

## **Electric Vehicle Strategy**

Date: December 11, 2019

To: Infrastructure and Environment Committee

From: Director, Environment and Energy

Wards: All

### **SUMMARY**

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This report presents the City of Toronto's Electric Vehicle Strategy ("EV Strategy") and seeks City Council's approval of the Strategy.

The development and implementation of this EV Strategy is a critical component of transitioning Toronto to a low-carbon city as articulated in the City's Climate Action Strategy, TransformTO, in particular the goal that 100% of transportation use zero carbon energy by 2050.

While support for public transit and active transportation will be critical to achieving this goal, increasing the adoption of electric vehicles ("EV"s), fuelled by Ontario's current low-carbon electricity grid, must also be realized.

Based on objectives presented in this EV Strategy, by 2030, Toronto should be prepared to accommodate more than 220,000 plug-in electric vehicles (approximately 20% of personal vehicles) and by 2050, 100% of personal vehicles should be zero carbon which can currently only be achieved by electric vehicles. This scale up will require a coordinated effort to address the current barriers and enable necessary charging and electrical capacity infrastructure and upgrades to avoid disruptions in service.

Electric vehicles have advanced significantly this past decade, owing in part to maturing technology, increased model availability (new and used EVs), decreasing battery costs, and significant greenhouse gas reduction, air quality and urban noise reduction benefits. This EV Strategy recommends actions that need to be taken if electric vehicles are to significantly penetrate the passenger vehicle market.

The EV Strategy was co-created under the leadership of the Environment and Energy Division with the cross-divisional Electric Vehicle Working Group ("EVWG") which includes over 20 divisions, agencies and corporations, in consultation with external stakeholders from academic, non-profit, automotive, utility and technology

organizations, oil and gas industry, property developers, community groups and the general public.

## **RECOMMENDATIONS**

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The Director, Environment and Energy Division recommends that:

1. City Council approve the Electric Vehicle Strategy presented in Attachment 1: City of Toronto Electric Vehicle Strategy to this report, and direct City Divisions identified as action leads to report back with:

- the outcome of activity exploration to be presented through the first EV Strategy status update report in 2021; and,
- business cases where relevant for activity implementation to be presented through the 2021 Budget process.

2. City Council direct the Director, Environment and Energy Division to work with members of the already established Electric Vehicle Working Group ("EVWG") and other relevant City divisions, and request City agencies and corporations to oversee the effective engagement, implementation, and evaluation of the Electric Vehicle Strategy.

3. City Council direct the Director, Environment and Energy Division in consultation with Transportation Services, Fleet Services and all other relevant City divisions to report back to the Infrastructure and Environment Committee with a status update on the progress of the immediate actions identified in the Electric Vehicle Strategy starting in the second quarter of 2021 and with a comprehensive Electric Vehicle Strategy review every four years aligning with TransformTO's annual status reporting and the implementation planning cycles with the first review presented in 2023.

## **FINANCIAL IMPACT**

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In response to the Climate Emergency Declaration (item 2019.MM10.3) that was adopted in October 2019 to accelerate high priority emission reduction areas in TransformTO, \$0.150 million has been submitted as part of the Environment & Energy Division's 2020 Operating Budget for Council consideration to fund a public EV charging location study and outreach and engagement initiatives.

With Council's approval of the EV Strategy, City divisions identified as action leads will develop business cases that include the dedicated operating and capital resources required to implement the EV Strategy actions for consideration through the 2021 and future year budget process.

The Chief Financial Officer and Treasurer has been provided with the financial impacts associated with this report for review as part of the 2020 budget process.

## EQUITY IMPACT STATEMENT

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It is important that the transition to electric mobility is designed to ensure goals, actions, guidelines and policies identified in the EV Strategy benefit everyone.

The City of Toronto's Equity Lens Tool has been used to assess the EV Strategy for potential impacts on equity-seeking groups and vulnerable residents of Toronto. An equity lens will continue to be employed throughout the implementation phase of the EV Strategy.

Populations living near busy roads or highways are subject to health impacts from traffic-related air pollution ("TRAP") and vulnerable populations such as young children, the elderly and people with pre-existing medical conditions are more prone to the impacts<sup>1</sup>. In Toronto, low-income residents are more likely to live in close proximity to major roadways and have higher exposures to TRAP. Transitioning to EVs reduces tailpipe emissions and can lead to improvements in air quality from the reduction of TRAP.

Moving forward, the general public and equity-seeking communities in particular will be engaged in the implementation of actions contained in this report.

## DECISION HISTORY

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At its meeting on November 30, 2009 to December 7, 2009, City of Toronto Council adopted the "Power to Live Green: Toronto's Sustainable Energy Strategy" (The Sustainable Energy Strategy) (item 2009.EX36.9). The Power to Live Green identified that the development of electric vehicle technology has the potential to assist Toronto in achieving its goals of reducing local smog and greenhouse gas emissions. It also provided direction to ensure that the first priority for transportation planning and infrastructure development is for net zero energy modes of commuting such as walking and cycling, and, as a second priority, for alternatives such as telecommuting, public transit and car-pooling.

<http://www.toronto.ca/legdocs/mmis/2009/cc/decisions/2009-11-30-cc42-dd.htm>

On July 11, 12 and 13, 2012, City Council approved a one-year pilot project (item 2012.PW16.4) to provide curbside charging stations for electric vehicles.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2012.PW16.4>

On September 11, 2012, Council approved the designation of five electric vehicle charging station parking areas for the exclusive use of electric vehicle charging for a one-year pilot project, on Ed Mirvish Way, Elizabeth Street and Wellington Street West (item 2012.TE18.68).

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2012.TE18.68>

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<sup>1</sup> Reducing Health Risks from Traffic-Related Air Pollution (TRAP) in Toronto:  
<https://www.toronto.ca/legdocs/mmis/2017/hl/bgrd/backgroundfile-108179.pdf>

On September 26, 2016, the Public Works and Infrastructure Committee requested the Transportation Services and Environment & Energy Divisions report back on expanding electric vehicle charging stations in Toronto (item 2016.PW15.0).

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.PW15.9>

On July 4, 2017, City Council unanimously adopted TransformTO: Climate Action for a Healthy, Equitable and Prosperous Toronto (item 2017.PE19.4). TransformTO identifies a pathway for Toronto to reduce city-wide emissions by 80% by 2050. Presented in the TransformTO report were three acceleration campaigns, including 'Prepare for Electric Mobility' which focuses on developing an electric vehicle transition strategy for Toronto.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.PE19.4>

On November 9, 2017, City Council adopted Preparing Toronto for Electric Vehicles (item 2017.PW24.7).

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.PW24.7>

On December 5, 2017 City Council adopted the Revised Report from the Medical Officer of Health and the Deputy City Manager, Internal Corporate Services, on Reducing Health Risks from Traffic-Related Air Pollution (TRAP) in Toronto (item 2017.HL22.3).

<http://www.toronto.ca/legdocs/mmis/2017/hl/bgrd/backgroundfile-108179.pdf>

On October 2, 2019 City Council adopted a motion directing the General Manager, Transportation Services to report to the appropriate Committee on a program to enable the oversight and management of e-scooters on City roadways (item 2019.IE7.13).

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2019.IE7.13>

On October 2, 2019 City Council declared a Climate Emergency and strengthen Toronto's goal of becoming net zero before 2050 (item 2019.MM10.3).

In addition to a number of commitments, City Council is committed to looking for opportunities to invest in and accelerate high priority emission reduction areas in TransformTO, such as transportation, as part of the 2020 Budget.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2019.MM10.3>

## **COMMENTS**

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### **Background**

#### Scope of the EV Strategy

This EV Strategy focuses on personal passenger vehicle electrification (i.e. light duty vehicles, which include cars, vans, trucks and SUVs, for personal and shared use) which includes both plug-in hybrid electric ("PHEV") and full battery electric vehicles ("BEV").

Medium and heavy duty commercial vehicles, transit, off-road vehicles, and hydrogen fuel cell vehicles are not included in the scope of the EV Strategy. The City will continue

to monitor the advancement of these technologies and intends to include them when appropriate in successive iterations of this EV Strategy.

In tandem, the City is currently implementing a suite of actions to convert City fleet and transit buses to use low-carbon technology, undertaking a goods and freight movement study, and an automated vehicles tactical plan, among other electric mobility initiatives, all of which complement and align with the recommendations in the EV Strategy.

## Process

Between Q3 2018 and Q4 2019, staff in the Environment and Energy Division and the City's EVWG worked with two consultants to develop the EV Strategy in two phases:

Phase 1: In Q3 2018 and through an Informal Request for Quotation procurement call, Pollution Probe in partnership with the Delphi Group were contracted to lead the work on an initial 'Assessment Phase' using a Strategy Framework that had been developed by the EVWG as a guideline. The final Electric Mobility Strategy Assessment Phase was completed in Q4, 2018 and can be found here, along with the Strategy Framework: [Toronto.ca/electric-vehicle](https://toronto.ca/electric-vehicle).

Phase 2: In Q2 2019 and through an RFP process, Dunskey Energy Consulting ('Dunskey') was contracted for the below scope to support the EV Strategy development:

- Review previous work including the Strategy Framework and the Strategy Assessment Phase reports;
- Conduct secondary research (other municipal EV strategies);
- Review initiatives currently underway at the City of Toronto and led by several divisions;
- Conduct a qualitative approach: through taking a collective approach to co-create the Strategy with a broad cross section of stakeholders and the public with a focus on equity issues; and,
- Conduct a quantitative approach: through a mapping exercise using Dunskey's Electric Vehicle Adoption model.

## Stakeholder consultation

The City engaged the public and stakeholders in five (5) in-person sessions and through an on-line survey. The primary objective of the consultations was to solicit feedback on prioritizing actions, while also identifying areas of opportunity, gaps or potentially inequitable social or health outcomes, roadblocks, or key considerations for implementation.

The following is a summary of the key consultation findings. For more details on the stakeholder and public consultations, refer to the EV Strategy available on the project website: [Toronto.ca/electric-vehicle](https://toronto.ca/electric-vehicle).

- The City should lead by example by implementing its own actions while also advocating and supporting other levels of government to implement actions;
- Residents who have no access to a private overnight parking space (e.g. garage orphans), or who live in Multi-Unit Residential Buildings ("MURBs"), are

experiencing difficulty in accessing and installing charging infrastructure. Residents shared ideas to resolve these barriers;

- Educating stakeholders and the public remains key;
- Partnerships will help spread awareness; and,
- Respondents from the online survey noted that improving charging availability would have the greatest impact.

## **Existing Electric Mobility Landscape**

In Q4 2018, over 6,200 EVs were registered in Toronto compared to 1,600 EVs in 2016. Although Toronto accounts for approximately 20% of all EVs registered in Ontario, only approximately 0.6% of all vehicles registered in the city are EVs.

On a Provincial level, in 2016 and after the announcement of a provincial target of 5% of new passenger car sales or leases being electric and hydrogen vehicles by 2020 and the creation of an EV purchase subsidy, EV sales increased rapidly in Ontario. By the end of 2018, 8.2% of all new car sales were EVs. Although EV sales declined following the cancellation of the provincial purchase rebate program, the federal purchase incentive, declining battery costs, and increased model availability continue to drive EV adoption in the province.

Although the EV market share in Canada is only 2.2%, EV sales have increased by approximately 80% between 2017 and 2018. According to FleetCarma estimates, Ontario accounted for 45% of total EV sales in Canada, followed by Quebec at 34% and BC at 18% between the first and third quarters of 2018.

In 2018, global EV sales surpassed two million units for the first time; twice those sold in 2017. While China and the United States had the highest sales volume of EVs, Norway is the world's leader in terms of sales share with 39% of new sales being electric in 2017<sup>2</sup>.

There is a shift in automakers' focus to increase EV models in their pipelines, including some who have committed to phasing out conventional gasoline and diesel engines altogether. The City recognizes the risk of not addressing the shift to electrification and has provided this EV Strategy as a roadmap to facilitate this transition.

## **Co-benefits Analysis: Environmental, Health and Economic opportunities**

Many benefits are associated with the increased adoption of electric vehicles related to human health, air quality, the environment, and economic growth. Understanding the quantitative value of these benefits provides guidance for the City to determine investment levels that accurately reflect the full value of electric vehicles to society. The following summary identifies the broad range of benefits that electric vehicles provide, for more details refer to the EV Strategy available on the project website:

[Toronto.ca/electric-vehicle](https://www.toronto.ca/electric-vehicle).

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<sup>2</sup> City of Toronto Electric Mobility Strategy Assessment phase:  
<https://www.toronto.ca/wp-content/uploads/2019/05/9685-EMS-Assessment-Phase-Final-Project-Report.pdf>

Significant reductions in GHG emissions would be achieved with the adoption of EVs. Through technical modelling, TransformTO identified that the electrification of all passenger vehicles in Toronto could result in a 1.95 megatonne GHG emission reduction annually<sup>3</sup>. At a more granular level, each BEV adopted in Toronto will lead to GHG emissions reductions of 3 to 5 tonnes per year, relative to gas-powered vehicles. Each PHEV will lead to reductions of 2 to 3.5 tonnes per year<sup>4</sup>. This highlights the important opportunity for Toronto to leverage the clean electricity supply mix and time of use pricing to achieve substantial GHG reductions.

Particulate matter emitted from gas-powered vehicles is a problem in cities like Toronto, and people who live and work close to major roads have been shown to be at greatest risk of adverse health effects related to TRAP. It is estimated that TRAP emitted within the city contributes to 280 premature deaths each year in Toronto. EVs are currently quieter than Internal Combustion Engine (ICE) vehicles, reducing noise exposure for residents who live near high-traffic areas. Research has identified a range of health impacts associated with various levels of environmental noise, such as hearing loss, sleep disturbance, annoyance, and some cardiovascular impacts<sup>5</sup>.

For individual consumers, comparable EVs have a higher upfront cost, however, these costs are offset by savings on fuel, maintenance, and financial incentives. Studies that compare the Total Cost of Ownership (TCO) of similar models of EVs to ICE vehicles using an average annual mileage and maintenance costs have found that EVs have a lower TCO. Given that in 2025, EVs will reach price parity<sup>6</sup> with most ICE vehicles the TCO for EVs will be even more pronounced.

## Overview of Recommended EV Strategy

The Toronto EV Strategy identifies actions that need to be taken so the City of Toronto is prepared for the global shift towards electric mobility and to ensure Toronto achieves its TransformTO goals, including that 100% of transportation uses zero-carbon energy sources by 2050. TransformTO also identifies that in 2017, 38% of greenhouse gas emissions are coming from the transportation sector and of that, 79% of the GHG emissions are from private passenger vehicles. Through the TransformTO modelling,

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<sup>3</sup> TransformTO, Results of Modelling Greenhouse Gas Emissions to 2050: <https://www.toronto.ca/wp-content/uploads/2017/11/91f6-TransformTO-Modelling-Torontos-Low-Carbon-Future-Results-of-Modelling-Gr....pdf>

<sup>4</sup> City of Toronto Electric Mobility Strategy Assessment phase: <https://www.toronto.ca/wp-content/uploads/2019/05/9685-EMS-Assessment-Phase-Final-Project-Report.pdf>

<sup>5</sup> World Health Organization. (2018). Environmental Noise Guidelines for the European Region. Available at: <http://www.euro.who.int/en/health-topics/environment-and-health/noise/publications/2018/environmental-noise-guidelines-for-the-european-region-2018>

<sup>6</sup> McKinsey and Company, Making electric vehicles profitable <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/making-electric-vehicles-profitable>

the electrification of transportation was identified as one of the 5 major actions that will have the biggest impact and can be achieved using existing technologies.

The zero-carbon transition will be guided by a number of principles that advance social equity, protect low income residents, improve affordability, especially for vulnerable populations, contribute to poverty reduction, enhance and strengthen the local economy, maintain and create good local jobs, improve public health and create resilient communities and infrastructure.

To ensure the City meets this transportation goal, the EV Strategy presents a pathway for personal vehicle electrification:

- By 2025, 5% of registered personal vehicles are EVs;
- By 2030, 20% of registered personal vehicles are EVs;
- By 2040, 80% of registered personal vehicles are EVs; and,
- By 2050, 100% of registered personal vehicles are EVs.

The EV Strategy aligns, informs and builds upon the initiatives currently underway within the City of Toronto and defines partnerships for the road forward. The EV Strategy consists of the following elements:

- Ten (10) broad actions that are organized around four (4) key objectives: increase charging availability, address the cost and convenience barriers, increase public awareness and education and create economic opportunities. Each action includes a number of activities;
- An implementation roadmap for the immediate, near and mid-term action items; and,
- A range of resources, tools and key performance indicators identified to support the implementation of the recommended activities.

Attachment 2: City of Toronto Electric Vehicle Roadmap provides a summary of actions under each category and indicates when planning will begin for the implementation of the actions during the first 8 years (2020-2027). Details on each recommendation are outlined in the EV Strategy in Attachment 1.

To implement the presented EV Strategy, the City will need to initiate a set up investment estimated between \$700,000 and \$3.5 million details of which will be presented through the annual budget process starting with the 2021 budget cycle. In addition to this initial investment, a community-wide level of investment is required and estimated between \$6 and \$34 million. In this context, the community-wide levels of investment include potential financial contributions from all orders of government (i.e. Federal, Provincial and City), plus the private sector and individual property owners.

## **Conclusion and Next Steps**

Toronto's EV Strategy is a product of extensive research and a collaborative effort with input from residents, multiple stakeholder groups and the City's EVWG. The EV Strategy provides a foundation for the City of Toronto's ongoing efforts and new actions aimed at preparing the City for increased EV adoption. The EV Strategy recognizes that some Toronto residents face challenges to accessing this technology and will continue to engage equity seeking groups to address and mitigate issues.



The EV Strategy puts the City of Toronto on the path to support increased EV adoption in a way that is equitable and realizes the co-benefit through improved air quality and economic opportunities achieved by shifting to zero-carbon energy transportation.

This initial EV Strategy identifies and prioritizes actions for the immediate, near-and mid-term. The identified lead City divisions will begin to develop the financial planning necessary to implement the actions. The financial impacts will be included for consideration through the 2021 budget process.

In 2020, the City will continue to implement the immediate actions currently underway by various City divisions. A number of accelerated actions have been included in the 2020 Budget process in response to City Council's Climate Emergency Declaration.

In order to ensure that the EV Strategy remains relevant and able to adapt to emerging technologies, the EV Strategy will be a living document. The EV Strategy reporting process and implementation timelines will align with TransformTO's reporting and implementation planning cycles with the first update report in 2021.

## CONTACT

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## SIGNATURE

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## ATTACHMENTS

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Attachment 1 - City of Toronto Electric Vehicle Strategy  
Attachment 2 - City of Toronto Electric Vehicle Roadmap