

ECOLOGY
OTTAWA



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OTTAWA

YELLOW BUSES GO GREEN

A review of the climate, health, and economic benefits of accelerating electric school bus adoption across Ontario



February 2023

Acknowledgments



Ecology Ottawa is a not-for-profit, grassroots and volunteer-driven organization. We know that Ottawa residents are concerned about issues such as climate change, pollution and waste, and that they want sustainable communities where clean energy, air, and water, public transit, active transportation and greenspace protection take priority. We provide residents with the information and tools needed to understand local environmental issues and promote environmental leadership at all levels impacting the City of Ottawa.

Completing this project would not have been possible without Ecology Ottawa's exceptional volunteers. This represents the culmination of efforts invested by a small but dedicated team of volunteers who offered their expertise to the research compiled in this report. We are grateful for the support of: Solay Tannahill, Ella Wylynko, Evelyn Mang, Kanan Raval, Kathy Patrick and Meghan MacDonald.



As Steering Committee members of the **Canadian Electric School Bus Alliance** (CESBA), Ecology Ottawa is grateful for the opportunity to work with other organizations across the country dedicated to the improvement of our environment and health.

This project is made possible by the generous funding of the **Trottier Family Foundation**.



 **succession** This report is a project by **Succession** in partnership with **Ecology Ottawa**.

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Executive Summary

Ontario has a fantastic opportunity to transition its 20,000-strong school bus fleet to electric, bringing significant climate, health and economic benefits for all Ontarians.



The noxious soup of diesel emissions comprise both greenhouse gases and particulate matter and within that, significant levels of black carbon. Transitioning our school bus fleet from diesel to electric presents a critical opportunity for significant greenhouse gas emission reductions, which can help mitigate climate change and associated extreme weather events. This will allow us to meet our climate targets by **eliminating over 4 million tonnes of emissions** across the fleet.

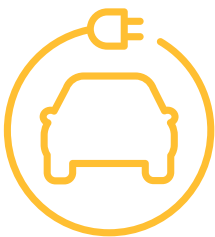


The shocking range of health problems caused by diesel emissions include cancer, breathing problems, heart disease and stroke, neurodegenerative diseases and reduced cognitive development. **Children are particularly vulnerable to the negative effects of diesel emissions and yet we ask them to get on a diesel bus every day to go to school.** With Canada facing a paediatric health crisis, it is beyond time to make the transformative changes we need to improve our children's health.



With current federal funding in place, total cost of ownership of electric school buses is lower than a diesel school bus. This is in spite of the higher upfront cost, once significant maintenance and fuel cost savings are gained over the lifetime of the bus. Vehicle-to-grid integration offers further economic benefits to bus operators. Beyond this, **health care cost savings to the province of \$236m** over 12 years, with the social cost of carbon contributing another \$16.56m in savings.

When considering the wider economic growth potential in Ontario, between manufacturing opportunities, critical mineral availability for batteries as well as recycling prospects and the significant benefit of replacing diesel imports with local electricity spending, the benefits to the province are immense.



The \$2.75bn currently available in federal funding provides a fantastic opportunity to be leveraged by the Ontario government by offering a provincial purchase incentive to accelerate the transition to electric. **Across Canada we have seen provincial funding encouraging the adoption of electric fleets, most notably in Quebec, BC and PEI.** The same trend can be seen in the US, where states with funding to supplement the federal Clean Bus Program are racing ahead with electrification.

These benefits will touch every Ontarian, whether in the form of cleaner air to breathe, reduced pressures on our healthcare system, job creation and economic growth or slowing the warming of our climate. Let's invest now to offer our kids a cleaner, brighter future.

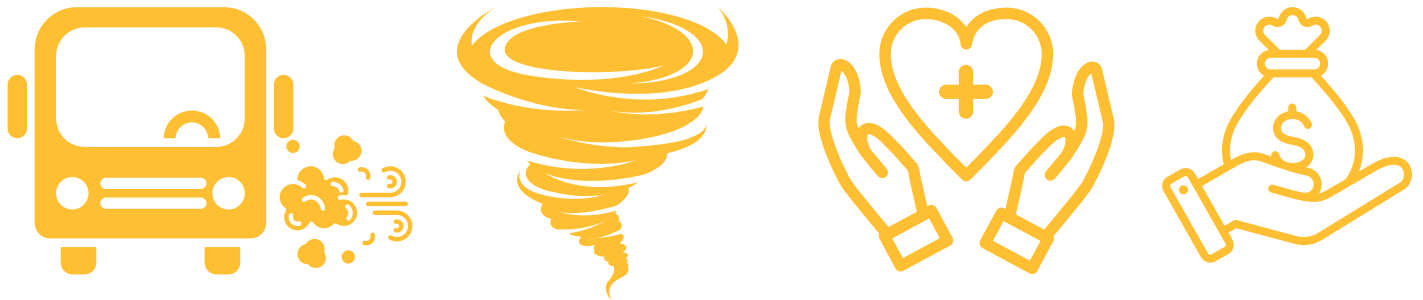
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Introduction

We are living in a climate emergency, while also facing a health crisis where children's hospitals are overstretched with kids struggling with respiratory issues. **So why are we still powering our school bus fleet with diesel that causes air pollution, negative health effects, and climate change when we are facing intersecting climate and health crises?**

The effects of the climate crisis have been undeniable right here in Ontario, with increased flood events, tornadoes and the May 2022 devastating derecho which caused widespread and extensive damage (at a cost of \$1bn) along a path that extended for 1,000km. The cost of mitigating these impacts will continue to grow with an increasingly warming climate.



We know that we need to reduce emissions and get off of fossil fuels, and often the best approach for school transportation is to walk or bike. However, this option is not available to many children going to school. In these cases, transporting by bus is better for the environment than private vehicles, and electric buses are better than buses driven by fossil fuels. Active school transportation is an important part of the solution, as are anti-idling mandates. But where school buses are needed to get kids to school, it is **time for our yellow school buses to go green.**

Choosing electric school buses can work to solve multiple crises at once. Electric school buses can improve the health of our children, while dramatically reducing greenhouse gas emissions that cause climate change. The economic benefits of transitioning are also extensive, with the potential for both school bus operators and the Ministry of Education to save millions of dollars every year.

Only 20 out of Ontario's 20,000 school buses are electric, meaning that most of our yellow buses are expelling a noxious soup of diesel emissions every day. Diesel emissions are proven to cause cancer, as well as respiratory, cardiovascular, reproductive and other harmful health effects. Children are particularly vulnerable, with kids in low-income neighbourhoods facing disproportionate levels of air pollution.

It is time for Ontario's school buses to transition fully to an electric fleet: for the sake of our children travelling to and from school every day, and for all of us breathing the air.

Introduction

In recognition of the higher upfront cost of electric school buses over diesel buses, the federal government in 2021 announced funding to support school bus operators across Canada electrifying their fleets. There has never been more financial support for the transition to electric school buses available across Ontario.



Ontario holds both Canada's financial capital and our national capital and should be leading the way in the transition to net-zero carbon emissions. Yet we look to the United States, BC, Quebec and PEI for inspiration on this transition. A provincial purchasing incentive is needed, and by introducing it now, provincial dollars will be matched by federal ones. Many voices will be needed in support of this transition and we can all do our bit.



Residents, parents and everyone interested in health, the environment and our finances can [sign our petition](#), reach out to councillors and school boards and let them know that you want to accelerate this transition



School boards, transport consortia and private school bus operators can contact MPPs, Ontario Ministers and our Premier to support the call for electrification



MPPs, Ontario Ministers and our Premier can recognize the health, climate and economic benefits of electrifying our 20,000-strong Ontario school bus fleet and reach an agreement on provincial funding to leverage the federal funding available right now

School Buses By The Numbers



833,000

students take the bus to and from school every day in Ontario

20,000+

school buses in Ontario, the province's school bus fleet is Canada's largest

20

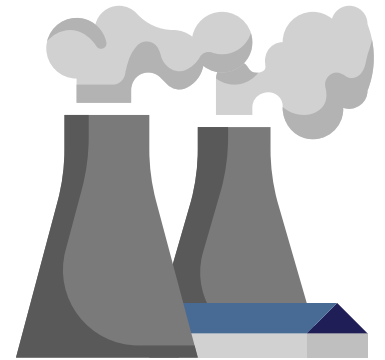
electric school buses in the province, a staggeringly low 0.1%

42%

of all greenhouse gas emissions in Ottawa are caused by transportation

340,000+

tonnes of greenhouse gas emissions would be eradicated every single year by electrifying the entire Ontario school bus fleet (17 tonnes per bus)



1,200

premature deaths in Canada were associated with traffic-related air pollution (both diesel and gasoline) in 2015

63%

of premature deaths were related to heavy-duty vehicles (including buses and commercial trucks)

710

premature deaths across Canada, with 2.2 million acute respiratory symptom days, 170,000 asthma symptom days and 3,000 child acute bronchitis episodes per year caused by diesel emissions alone



\$9.5bn

the annual monetary value of the health burden of traffic related air pollution in Canada in 2015

\$2.75bn

Federal funding available for electric school buses



Ontario's School Bus Fleet

Over 20,000 school buses operate in Ontario, making the province's school bus fleet Canada's largest. Yet only 20 school buses in the province are currently electric. Every day, these 20,000 buses carry over 833,000 Ontario children to school, travelling a total 1.8 million kilometres (40 times around the world) daily. Approximately 150 companies operate under contract to Ontario's school boards.

Ontario's Ministry of Transportation in 2017 launched an electric school bus pilot program, to help achieve Ontario's five-year Climate Change Action Plan to reduce greenhouse gas emissions to 15 per cent below 1990 levels by 2020, 37 per cent by 2030 and 80 per cent by 2050. However, when the Progressive Conservatives took power in 2018, they cancelled the pilot program. In all, 13 electric school buses were delivered across the province as part of the pilot project and allowed testing in cold winter conditions which we encounter here.

Despite the cancellation of the pilot, some Ontario school bus operators have placed orders for electric school buses. Langs Bus Lines, operating over 600 buses throughout Southwestern Ontario, ordered 200 electric school buses in 2021 after having success with one of the buses in the pilot project. Hammond Bus in Bracebridge in 2022 has also ordered 10 electric school buses to join their fleet.

Wauzhushk Onigum launches first electric school bus in an Ontario First Nation

KATHLEEN CHARLEBOIS Miner and News
Published Jun 14, 2018 • 2 minute read

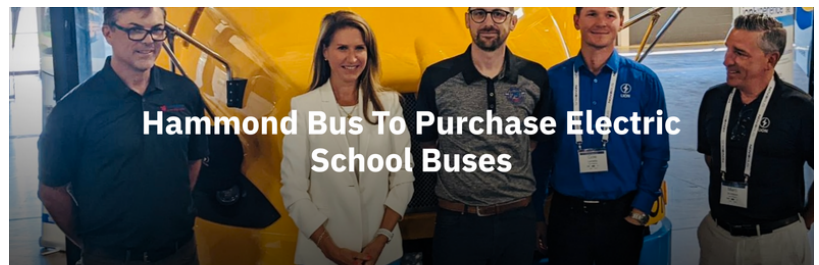


ML Bradley Ltd.
22 August 2018

This year we'll be adding an advanced and unique school bus to our fleet.
Read more about the addition of our 100% electric school bus in the article below!



CBC.CA
Electric school bus one of a kind after program zapped | CBC News
The wheels on a new electric school bus hitting Ottawa's streets this fall could be the last ...



Langs Bus Lines Limited
15 December 2021

We have some exciting news! 🎉 Langs has recently completed a conditional sales agreement with Lion Electric to purchase 200 fully electric school buses over the next 5 years! 🌱 The addition of these electric school buses will help us reduce our fleet's carbon emissions and become an industry leader in eco-friendly transportation.



Climate Benefits

Diesel emissions

Transitioning to a fully electrified school bus fleet offers environmental benefits to help us meet our climate commitments. Diesel emissions are a complex mixture of gases, vapours & particles. The gases include carbon monoxide (CO), carbon dioxide (CO₂), oxides of nitrogen (NO_x), sulphur dioxide (SO₂) and volatile organic compounds (VOC).



As well as greenhouse gases, diesel emissions are a major source of particle pollution, creating 100 times more particles than gasoline-powered engines. Black carbon is a component of particulate matter (PM) and a short-lived airborne particle linked to both climate warming and adverse health effects. Transportation is the largest source of black carbon in Canada (60%). Diesel PM is considered particularly harmful because the particles are extremely small: they can be inhaled easily, are small enough to be deposited in lung tissue and can penetrate the walls of blood vessels to enter the bloodstream and affect other systems within the body, such as the cardiovascular system.

Of course diesel school buses are only one source of all emissions from diesel exhaust and switching to electric school buses is only one part of a much larger transition away from burning fossil fuels that needs to be made to eradicate these emissions.

And as with all other vehicles, variation in levels of emissions from diesel school buses are found to be based on the make, model, age, as well as emission control technologies installed in those vehicles. Technologies which may assist in reducing emissions include retrofitting older buses with a diesel oxidation catalyst, a crankcase ventilation filter, or both. These could be invaluable in reducing emissions around the school yard. And in-cabin air filtration systems are equally important in reducing those emissions inside the bus.

It is clearly important to recognise that many steps can be taken to mitigate diesel exhaust emissions whilst the transition to an electric school bus fleet is underway. Again, active school transportation including walking and cycling to school is one fundamental aspect, as is an anti-idling mandate. And installing emission control technologies on diesel buses before they reach their end of life is another important requirement.

Climate Benefits



Living In a Climate Emergency

65 municipalities across Ontario have declared a climate emergency, with the effects of the climate crisis visible all around us and increasingly destructive weather events following predictions from climate change modelling.

Transportation accounts for a significant proportion of all greenhouse gas emissions (24% across Canada, but as high as 42% in Ottawa, for example), with diesel being a major contributor, yet Canada generates approximately 82% of its electricity from zero emission power sources.

Shifting vehicles away from fossil fuel engines towards zero emission alternatives presents a critical opportunity for significant greenhouse gas emission reductions, which can help to mitigate climate change and its extreme weather events.



Meeting Our Climate Commitments

In March 2022, the Government of Canada introduced Canada's 2030 Emissions Reduction Plan. This plan targets a country-wide 40-45% emissions reduction by 2030. As part of this plan, the Government of Canada consulted with municipalities on how to achieve these reductions. The City of Ottawa (as part of its Energy Evolution plan to transition to zero-emissions by 2050) recommended that the Federal Government implement a mandate for only selling zero-emission vehicles at 90% by 2030, and 100% of vehicles by 2040.

Using this policy as a template, a 90% electric school bus purchase mandate for private school bus operators across Ontario by 2030 would be a good place to start, with incremental increases to 100% by 2040.



Saving Our Planet, One Electric Bus At A Time

Even taking into account the carbon intensity of Ontario's electricity consumption and the use of diesel heaters on electric buses which produce small quantities of emissions, an electric school bus saves about 17 tonnes of greenhouse gas emissions annually compared to a diesel school bus. That means that the emissions reductions potential across the entire Ontario school bus fleet would be 4,080,000 tonnes over the 12 year life of a bus.

Health Benefits

Health Effects of Diesel Emissions

We are in the midst of a national health crisis, with hospitals running well over capacity and patients unable to get the medical care they need. Health Canada has published significant reports on the negative health impacts of diesel emissions and traffic related air pollutants (TRAP), confirming the urgent need to reduce emissions. CAPE (Canadian Association of Physicians for the Environment) recently carried out a scoping review of medical studies on TRAP highlighting the serious health impacts.

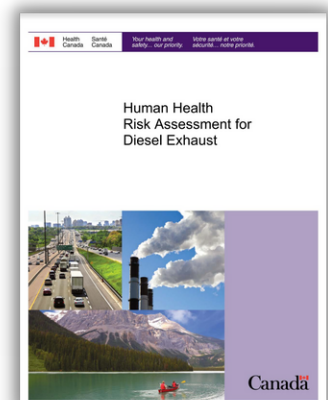
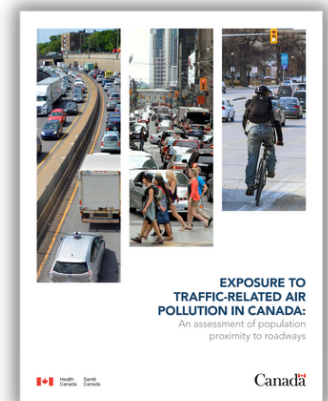
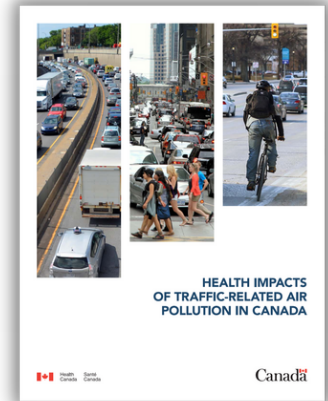
Together, these reports set out clearly the wide-ranging negative health impacts of diesel exhaust, especially from medium and heavy-duty vehicles. It is well past time to act on them.

Diesel emissions are a type 1 carcinogen, meaning that it is proven to cause cancer in humans, specifically lung and bladder cancer. The emissions cause immediate short term pulmonary effects, and longer term effects such as decreased lung capacity, asthma, or neurodevelopmental differences, all as set out in Health Canada's Human Health Risk Assessment for Diesel Exhaust.

Diesel emissions caused 710 premature deaths across Canada in 2015, along with 2.2 million acute respiratory symptom days, 170,000 asthma symptom days and 3,000 child acute bronchitis episodes per year. As well as premature mortality, diesel exhaust is associated with numerous systemic health impacts, including:

- **Respiratory effects** - reduced lung function, inflammation of the airways, asthma, chronic pulmonary disease
- **Cardiovascular effects** - heart disease, arrhythmia, stroke
- **Cancer** - childhood leukemia, lung and bladder cancer in adults
- **Central Nervous System** - neurodegenerative diseases such as Parkinson's disease
- **Immunological effects** - increased sensitivity to environmental allergens
- **Reproductive and Developmental effects** - cognitive development, brain function, neurodevelopmental disorders such as autism

In 2015, the annual monetary value of the health burden of traffic related air pollution in Canada was estimated at \$9.5 billion.



Health Benefits



Children Are Particularly Vulnerable

Children are especially at risk of experiencing adverse health effects of all TRAP due to their breathing rate relative to body size, and the general immaturity of their respiratory and immune systems.

Diesel emissions can cause developmental and immune effects that are significantly more harmful for children and those living in high traffic areas. Children also have greater exposure to air pollutants because they spend more time being active outdoors and they are closer to the ground, where vehicle emissions are concentrated. This means that they are particularly vulnerable while travelling in and moving around diesel school buses.



Health Impacts from Diesel Emissions Are An Equity Issue

Diesel school buses cause heightened pollution levels inside and around the school bus, in and around school buildings as well as communities along bus routes. Diesel school bus routes are concentrated in mainly residential areas and 68% of Ontarians live within 500m of a high traffic road, increasing their exposure to dangerous emissions.

People of low socio-economic status face increased risk of adverse health effects due to higher emission exposure and healthcare access barriers, leading to environmentally driven healthcare disparities.

Although there is a significant gap in Canadian data and literature, US data demonstrates that racialized people also experience disproportionately high TRAP exposure as they are intersectionally marginalized and significantly more likely to reside near a major road, as well as facing barriers to healthcare access, leading to environmental racism and health disparities, including higher rates of asthma diagnoses.

Health Benefits



Reducing Eco-Anxiety In Youth

Eco-anxiety is a form of practical anxiety, characterized as mental distress related to ecological crises that is constant and can lead to further mental health issues in the future where not adequately addressed. This constant anxiety is especially prominent for young people, and youth may also have pessimistic views towards the future and feel a lack of control over their lives as they are dependent on adults who may not share their fear of the future, further exacerbating eco-anxiety.

A 2022 study of 45 million people from 42 countries found that climate anxiety can be cruel, inhuman, and degrading and that eco-anxiety is therefore a human rights issue. With the combination of youth being exposed to diesel emissions, as well as the long term health effects of constant anxiety, they are at a greater risk to experience psychological effects.

As a result, they have the potential to develop long term mental health concerns such as mood and neurodevelopmental disorders, as well as cognitive defects such as memory loss, and schizophrenia. Clearly, eco-anxiety must be addressed, and we believe that the positive action of taking a zero-emissions bus to school can help reduce the impact of eco-anxiety.



Habit Forming Behaviour In Children

Early childhood, from ages 0–6, is when children develop basic values, intellectual and social ideas and behaviours that act as a foundation for adulthood, making it an ideal time to introduce ecologically sustainable behaviour such as taking an electric school bus.

Allowing children to acquire specific skills, habits and attitudes towards sustainable living that they carry through into adulthood can influence not only their behaviour, but also their families' activities, purchases and choices and promote their parents' sustainable behaviour.

Along with activities such as recycling, gardening, and litter-less behaviour, taking sustainable transportation can allow children to integrate ecologically responsible behaviour into their lives. By treating our children as the adults of tomorrow, we are engaging in a sustainable future and encouraging the adults of today to continue modeling ecologically sustainable behaviour.

Direct Economic Benefits

Significant long term savings can be gained from the transition of Ontario school buses with direct economic benefits from savings in energy costs, operation and maintenance costs, which can be seen in this recent [economic analysis of the quantitative impact and benefits](#) of a progressive uptake of electric school buses.

Maintenance

Many maintenance tasks on a diesel bus are unnecessary with an electric, including engine oil changes, engine air filter changes, smog testing, replacing coils or spark plugs and transmission maintenance. The coolant doesn't have to be changed as often, and brake pads get a longer lifespan due to regenerative braking. Less maintenance needs translates directly into cost savings, and the bus fleet can stay on the road rather than spending costly time in the auto shop.

When performing maintenance on an electric bus, you can eliminate:



ENGINE OIL
CHANGES



ENGINE AIR
FILTER CHANGES



SMOG TESTING



REPLACING COILS
OR SPARK PLUGS



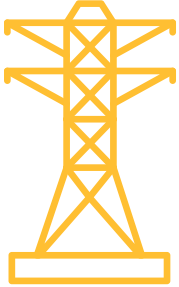
TRANSMISSION
MAINTENANCE

Fuel

Ontario's Ministry of Education subsidizes the noxious soup of diesel for school bus operators to 98¢. Even with this subsidy, millions of dollars can be saved by switching to locally generated electricity. And the uptake of electric school buses can help lead to [energy security](#), as recognized by the [Manitoba government](#), and of course less money spent to pay for fossil fuel imports means more money spent locally in Ontario's economy.

	DIESEL	LION C
BUS COST	\$125,000	\$345,000
LESS AVAILABLE FUNDING THROUGH ZETF	(\$0)	(\$172,000)
ANNUAL BUS COST (OVER 12 YEARS)	\$10,417	\$14,375
ANNUAL ENERGY COST (BASED ON 19,600KM AT 36L/KM @ 98¢ AND 0.76 KWH/KM @ 13¢)	\$7,122	\$1,947
ANNUAL MAINTENANCE AND REPAIR COSTS	\$8,232	\$3,293
TOTAL ANNUAL COSTS	\$25,771	\$19,615
TOTAL COST OF OWNERSHIP (OVER 12 YEARS)	\$309,252	\$235,382

Indirect Economic Benefits



Vehicle-to-Grid Integration

Another technology reducing overall costs is vehicle-to-grid (V2G) integration, which can enhance the cost benefit analysis. This involves working with utility companies to provide vehicle to grid power storage options, allowing unused energy from EV batteries to be pushed back to the power grid and allow better grid management during peak hours. School buses, in particular, are well suited for V2G as they are not active during evening peak hours. As well as V2G here in Canada, utility companies in the US are installing V2G technology to help school districts adopt electric buses and entering pay as you go agreements where the utility covers the initial installation cost and the school district pays it off in power returned to the grid.



Health Care Costs Savings

Recent analysis puts a dollar figure on the total health care cost savings from mental and physical health issues avoided due to decreased air pollution (from NOx, SOx and PM2.5) when one diesel bus is converted to electric. The estimated \$11,800 saved in health care costs over the 12 year lifetime of a single bus, demonstrate dramatic savings when applied to the 20,000 diesel school buses currently being driven in Ontario, representing a **\$236m saving to the province** in health care costs. The question is clear: can we afford to postpone the transition to electric school buses?



The Social Cost of Carbon (SCC)

According to the Government of Canada: "*The SCC is a measure of the incremental additional damages that are expected from a small increase in carbon dioxide (CO2) emissions (or conversely, the avoided damages from a decrease in CO2 emissions). Estimates of the SCC provide a way to value CO2 emission changes in [Cost Benefit Analysis] and compare them to the incremental costs of abatement.*"

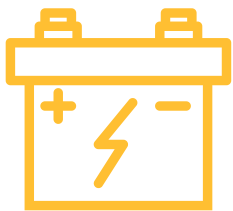
The SCC is a critical tool for assessing the damages associated with carbon pollution that encompasses all costs incurred by society caused by an extra tonne of carbon dioxide being emitted, including the effects carbon emissions on agriculture productivity, labour productivity, sea levels rising affecting homes, and changes in energy consumption and it is measured by the difference between the economic outcomes of these activities without and with that extra tonne. The current estimate of SCC in the US is US\$51 per tonne. Using a CA\$69 conversion, and assuming conservatively that each bus emits 20 tonnes of greenhouse gases per year, that would amount to **savings of \$16.56m** over the 12 year lifetime of the 20,000 diesel buses in Ontario.

Economic Growth Potential



Localized Economic Growth

Electric school bus manufacturers include large US manufacturers such as [Blue Bird Corporation](#) and [Thomas Built Buses](#). However, right here in Canada, [Lion Electric's](#) manufacturing plant is in Quebec and [GreenPower Motor Company](#) has headquarters in BC, and an assembly plant in California. Using Quebec-based Lion Electric as a case study, the company has seen enormous growth since the launch of their first bus in 2011, to listing on the Toronto and New York Stock Exchanges in 2021, they have over 700 electric school buses on the road, with 14m kilometres driven in all weather conditions across Quebec, Southern Ontario and California and they employ over 1350 staff. The potential for growth in this sector is great and [Canadian companies could stand to benefit](#) from such localized economic growth. The transition to electric school buses, including in the manufacturing, technology and battery sectors, can all drive job direct creation here in Ontario, with employment opportunities benefitting the local economy from investment into the green energy industry.

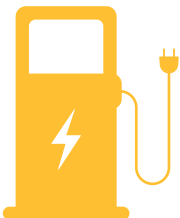


Lithium-Ion Batteries

With electric vehicle and worldwide lithium-ion battery production expected to increase significantly in coming years, there is great concern over both the production and disposal of valuable, non-renewable resources like nickel, cobalt, and manganese in batteries. [Clean Energy Canada](#) reports the *"potential to build a domestic EV battery supply chain that could support up to 250,000 jobs by 2030 and add \$48 billion to the Canadian economy annually"*. Ontario holds valuable resources, with [mineral development opportunities](#) for critical minerals needed in the transition to electric vehicles, and with exploration activity already underway in [Ontario's Ring of Fire region](#). It is vital that whilst exploring these economic growth opportunities, that First Nations stewards of the land are involved at every step and that activities are assessed with a strong environmental lens.



The fate we have already seen where such batteries in consumer electronics end up in landfills, need not continue. [One Canadian company](#) with a plant in Kingston, Ontario, already offers a *"revolutionary solution that recovers up to 95% of all battery materials found within a spent Lithium-ion battery and reintroduces the materials back into the supply chain"*, offering lithium-ion battery recycling in a closed loop resource recovery. The development of another battery material recycling demonstration plant in Ontario was also [announced late 2022](#) in relation to this high growth area.



Local Energy Production

Local utilities have an important role to play in the transition of the Ontario school bus fleet to electric. They have much to benefit from the transition, and the wider local economy will reap the benefits of eliminating the import of millions of litres of diesel. We have seen strong partnerships already formed where Ontario cities have begun to transition urban transit fleets, such as the collaboration between the Toronto Transit Commission (TTC), Ontario Power Generation and Toronto Hydro-Electric System Limited for the co-investment, ownership, design, build, operation, and maintenance of electrification infrastructure.

Regional Comparisons

Quebec

Quebec's 2030 Plan for a Green Economy is being led by Premier François Legault, who has pledged \$250m to electrify 65% of the province's 10,000 strong bus fleet by 2030. Along with this financial support, since November 2021 the province also made it mandatory for all bus operators to switch to an electric vehicle once one of its diesel buses reaches end-of-life.



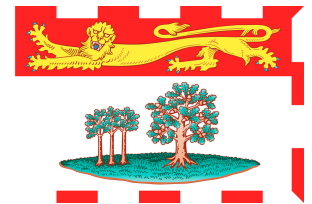
The Bus Carriers Federation (which represents over 650 Quebec-based private companies operating passenger transportation) reached an agreement in 2021 with Canada Infrastructure Bank (CIB) to invest up to \$400 million for the purchase of 4,000 electric school buses in Quebec.

The investment is by way of a long-term loan to help bus operators cover the vehicles' higher upfront costs and charging infrastructure expense and help accelerate the shift to electric school buses in the province. The bus operators that receive the loans will be responsible for repaying them over the life of each purchased bus. According to Charles Todd, managing director of investments at CIB *"it's a loan that's based on the expected savings that the buses are going to generate over their life... if you think about running a diesel bus for 10 years, you're going to spend a certain amount of money on diesel, [but] running an electric bus for 10 years, you're going to spend a lot less money on electricity. So the difference between those two numbers is how [much] we're repaid."*

As a result of this provincial leadership, orders for electric school buses across Quebec have been increasing rapidly, with 260 ordered by Autobus Transco (a Quebec-based subsidiary of First Student Canada) from Lion Electric, the largest order in the manufacturer's history to date.

PEI

PEI has made significant progress in its transition to a fully electric school bus fleet, driven by Premier Dennis King's commitment in May 2020 *"to moving our school buses to full electrification over the next few years and leading the county in this form of clean transit"*. By late 2022, PEI has 82 electric school buses, representing 25% of its 322 bus fleet.



According to the Conservation Council of New Brunswick: *"P.E.I. faces the same challenges as other jurisdictions: high capital costs, installing charging infrastructure, changing weather patterns, and bus driver acceptance. Despite these challenges, the province continues to break down barriers and forge ahead with its goal of becoming the first in Canada with a fully-electric school bus fleet."* PEI is taking advantage of federal funding supporting fleet electrification through the Green Infrastructure Stream of the Investing in Canada Infrastructure Plan and the province paid the other half of the total costs.

Regional Comparisons



BC

The BC government has been encouraging the adoption of electric school buses in line with CleanBC's Roadmap to 2030, by providing financial support for the purchase of the bus and associated charging infrastructure. Core bus funding is provided by the Ministry of Education and Child Care.

CleanBC Go Electric funding streams specifically target electric school buses, with a subsidy covering 33% of the pre-tax purchase price of an electrical school bus, up to \$150,000, plus up to \$6,000 to cover a new Level 2 charger (equipment, installation and electrical upgrade costs). There are also other funding opportunities, including an additional \$25-30,000 over and above the core bus funding from the Ministry of Education and Child Care and the Ministry of Education's Carbon Neutral Capital Program one-time grant offering \$50,000. The balance after this funding support is taken into account can be funded through ZETF and this level of incentivization has seen the transition to electric school buses rapidly accelerate in BC.

BC's Low Carbon Fuel Standard (LCFS) can also provide credit revenue for operating vehicle charging sites. In BC, based on 20,000km annually, an operator would receive additional revenues of \$4,232 per year per bus by selling their carbon credits; this could earn a school district over \$100,000 in LCFS credit revenue over the lifetime of a bus. The BC LCFS program is also available in some states in the US and there is potential for a new Canadian carbon credit market.

US

As part of President Biden's Bipartisan Infrastructure Law which created an historic \$5 billion investment for low- and zero-emission school buses over five years (2022-6), the Clean School Bus Program provides \$1m per year. School districts can apply to receive funding to cover up to 100% of the cost of up to 25 electric school buses and their charging stations. Awards are given on a lottery basis, with priority given to school districts serving low-income, rural and tribal communities.



California is leading the US transition, with more than 1,800 zero-emission school buses operating or on order with ongoing state investment supporting the federal Clean School Bus Program. The states of New York, Maryland, New Jersey, Connecticut, Arizona, Colorado, Nevada and Washington have all passed recent legislation to fund electric school bus programs. These funding commitments provide inspiration for Ontarians who see children's health being prioritized, climate commitments being recognized and financial spending being leveraged.

Federal Funding



With an average lifespan of 12 years, each of Ontario's 20,000 buses will need to be replaced in the next 12-15 years. There are two options, either replacing them with electric school buses or condemning Ontarians to another 12 years of damaging health, environmental and economic impacts with diesel buses.



Although electric school buses offer significant energy and maintenance cost savings over their typical 12 year lifetime, they do have higher upfront costs than diesel buses. To remove this barrier, the federal government in 2021 announced Infrastructure Canada's \$2.75 billion Zero Emission Transit Fund (ZETF) to support school bus operators across Canada electrifying their fleets. ZETF will cover 50% of all costs (bus purchase, charging infrastructure and electrical upgrades required).



ZETF builds on programs such as the Public Transit Infrastructure Stream of the Investing in Canada Infrastructure Program and Canada Infrastructure Bank's 2020 commitment to invest \$1.5 billion in zero-emission buses and associated infrastructure by providing flexible financing solutions by leveraging forecasted lifecycle operational cost savings to help offset the higher upfront costs of zero emission buses.



Taken together, there has never been more federal funding to support the transition to electric school buses. However, when we look across at other provinces further ahead in the transition of their school bus fleets, we see that in all cases, provincial funding is essential to supplement the federal funding available. This creates a prime opportunity for the Ontario Ministry of Transportation to fund a provincial purchase incentive and leverage this federal funding to invest in zero emission school transportation to ensure cleaner air for our children, create jobs, and support Canadian manufacturing.

Ontario School Bus Funding



Ontario's Ministry of Education provides transportation funding to each school board (with any transportation funding shortfall coming out of the school board's non-operating budget). Transportation consortia then send out Requests for Proposals, which private bus operators bid on to gain 5-7 year contracts.

This funding structure creates challenges to overcome in the transition to electric school buses in Ontario:

- School boards and transport consortia who may support the call to transition on student health grounds, do not have funding from the Ministry of Education to cover the higher upfront costs of ESBs; and
- It is challenging for private bus operators to justify the purchase of a bus with significantly higher upfront costs when bus operator contracts in Ontario are typically only half the life of a bus, whereas the cost savings with electric buses are seen over the full lifetime of a bus.

Four changes are needed to accelerate adoption in Ontario:



Provincial funding from the Ministry of Transportation is **essential** in accelerating the adoption of electric school buses, leveraging current federal funding available until 2025



Contract extension to 10-12 years to cover the lifetime of the bus so operators can recoup costs



Mandated % purchase of ESBs as diesel buses are decommissioned at their end of life for operators to bid on transportation consortia RFPs



The Ministry of Education needs to end the school bus diesel subsidy (currently at 98¢) over time

Next Steps

Municipal Councillors

Sign our petition calling on municipalities and Ontario to work together to accelerate the adoption of ESBs

MPPs

Write or speak to your MPP and ask them to champion the adoption of ESBs at the provincial level in Queen's Park

Local School Boards

School boards can
1) send letters of support for ESBs to the Ministry of Transportation to protect students' health and
2) request Transport Consortia mandate % purchase of ESBs when diesel buses reach end of life to win contracts

Transport Consortia

Consortia can 1) extend contracts to 10-12 years so that private bus operators can ensure costs recouped over lifetime of bus when purchasing ESBs, and 2) mandate % purchase of ESBs when diesel buses reach end of life to win contracts

School Bus Operators

Can 1) vocally support the call for provincial funding and 2) work with transportation consortia to set realistic mandate for % purchasing of ESBs when diesel buses reach end of life

Ministry of Education

1) mandate % purchase of ESBs when diesel buses reach end of life to receive Ontario transportation funding and 2) end the school bus diesel subsidy at 98¢ over time

Ministry of Transportation

Provide funding for electric school buses, moving beyond the 2017 pilot and leveraging Federal funding in place until 2025

Ministry of Health

Support the call for provincial funding to protect residents' health from harmful diesel emissions

Ministry of Environment, Conservation & Parks

Support the call for provincial funding to help meet our climate commitments



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