



**City of Kingston  
Report to Council  
Report Number 17-262**

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<b>To:</b>	<b>Mayor and Members of Council</b>
<b>From:</b>	<b>Lanie Hurdle, Commissioner of Community Services</b>
<b>Resource Staff:</b>	<b>Peter Huigenbos, Director Real Estate &amp; Environmental Initiatives</b>
<b>Date of Meeting:</b>	<b>October 3, 2017</b>
<b>Subject:</b>	<b>Proposed Kingston Electric Vehicle Strategy</b>

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**Executive Summary:**

Conversion from petroleum fuels to electric energy for light duty transportation represents a significant opportunity for reducing greenhouse gas emissions and the cost of vehicle operation for the community and the municipal corporation. This report presents a strategy to support electric vehicle (EV) uptake in Kingston by: incorporating electric vehicles into the municipal fleet; installing electric vehicle charging stations on municipal property for public use; promoting the benefits of electric vehicles; readying the local electrical distribution network for EV charging demand; and supporting employees who choose to commute using EVs.

As part of this EV strategy, staff are recommending that the City plays a leadership role in the installation of Level 1, Level 2 and Level 3 EV charging stations available for public use. Staff are proposing that Level 1 and Level 2 EV charging stations be available at no cost for public use during the first two (2) years of operations in order to build awareness and increase usage. Staff are also recommending that fees apply to Level 3 EV charging stations in 2018. There are currently limited charging options in Kingston for members of the public wishing to own an electric vehicle. This is a barrier to the introduction of more electric vehicles within the community. The existing EV charging stations in Kingston tend to have limited public access or limited hours of operations. Exhibit C to Report Number 17-262 provides a map of existing and proposed City public EV charging stations.

This EV strategy also provides a plan for the City to gradually replace its own fleet with electric vehicles, especially light duty vehicles. This transition from petroleum fuels to electric energy for light duty vehicles will also include the installation of electrical charging stations to exclusively support municipal fleet. The EV strategy also identifies a shift from diesel fuel to electric transit buses as a potential next step considering recent technology changes, implementation of

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electric buses in some municipalities and grant funding available to support electric bus acquisitions.

Staff are recommending that the installation of the public EV charging stations and conversion of municipal fleet, with a cost of up to \$796,000, be funded from the Environmental Reserve Fund. With an approved EV strategy, staff will be pursuing various grant opportunities to limit the municipal capital investment.

Staff are also recommending that the first two years (2018-2019) of public access to EV charging stations be funded to a maximum of \$82,000 per year from the Working Fund Reserve. It is anticipated that revenue generation through the use of Level 3 EV charging stations will be initially limited but that over time, and especially after the introduction of fees for Level 1 and Level 2 stations, the municipality will experience an increase in revenue.

**Recommendation:**

**That** Council direct staff to implement the Kingston Electric Vehicle Strategy as described within Report Number 17-262; and

**That** Council approve up to \$796,000 to be included in the 2018 capital budget and to be funded from the Environmental Reserve Fund; and

**That** Council approve up to \$82,000 to be included in the 2018 and 2019 operating budget, funded from the Working Fund Reserve to cover the cost of the first two (2) operational years in order to provide free public access to Level 1 and Level 2 electric vehicle charging stations; and

**That** Council direct staff to amend the Fees and Charges By-Law to include a fee for Level 3 electric charging stations in 2018; and

**That** Council delegates approval and signing authority for grant applications and agreements for financial assistance related to the implementation of the Kingston Electric Vehicle Strategy, to the Commissioner, Community Services or his/her delegates, in a form satisfactory to the Director of Legal Services, it being understood that any City contributions will be consistent with approved municipal budgets.

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**Authorizing Signatures:**

ORIGINAL SIGNED BY COMMISSIONER

**Lanie Hurdle, Commissioner, Community Services**

ORIGINAL SIGNED BY CHIEF ADMINISTRATIVE OFFICER

**Gerard Hunt, Chief Administrative Officer**

**Consultation with the following Members of the Corporate Management Team:**

Desirée Kennedy, Chief Financial Officer & City Treasurer



Denis Leger, Commissioner, Corporate & Emergency Services



Mark Van Buren, Acting Commissioner, Transportation & Infrastructure Services



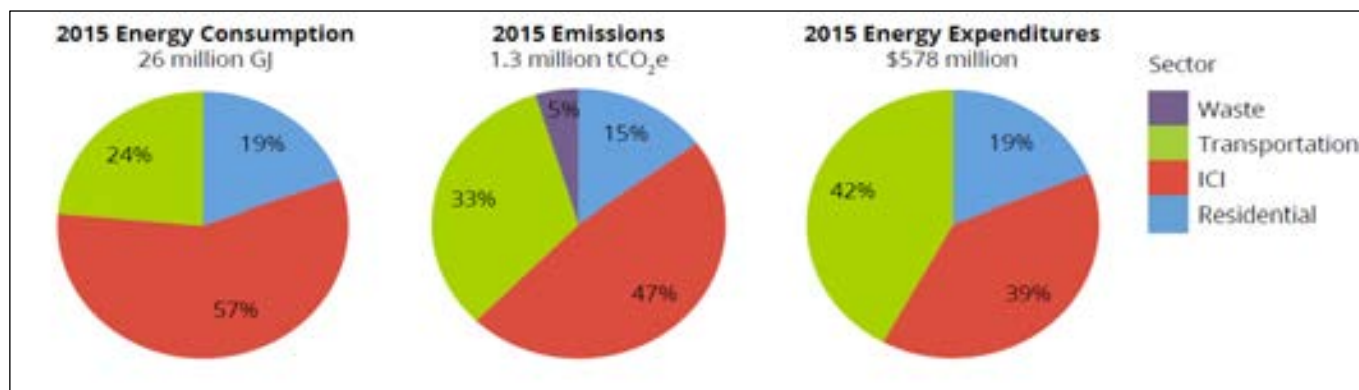
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**Options/Discussion:****Background**

The City of Kingston is committed to reducing greenhouse gas (GHG) emissions from municipal operations and throughout the entire community. The inventory of energy use and emissions for 2015 indicates that gasoline and diesel consumption within the transportation sector was responsible for approximately 33% of our community's total GHG emissions (Figure 1) and over 40% of our entire community's energy purchasing.

Figure 1: 2015 Kingston Community GHG Profiles



Both the Kingston Climate Action Plan and the Ontario Climate Action Plan identify the electrification of transportation as one of the most significant opportunities to reduce GHG emissions and the collective impact on climate change. Each conventional gasoline light duty vehicle replaced with a battery electric vehicle can result in up to a 90% reduction or avoidance in that vehicle's GHG emissions and over a 70% reduction in the cost to fuel it. The Ontario government has set a goal of 5% of all passenger sales being EVs by 2020.

Major barriers to EV ownership have included high purchase cost and anxiety over the availability of charging infrastructure. The Ontario government currently provides significant incentives for the purchase of battery electric and plug-in hybrid vehicles, and for home charging systems, bringing them approximately equivalent in purchase cost to conventionally powered vehicles.

Municipalities, by virtue of their ownership and operation of the roadways and parking infrastructure, as well as recreation and administrative facilities, are in a unique position to help catalyze the adoption of the EV by providing reliable access to charging infrastructure. Municipalities can also take steps to integrate EVs into their fleets, thus increasing public awareness of EVs and normalizing their use.

**Kingston's EV Strategy**

Staff have developed a preliminary strategy to facilitate the adoption of EVs within the municipal fleet and the community in 2017 through 2019. The Kingston EV Strategy sets out a number of initiatives that would:

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1. Convert appropriate light duty municipal fleet vehicles to EVs upon their scheduled replacement dates;
2. Continue monitoring opportunities for electrification of heavy duty municipal fleet vehicles;
3. Install and operate public EV charging stations on municipal property throughout the City;
4. Promote the environmental and economic benefits of EV use to Kingstonians and monitor uptake of EVs locally;
5. Ready local infrastructure for increasing EV charging demand; and
6. Determine demand for EV charging among municipal employees commuting to work.

Each initiative is described in greater detail below.

Implementation of the Kingston EV Strategy will require approval of budget within 2018 and 2019 as described herein. The total budget amounts that would be expended by the City of Kingston could be reduced through the acquisition of grant funding that may be available from several programs as follows:

1. Ontario's Electric Vehicle Charging Opportunities (EVCO) fund;
2. Ontario's Electric Vehicle Incentive Program (EVIP) and Electric Vehicle Charging Incentive Program (EVCIP);
3. The Ontario Municipal GHG Challenge Fund; and
4. The Federation of Canadian Municipalities' (FCM) Municipalities Climate Innovation Program (MCIP) and Green Municipal Funds (GMF) programs.

### **Target Area 1 – Electrification of Municipal Fleet**

#### **Initiative 1A: Purchase EVs for Municipal Fleet Use**

For every new or light-duty replacement vehicle proposed for purchase, the Fleet Services Division and the department purchasing the vehicle are to evaluate the feasibility of a battery electric or plug-in hybrid vehicle instead of a conventional petroleum powered vehicle. The evaluation will consider the operational requirements of the vehicle as well as the financial and technical feasibility of plug-in hybrid or battery electric technologies. In some cases operational requirements may preclude conversion to electric or plug-in hybrid based upon the types of vehicles available for purchase. This evaluation procedure has already been put into effect by Fleet Services and City Council recently approved the purchase of 5 light duty EV's to replace gasoline powered vehicles. The time frame to acquire these vehicles will be impacted by the availability on the market.

An approximate schedule for light duty vehicle replacement with the potential for right sizing and EV replacement is described within Exhibit A. It is important to note that the time frame to acquire these electrical vehicles will depend on availability and serviceability.

**Capital Costs:** The capital cost of purchasing an electric light duty vehicle is expected to be approximately equivalent (i.e. no net increase in capital cost) to a conventional gasoline powered unit when the current \$14,000 per vehicle provincial incentives under the Electric Vehicle Incentive Program (EVIP) are applied. As this technology changes rapidly, the lifecycle costs and replacement costs are not yet known. In addition to the purchase of the vehicle, there

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is a capital cost required to install a charging station for it. The Electric Vehicle Charging Incentive Program (EVCIP) will provide up to \$1,000 toward a qualified charging station for each fleet EV purchased.

With the \$14,000 per vehicle in EVIP incentives, and the \$1,000 per charging station in EVCIP incentives, the net increase in capital cost to the City to acquire the replacements for up to 20 light duty vehicles with EV's is expected to be approximately \$36,000, or \$1,800 per vehicle.

**Operating Cost Impacts:** The cost to operate an EV is expected to be less than a conventional gasoline powered unit. A fuel cost saving of approximately 75% (saving roughly \$300 to \$400 per vehicle per year) is expected. A maintenance cost reduction for EVs is also expected due to the elimination of servicing needs for engine and transmission oils, coolant systems, ignition systems, oil filters, air filters and fuel filters. The Edmunds Inc. True Cost to Own<sup>®</sup> (TCO<sup>®</sup>) online pricing system estimates an approximate 25% reduction in maintenance costs with the electric version of a small vehicle<sup>i</sup> versus its gasoline powered equivalent. Exhibit B provides a comparison of the emissions and costs associated with two similar light duty vehicles.

Operational cost impacts of EV charging will be further minimized by charging vehicles overnight during off-peak time of use periods when electricity costs are lowest.

**GHG Impacts:** Implementation of this initiative is expected to reduce the GHG emissions from replaced vehicles by up to 90%. The total amount of annual GHG reduction is expected to be an average of 0.9 tonnes per vehicle replaced. Replacement of 20 light duty fleet vehicles with EVs could provide a GHG reduction of up to 20 tonnes per year depending on kilometres travelled.

**Implementation Requirements:** Each EV must be provided with one Level 2 EV charger installed at a location where the vehicle will be parked when not in use. Charging of fleet vehicles would be completed overnight, using timers to activate when electricity rates are lowest.

**Risks:** While the operating cost of EVs are expected to be lower than conventional units, there are offsetting risks to the municipality that should be considered. The largest risk identified in moving toward electrification of light duty vehicles is associated with the uncertainty surrounding durability and residual trade-in values if battery warranties have expired and battery replacement costs remain high. Given that trade-in values for existing conventional vehicles are generally about 10% of purchase price, the impact of the risk of having zero trade-in value for EVs would be relatively small at approximately \$2,000 to \$4,000 in lost future revenue per vehicle. The risk associated with premature replacement is mitigated somewhat by the electric car maker's warranty, and that Fleet services has moved from the current 12 year replacement schedule to an 8-year replacement schedule for EVs to correspond with battery warranties currently being offered. If the battery outperforms the manufacturer's warranty, or if the cost of a complete battery pack replacement reduces as many predict, the vehicle replacement timing could potentially be extended beyond 8 years.

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<sup>i</sup> Comparison of cost to own between 2017 Ford Focus electric versus gasoline models, [www.edmunds.com](http://www.edmunds.com)

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### **Initiative 1B: Monitor the Feasibility of Electrifying Public Transit, Heavy Duty and Specialty Vehicles**

Assessments made in 2016 indicated that the capital cost requirements and operational cost implications for electrification of the transit fleet were not yet suitable. The technology of electric transit vehicles is changing rapidly and it is foreseeable that a feasible option may materialize in the near future. Kingston Transit will continue to monitor the state of electric transit fleet offerings and the progress of pilot scale programs being run by the Canadian Urban Transit Research and Innovation Consortium (CUTRIC). Kingston Transit will also evaluate recent funding opportunities through the Ontario Municipal GHG Challenge Fund to potentially procure electric bus units for use on a pilot scale basis.

Kingston Fleet Services Division will also assess heavy duty vehicle procurements for the potential to purchase battery electric or hybrid technologies on a case by case basis. The potential for production of renewable natural gas from municipal solid waste and bio-solids, and use of the generated gas for heavy fleet use is an emerging technology that will also continue to be evaluated in conjunction with conversion to electric.

Kingston municipal departments will also assess the viability of electrification of specialty vehicles (i.e. ice resurfacing machines) and equipment.

**Capital and Operating Cost Impacts:** Capital and operating cost impacts cannot be determined at this point without analysis of emerging technologies that may materialize. Opportunities for grant funding derived from Ontario cap and trade revenues are emerging and will be incorporated into the assessment of heavy duty vehicle electrification.

**GHG Impacts:** None at this stage.

### **Target Area 2 – Support Community Adoption and Use of EVs**

#### **Initiative 2A: Provide Charging Stations for Public Use at Municipal Facilities**

Install and operate up to two Level 3, twenty-five Level 2 and two Level 1 charging stations for public use at municipal parking facilities, recreational facilities and municipal service locations. These locations are identified for consideration but could be amended or removed depending on operational requirements:

1. Two Level 3 (fast 450v DC charging) stations at:
  - a. INVISTA Centre
  - b. Downtown business improvement area (location to be confirmed)
2. Twenty Five Dual Level 2 (standard 220 volt charging) charging spots at:
  - a. Artillery Park Aquatic Centre (1 dual Level 2 station, replaces existing Level 1 stations)
  - b. North side of Clarence Street between Wellington and King Streets (1 dual Level 2 station)
  - c. Chown parking garage (2 dual Level 2 stations)
  - d. KGH waterfront surface parking lot (1 dual Level 2 station)

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- e. INVISTA Centre (2 dual Level 2 stations)
  - f. Hanson parking garage (2 dual Level 2 stations)
  - g. Norman Rogers Airport (1 dual Level 2 station)
  - h. 1211 John Counter Boulevard visitor parking (1 dual Level 2 station)
  - i. 362 Montreal Street visitor parking (1 dual Level 2 station)
  - j. John Machin Sports Fields parking (1 dual Level 2 station)
  - k. Rideau Heights Community Centre (1 dual Level 2 station)
  - l. Portsmouth Olympic Harbour (1 dual Level 2 station)
  - m. Memorial Centre (1 dual Level 2 station)
  - n. Cataraqui Community Centre (1 dual Level 2 station)
  - o. PumpHouse Steam Museum Lot (1 dual Level 2 station)
  - p. Kingston East Community Centre (1 dual Level 2 station)
  - q. Grass Creek Park (1 dual Level 2 station)
  - r. McKee Memorial surface parking lot (1 dual Level 2 station)
  - s. Woodbine Park (1 dual Level 2 station)
  - t. Lake Ontario Park (1 dual Level 2 station)
  - u. Centre 70 (1 dual Level 2 station)
  - v. Belle Park (1 dual Level 2 Station)
3. Two Level 1 (120 volt slow charge) stations to serve non-automotive mobility on the Urban K&P Trail at:
- a. Belle Park
  - b. Douglas Fluhrer Park at the K&P Trailhead

#### Level 1 Charging Station:

- 120V AC supply
- Intended for electric wheelchairs, scooters, e-bikes, etc.
- Up to \$1,500 to install depending on distance to supply

#### Level 2 Charging Station:

- 240V AC supply, approximate current draw is 30 to 60A
- Uses a single phase, special outlet on a dedicated circuit
- Can provide a full charge in 6 to 8 hours
- Up to \$15,000 to supply and install one dual station

#### Level 3 Charging Station:

- 450V DC supply, approximate current draw is up to 400A
- Typically requires dedicated transformer
- Can provide full charge in 30 to 60 minutes
- Up to \$125,000 to supply and install one station
- Especially valuable to those travelling between cities or day visiting Kingston



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A detailed assessment of potential EV charging station locations and refinement of installation effort and cost estimates will be required to support procurement. Assistance in station location will be required from other departments (Recreation & Leisure Services, Parking Operations, Airport, Facilities Management & Construction Services, Culture, Public Works, etc.) so that the stations are of greatest use to facility users and do not interfere with or complicate facility operations. In general, the location of EV charging stations will be determined based primarily on their proximity to electrical supply infrastructure so that installation costs and complexity can be minimized. Station locations will not be placed to provide preferential parking locations. The installation of Level 2 stations will be undertaken to allow for future upgrade to Level 3 fast charging service wherever practical.

Initially, during a 24 month pilot phase, there would be no cost for public charging at Level 1 and 2 stations, other than applicable parking fees required at each location, if any. Level 2 public charging stations would be equipped with technology that will allow for them to be discoverable from smartphones, be able to accept electronic forms of payment, and provide usage status and data (i.e. smart chargers). Stations should also be compatible with pay to park smartphone apps such as Honk™ so that payment for parking and access to charging can be combined once the initial no-pay pilot program has concluded. Because of the exceptionally high value presented to EV users by a Level 3 charging station and the higher cost they present to the municipality, the two proposed Level 3 charging stations would not be included within the 24 month pilot program and would include a charging cost that would be included in the Fees and Charges By-Law.

Exhibit D illustrates typical Level 2 and Level 3 public charger installations in outdoor pedestal and indoor wall mount formats.

**Capital Cost Impact:** Each Level 1 station is estimated to cost \$1,500 to supply, install and commission. Each dual Level 2 charging station is estimated to cost up to \$15,000 to supply, install and commission depending on quality of existing electrical service at each location.

The following capital costs are expected for the supply, installation and commissioning of the proposed Level 1, 2 and 3 public EV charging network:

- \$450,000 (including 20% engineering, procurement and construction management costs) for other Level 1 and Level 2 charging locations
- \$300,000 (including 20% engineering, procurement and construction management costs) for two Level 3 charging stations

At the time of the writing of this report, no incentive programs were available explicitly for public charging stations in Ontario. The Electric Vehicle Charging Ontario (EVCO) grant program may open a second round of applications that the City could apply to for public charging infrastructure, but timing is unknown. Other granting opportunities may be available through the Federation of Canadian Municipalities and Ontario's Municipal GHG Challenge Fund. The City will explore options to partner with the Province on the installation of Level 3 stations located near Highway 401.

**Operational Impacts:** The cost for Level 1 station operation is expected to be negligible.

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Operational costs for Level 2 stations are expected to be up to \$2,400<sup>ii</sup> per dual station per year, which is comprised of additional electrical utility and maintenance costs during the two year pilot phase. At completion of all proposed Level 2 and Level 1 stations, the total annual operating budget impact is expected to be approximately \$35,000 in electricity costs and \$25,000 for station maintenance. Following the completion of the 24 month pilot program period, it is staff's intention to apply a rate that will help to partially or wholly offset the operational and maintenance Level 2 stations costs as these costs will be included in the host departmental operational budgets.

Granting opportunities may be available which may cover part or all of these operating costs during the 24 month pilot program phase.

The installation of Level 2 charging stations will include placement of conduit and other appurtenances that would facilitate a future upgrade to Level 3 service, if required and where practical.

Operation of the Level 3 charging stations will require a dedicated data connection to allow for data collection and point of sale transactions. The annual operating cost of a Level 3 charging station is comprised of network connection fees, software licensing fees, scheduled maintenance and electricity consumption, and is estimated to be approximately \$11,000/year per station. The collection of a \$10 to \$15/hour fee for charging at Level 3 stations may offset these operating costs but full cost recovery is considered unlikely until the number of EV's within Kingston significantly increases and station utilization increases accordingly.

The proposed public EV charging stations are intended to service EV users and will require the creation of by-laws that enable the City to place signage restricting the use to electric vehicles, and the issuance of tickets and towing for illegally parked vehicles. An amendment to the City's Fees and Charges By-Law will also be required to permit the collection of fees for the Level 3 stations and, once the pilot phase has ended, for the Level 1 and 2 stations. Facilities Management & Construction Services will coordinate the maintenance of Level 2 and Level 3 stations.

**GHG Impacts:** The GHG reduction potential of providing public EV charging stations cannot be definitively quantified but is expected to be large if EV use is stimulated. Based upon the gasoline component of the 2015 Community GHG Emissions Inventory, for each 0.1% increase in EV use and corresponding 0.1% decrease in petroleum fueled vehicle use, Kingston could expect to see a decrease of up to 400 tonnes of GHG emissions per year. If the provincial goal of 5% of all new passenger vehicles being EV's is achieved, then an annual GHG emission reduction of up to 20,000 tonnes may be realized, equivalent to a 1.5% reduction in total community emissions for Kingston.

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<sup>ii</sup> Assumes an average of 2 hours of use per day at an average of \$0.175/kW hour for 365 days per year plus a \$1,000 annual maintenance allowance per station.

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**Initiative 2B: Promote and Evaluate EV Use**

Utilize existing municipal media instruments to promote the availability of new Level 1, 2 and 3 charging stations at municipal facilities, and utilize surveys and charging data to determine station use, EV ownership, trends in local EV ownership and preferred charging locations.

**Initiative 2C: Ready the Kingston Hydro Local Electrical Distribution Network for Future Residential and Commercial EV Charging Demand**

Kingston Hydro should continue to forecast and assess implications of future EV charging demands by residential and commercial customers and future building code requirements for EV charging within their service area and integrate into electrical distribution system planning. Kingston Hydro is currently undertaking this work (2017 and ongoing).

**Initiative 2D: Ready New Construction for EV Charging**

The City's Municipal Green Building Policy will be updated to ensure that the incorporation of public, fleet and employee electric vehicle charging is considered for all new facilities.

**Target Area 3 – Support Municipal Employee Use of EVs****Initiative 3A: Determine Existing and Future Employee EV Demand**

Staff will consult with City and UK employees to determine present and future demand for EV charging for municipal employees' personal vehicles, and whether investment in EV charging within employee parking areas is warranted and feasible.

Staff will report back to Council at the end of the 2 year pilot project with recommendations on any changes that should be implemented including upgrades and/or removal of stations.

**Existing Policy/By-Law:**

Amendments to the Fees and Charges By-Law and others will be required to permit the City to collect fees for charging and to allow for posting of signage and enforcement of EV only parking at EV charging stations.

**Notice Provisions:**

Not applicable

**Accessibility Considerations:**

The installation of EV charging infrastructure on municipal properties and within the streetscape must not create barriers to mobility or access for those with disabilities, or other accessibility challenges, and must comply with the Accessibility for Ontarians with Disabilities Act (AODA) and the City's Facility Accessibility Design Standards (FADS).

**Financial Considerations:**

Implementation of the proposed Kingston EV Strategy would require inclusion of the following amounts within capital and operating budgets:

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Initiative	Capital	Operating
1A Conversion of Municipal Light Duty Fleet to EV 2018-19	\$9,000 for fleet EV chargers in 2018 \$27,000 for fleet EV chargers in 2019	Minimal change anticipated.
2A Install and Operate 25 Level 2 and 2 Level 1 Public EV Charging Stations	\$450,000 in 2018	\$35,000 in electricity cost, \$25,000 in maintenance in 2018 and 2019 pilot phases of the program (offsetting revenues expected to begin after 24-month pilot phase).
2A Install and Operate 2 Level 3 Public EV Charging Stations	\$300,000 in 2018	\$12,000 in electricity cost, \$10,000 in maintenance annually (offsetting revenues expected to be small but to increase over time).
2B Promote and Evaluate EV use in 2018/2019	\$10,000	
<b>Totals</b>	<b>\$796,000</b>	<b>\$82,000/year (offsetting revenues expected to reduce net municipal contribution over time).</b>

It is recommended that up to \$796,000 be approved in the 2018 capital budget to be funded from the Environmental Reserve Fund and that up to \$82,000 be approved for annual operations in 2018 and 2019 to be funded from the Working Reserve Fund. If approved, staff will begin seeking grant monies to assist in funding the EV strategy, and shall provide updates to Council as appropriate.

Incentives available through Ontario's Electric Vehicle Incentive Program (EVIP) and Electric Vehicle Charging Incentive Program (EVCIP) to support the purchase of electric light duty fleet vehicles and associated fleet charging stations can be relied upon as long as those programs continue.

Staff are hopeful that some of the capital costs required for the installation of Level 1, 2 and 3 public EV charging stations can be secured in the form of grants from one or more of the following potential funding programs:

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1. Ontario's Electric Vehicle Charging Opportunities (EVCO) fund;
2. The Ontario Municipal GHG Challenge Fund;
3. The Federation of Canadian Municipalities' (FCM) Municipalities Climate Innovation Program (MCIP) and Green Municipal Funds (GMF) programs.

Staff will also pursue grant funding to cover costs associated with the operation of public EV charging stations during the 24 month pilot phase when there will be no fee to charge.

In 2016, City Council approved ([Report Number 16-078](#)) the City's participation in two consortium applications to Ontario's Electric Vehicle Charging Opportunities (EVCO) Program to fund installation of public EV charging stations within Kingston. The applications made to EVCO were not successful and a second round of EVCO intake has not been announced.

**Contacts:**

Paul MacLatchy, Environment Director, Real Estate & Environmental Initiatives

**Other City of Kingston Staff Consulted:**

Sheila Kidd, Director, Transportation Department

Speros Kanellos, Director, Facilities Management & Construction Services Department

Luke Follwell, Director, Recreation & Leisure Services Department

Kevin McCauley, Director, Measurement & Communication, Utilities Kingston

Lana Foulds, Manager, Financial Planning

**Exhibits Attached:**

Exhibit A Pending and Potential Municipal Light Duty Fleet Replacements 2017-2019

Exhibit B Comparison of GHG Emissions and Operating Costs for Two Similar Light Duty Vehicles

Exhibit C Locations of Existing and Proposed Public EV Charging

Exhibit D Typical Public EV Charging Stations in Pedestal and Wall Mount Configurations

### Pending and Potential Light Duty Fleet Replacements 2017-2019

Replacement Year	Department	Vehicle	Status
2017	Real Estate & Environmental Initiatives	Ford Escape	RFP for EV replacement issued Aug 2017
	Social Services	Toyota Echo	
	Social Services	Toyota Echo	
	Licensing/Enforcement	Chevy Cruze	
	Clerk's Office	Toyota Echo	
2018	Facilities Management & Construction Services	Dodge Caravan	TBD
	Building Inspection	Chev S10	Retire without replacement
	Building Inspection	Ford Ranger	Retire without replacement
	Building Inspection	Ford Ranger	Retire without replacement
	Transit	Dodge Caravan	Replace with EV or Plug-In Hybrid
	Transit	Dodge Caravan	Replace with EV or Plug-In Hybrid
2019	Building Inspection	Ford Ranger	TBD
	Building Inspection	Ford Ranger	TBD
	Licensing/Enforcement	Ford Ranger	TBD
	Licensing/Enforcement	Ford Ranger	TBD
	Transit	Toyota Prius Hybrid	Replace with EV or Plug-In Hybrid
	Transit	Toyota Prius Hybrid	Replace with EV or Plug-In Hybrid
	Transit	Ford C-Max Hybrid	Replace with EV or Plug-In Hybrid
	UK- Technical	Dodge Caravan	TBD
	UK – Gas & metering	Chev Uplander	TBD

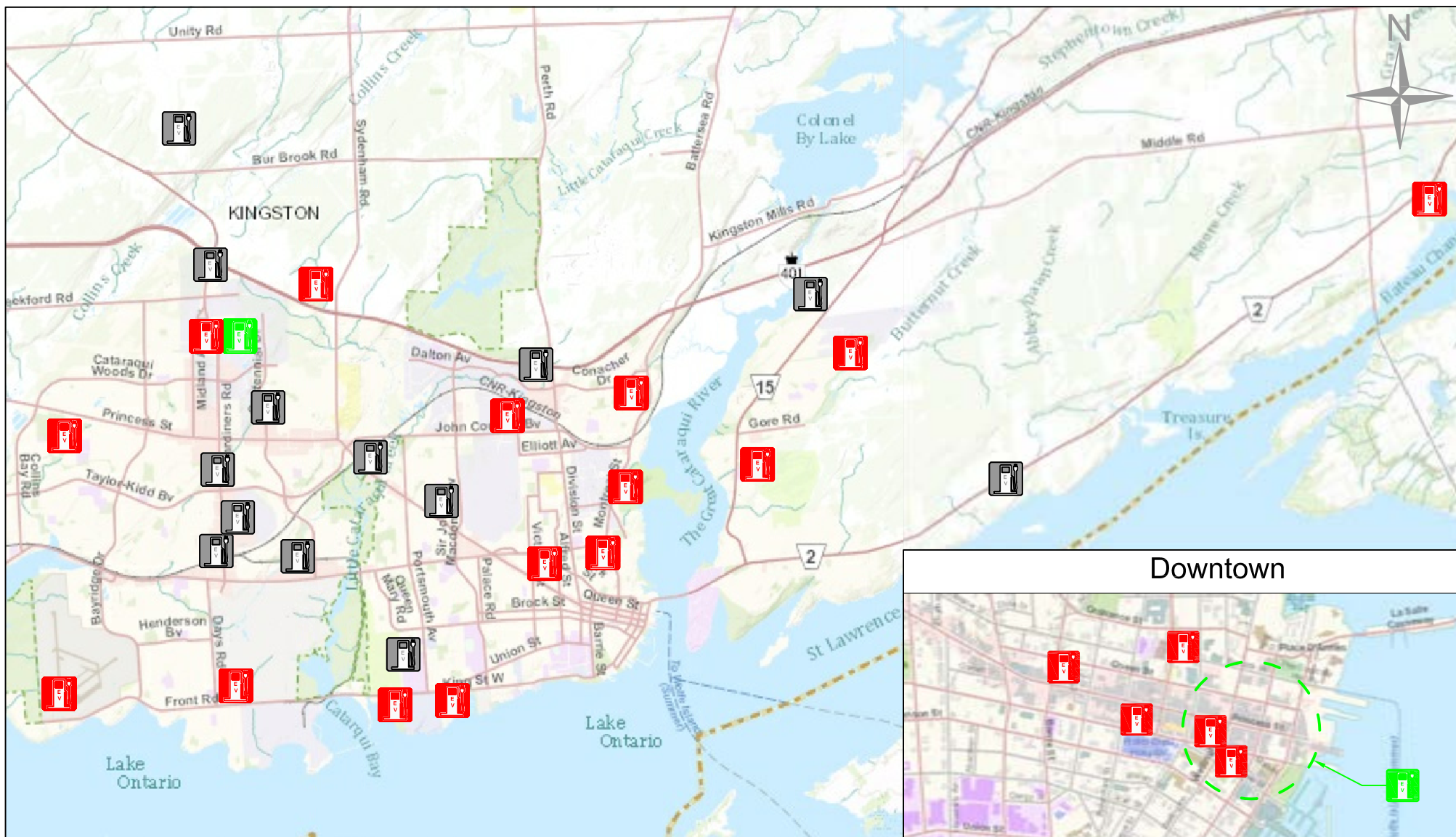
## Comparison of GHG Emissions and Costs for Two Similar Light Duty Vehicles

### Fuel Cost for Similar EV and Gas Vehicles Driven 20 Kilometres/Work Day

	Fuel	Fuel Cost	MSRP	Annual Fuel Cost	Annual Carbon Emissions	Range per Charge
2017 Nissan Rogue	gasoline	\$1.10/litre	\$25,948 <sup>i</sup>	\$470	1 tonne	n/a
2017 Kia Soul EV	electricity	\$0.10/kWh <sup>ii</sup>	\$21,395 <sup>iii</sup>	\$103	0.1 tonnes	150 km

- i. MSRP from Nissan.ca
- ii. Electricity cost during off-peak charging hours
- iii. \$35,395 MSRP from PlugNdrive.ca net of \$14,000 rebate from the [Ontario Electric Vehicle Incentive Program](#)
- iv. A \$3,000 (\$2,000 net of the EVCIP rebate) cost for supply and installation of one non-public Level 2 charger would also be required for the EV option.

# Existing and Proposed EV Charging Stations



## Legend:



Proposed Municipal Level 2 Station

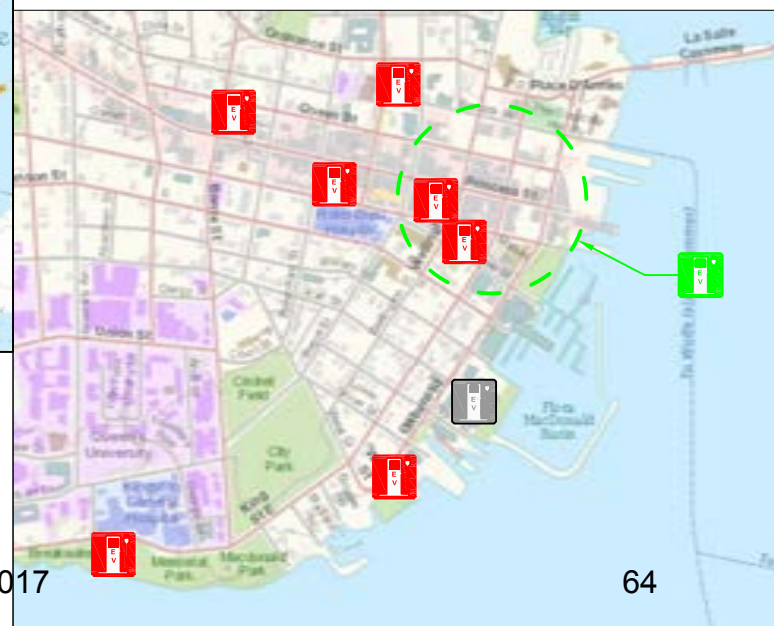


Proposed Municipal Level 3 Station



Existing Private Station, Limited Public Access

## Downtown





## Examples of Public Charging Station Configurations



Level 2 EV Charging Stations (from [suncountryhighways.ca](http://suncountryhighways.ca))



Level 3 Fast Charge Station (from [fleetcarma.ca](http://fleetcarma.ca))