partners to help finance and de-risk large infrastructure projects.
15. Federal Transit Administration. "Low or No Emission Vehicle Program." <https://www.transit.dot.gov/funding/grants/lowno>
16. Federal Transit Administration. "Frequently Asked Questions." [https://www.transit.dot.gov/faq?combine=&shs\\_term\\_node\\_tid\\_depth=2126](https://www.transit.dot.gov/faq?combine=&shs_term_node_tid_depth=2126)
17. Federal Transit Administration. "Fiscal Year 2019 Low or No-Emission (Low-No) Bus Program Projects." <https://www.transit.dot.gov/funding/grants/fiscal-year-2019-low-or-no-emission-low-no-bus-program-projects>
18. New York State Energy Research and Development Authority. (February 2020.) "New York Truck Voucher Incentive Program: Implementation Manual." <https://portal.nyserda.ny.gov/servlet/servlet.FileDownload?file=00P000000KtAw3EAF>
19. Federal Transit Administration. "Low or No Emission Vehicle Program - 5339(c)." <https://www.transit.dot.gov/funding/grants/lowno>
20. Proterra. "Financing Your Electric Bus." <https://www.proterra.com/vehicles/catalyst-electric-bus/financing>; and <https://www.proterra.com/press-release/proterra-and-mitsui-co-ltd-create-200-million-credit-facility-to-scale-proterra-battery-leasing-program/>
21. Metrolinx. Transit Procurement Initiative. <http://www.metrolinx.com/en/projectsandprograms/tpi/tpi.aspx>
22. For more information on joint procurement in Quebec, please see: Max Kalinowicz. (August 21, 2018.) Montreal, Laval team up to buy 40 electric buses. *Global News* <https://globalnews.ca/news/4398937/montreal-laval-buy-electric-buses/>; and, Volvo Group (June 11, 2018.) "Nova Bus is proud to receive its largest bus order in North America." <https://www.volvogroup.com/en-en/news/2018/jun/nova-bus-is-proud-to-receive-its-largest-bus-order.html>
23. Many of the ideas in this report were informed by the March 2020 CUTA Zero-Emission Bus Member Survey. [https://cutaactu.ca/sites/default/files/cuta\\_zeb\\_survey\\_results\\_-\\_feb\\_2020\\_0.pdf](https://cutaactu.ca/sites/default/files/cuta_zeb_survey_results_-_feb_2020_0.pdf)

