

Andrew Robertson

Carbon Neutrality & Electric Vehicles

in Toronto's Financial District

June 2022



CONTENTS

SUMMARY	1
BACKGROUND	2
Net Zero	2
Electric Charging Basics	2
Low-Emission & Zero-Emission Vehicles.....	2
A Common Goal.....	2
INTRODUCTION	3
TransformTO	3
Short-Term Implementation Plan.....	3
Toronto Green Standard	3
Net Zero Existing Buildings Strategy	3
Electric Vehicle Strategy	4
Charger Installations	4
Current Implementation	4
IMPACTS & CHANGES.....	6
Infrastructure.....	6
Traffic.....	6
Public & Private Space	6
OTHER CITIES	7
New York City.....	7
Montréal	7
Vancouver	9
Boston	9
REFERENCES	I

SUMMARY

What's here?



By 2030, 30% of cars in Toronto should be electric, and transit reliability should increase (Corporate Services, 2021).

- The impacts of climate action strategies, including Toronto's *Electric Vehicle Strategy*, on the Financial District's public realm.
- High-level analysis of infrastructure requirements, traffic impacts, and the use of public and private space.
- Jurisdictional scan of other similar strategies in comparable cities.

Toronto, like most North American cities, has agreed to have no net greenhouse gas emissions by 2050. This is part of the C40 cities' agreement, related to the Paris climate change agreement. Toronto is aiming for a 2040 net-zero date as Council believes the city can and should meet the deadline ten years early.

However, this will require continuous and determined change. The City of Toronto has set out several interlocking strategies to make the 2040 date. This will, necessarily, affect existing & new buildings and public spaces downtown, including in the Financial District.

This is an overview of common net-zero and electric vehicle (EV) terms and technologies, a look at Toronto's current strategies on this front, how these strategies may affect the Financial District's public realm, and what other cities are doing.

Toronto's strategies start lightly and slowly become more restrictive over time. This is intended to reduce drastic change in exchange for continuous gradual change. New buildings are targeted first, with retrofits for existing buildings coming later. Larger and City buildings are expected to lead the way, with changes

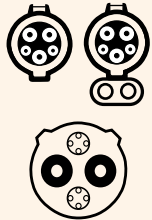
such as on-site electricity generation, natural gas being phased out, and car charging capability being installed in all new parking spots (both public and private).

This is anticipated to make the public realm more enjoyable for the public: traffic and noise will be reduced, outdoor surfaces will be cleaner, and shaded gardens will be more common.


Toronto is positioned well in comparison to other cities. New York, Montréal, Vancouver, and Boston all have similar strategies, and Toronto has already started implementation, like all the cities on this list. Toronto's built-form plans are in good company, but it lags in its implementation of its transportation and EV policies. However, determination is the important factor, and in that regard, Toronto's plans with their technical backing and specific steps are well-placed.


BACKGROUND

What is “net zero” and what does that entail?



Level 2 J1772 (top-left ↖), Level 3 CCS 1 (top-right ↗) & Level 2+3 CHAdeMO (bottom ↓) plugs. ↖J1772 fits CCS 1 ↗ but not the reverse.

 Tesla chargers are considered Level 3, but since they are proprietary, they tend not to be ignored. Teslas can plug into any Level of charger with an adaptor, but other vehicles cannot plug into Tesla chargers.

 Electric cars do not have to fully charge to be useful. Charge times are often given in km/h or km/min (range per charging time), so a driver can charge only as much as they need to.

Payment for charging can either be done by the hour (like a traditional parking spot), by the unit of electricity (kWh) (like a building's hydro meter), or a hybrid model (such as by kWh while charging, and by time when done). Charging by time prevents loitering and frees up unused chargers (Vancouver, 2016).

NET ZERO

“Net zero” is a goal where greenhouse gas emissions are reduced as much as possible. For any remaining emissions, these are “offset” by taking the equivalent gases out of the air and storing them permanently (Toronto & Live Green Toronto, 2021a).

Many (if not all) net-zero strategies rely on “heat pumps”: an air-conditioner-like machine that can move heat outside in the summer and capture heat from winter air and move it inside, too. They are incredibly efficient, and compatible with any building that already has an air conditioner.*

Some net-zero strategies (although not Toronto’s) rely on “renewable natural gas” (RNG): natural gas that is not mined, but is produced from decomposition or synthetic processes. It is intended to be interchangeable with natural gas (Con Edison et al., 2021).

ELECTRIC CHARGING BASICS

Electric cars or electric vehicles (EVs), are essentially the same as existing gasoline-powered vehicles, except they are powered by batteries which need to be plugged in to charge. Such cars can plug into a standard wall socket to charge, but they often have their own chargers, which decrease charging time significantly. These are classified into “levels”:

- **Level 1:** A standard 120V wall socket. These take about 24 hours to charge, and are typically last resorts.
- **Level 2:** A 240V charger, typically plugged into a dryer/stove outlet installed by an electrician. These tend to come with two types of car plugs (**top-left**) and are the most common. These take about 6 hours to charge.

- **Level 3:** “Fast-chargers” that take about 45 minutes to charge. These are rare, and not installed in homes.†

(ChargeHub, 2020; Pollution Probe & Delphi Group, 2018; New York City Mayor’s Office of Sustainability & New York City DOT, 2021)

LOW-EMISSION & ZERO-EMISSION VEHICLES

A “low-emission vehicle” (LEV) is any vehicle that does not create many emissions in operation, such as a hybrid, small engine, or natural-gas car (U of T Mississauga, 2020).

A “zero-emission vehicle” (ZEV) is any vehicle that does not produce toxins in operation. This includes electric cars and hydrogen cars (Pollution Probe & Delphi Group, 2018).

Once cities have legally defined these vehicles (typically by adopting state, provincial, or federal standards), they can set up Low-Emission Zones (LEZs) and Zero-Emission Zones (ZEVs). These are areas of the city where only vehicles meeting these requirements are allowed to drive. This differs from, and is not mutually exclusive with, a congestion charge, which tolls drivers in certain areas or at certain times for the privilege to drive on the street (Dunsky Energy Consulting, 2019, *Action 5*).

A COMMON GOAL

All of the cities investigated here are **C40 cities**: they have committed to take action to help meet the **Paris Climate Agreement**. North American cities are expected to be world leaders, and as such, many have similar goals (Google, 2022a).

† A Level 3 charger cannot charge a Level 2 car, but Level 3 cars can charge on Level 2 chargers; i.e. chargers are not downwards compatible, but cars are. Level 3 charging is an option on some cars (General Motors of Canada Company, n.d.). See **sidebar** for standardized plugs used in North America.

* This video series provides an excellent summary of heat pumps: https://www.youtube.com/watch?v=7J-52mDjZzto&list=PLvOjwu7G_DFVIotubOZdR-KC-LF-dOVqi&index=1

INTRODUCTION

What is Toronto doing?

Nothing happens in a municipality until a by-law says it does. As such, a plan or strategy is just an idea until it is implemented by by-law.



As such, not all policies shown here may be the rule. An effort has been made to track down applicable Toronto by-laws, but this is not intended to be a complete or official list of North American net-zero implementations.

TransformTO

Toronto's main net-zero strategy is called *TransformTO* and has been enacted by by-law (TransformTO - Critical Steps for Net Zero by 2040, 2021).

TransformTO implements several other plans and policies that each contain specific actions for various parts of city life. TransformTO itself was created based on recommendations from an earlier technical report (Toronto & Live Green Toronto, 2021b). Other plans and policies also exist in Toronto that are not part of TransformTO, but nonetheless complement it.

TransformTO standards become gradually more restrictive over time to meet Toronto's 2040 net-zero goal. Early adopters of upcoming standards are rewarded, typically with property or development tax rebates (Deputy City Manager & Toronto, 2021; Toronto & Live Green Toronto, 2021b). In this way, the City expects no changes to be too drastic. The strategy calls upon other strategies for implementation, sorted by category:

SHORT-TERM IMPLEMENTATION PLAN

This part of TransformTO contains direct steps that Toronto can take before 2025 to meet their intermediate 2030 goals. New construction standards are implemented, public outreach is started, and the first phase of existing building plans start which include annual emissions

reporting, initial natural gas phase-out, and zoning modifications to allow easy installation of green technologies. Mainly, however, the City will be taking this time to implement and test their strategies themselves. Electric vehicles and bikes will also be phased in, with 30% of Toronto vehicles electric by 2030; *ActiveTO* will be expanded, and electric delivery options will be encouraged in the form of electric trucks or e-bikes. Major changes for existing buildings generally do not occur in this plan; the City is focusing on changing new construction and habits (Corporate Services, 2021).

TORONTO GREEN STANDARD

Enacted by its own by-law (Toronto Green Standard Review and Update, 2021) and encouraged by TransformTO, the *Toronto Green Standard* applies to buildings being built. It is sorted by category (residential, commercial, and industrial) and then size, with different standards that must be met for each category. Checklists are available for simplicity. It is available in different "Tiers", with higher, stricter tiers being voluntary (with reward) for now, but gradually becoming mandatory (Toronto, 2022).

NET ZERO EXISTING BUILDINGS STRATEGY

This is the Toronto Green Standard for existing buildings. The City will provide support for smaller buildings, but expects large buildings to lead by example. As this is not part of the Short-Term Plan, there are no hard targets, yet. Up-front costs are expected to be high, but operations costs will be lower while providing cleaner air and improved comfort. Heat pumps are strongly encouraged, but the City sets targets, not methods, so there is flexibility in implementation. Large buildings should consider generating their own electricity. Buildings will be required to publicly report their progress (to encourage compliance). Early adopters will be supported with tax rebates (Deputy City Manager & Toronto, 2021).



C40 cities have made a declaration to collectively halve their greenhouse gas emissions by 2030 to keep with the Paris Climate Agreement (Google, 2022a). As such, member cities in North America can all be expected to have similar climate strategies (Montréal, 2019).



ELECTRIC VEHICLE STRATEGY

The *Electric Vehicle Strategy* is enacted by its own by-laws and the City has already started implementation (Dunsky Energy Consulting, 2019; On-Street Electric Vehicle Charging Stations - Pilot Conclusion and Next Steps, 2022). It compliments TransformTO.

The Electric Vehicle Strategy sets goals for the number of electric car chargers installed, area types the City will be focusing on, financing possibilities, and potential effects on City life.

The City will prefer to install chargers near public amenities such as washrooms, parks, and shelters; near businesses with a lot of car commuters; in residential neighbourhoods with long-distance drivers; and other areas identified as high-priority and capable of supporting charging infrastructure.

The City suspects that once adequate home chargers are installed, downtown chargers may not be used as much, however, visible public chargers are important in reducing range anxiety (where drivers worry that their car will run out of batteries) and normalizing electric cars. The City of Toronto appears to see charging as an overnight at-home task, and so is not currently investing much in

Level 3* fast-chargers or municipal downtown chargers. City policy is silent on visitors and tourists, who would presumably benefit from, and look for, high-quality chargers.

Once sufficient chargers have been installed and electric car uptake is on the rise, a Low-Emission Zone (LEZ) may be implemented.

Electric cars will make streets quieter (like King St E is today) and will reduce the need for cleaning, as electric cars produce less soot (Dunsky Energy Consulting, 2019).

CHARGER INSTALLATIONS

Currently, the City is conservative about deciding where to put chargers: to minimize impact, essentially only existing, rarely-used spots are converted. Parking must already be allowed at all hours. This will evidently have to change if electric car charging is expected to catch on. The City realizes this and is currently finalizing its installation plan, to be released in 2023 (Dunsky Energy Consulting, 2019).

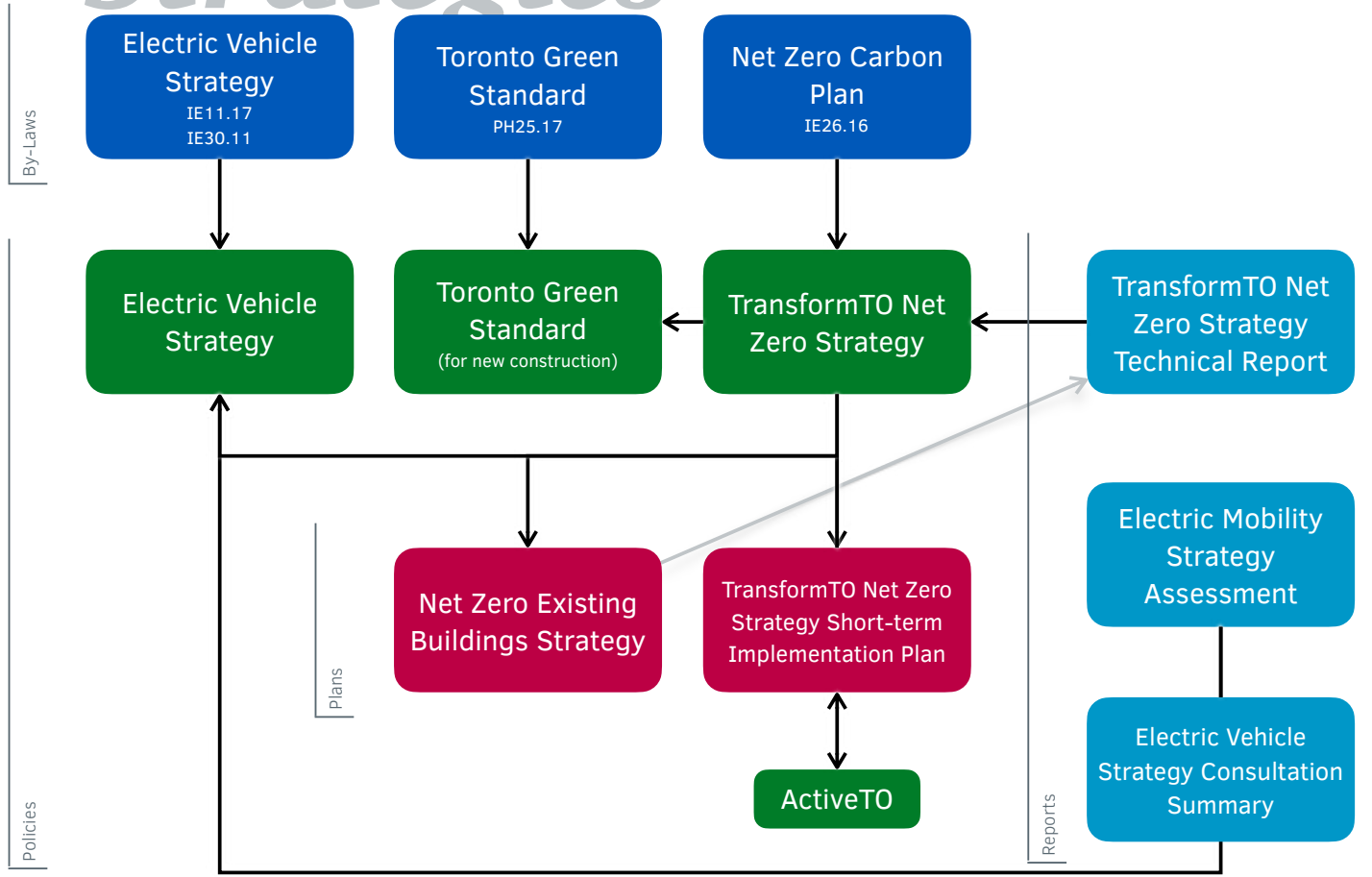
* Which Toronto calls “DCFC” for Direct-Current Fast Charging

CURRENT IMPLEMENTATION

The City has currently installed eight chargers to see how the program will work. They have been met with mild success, and the City will install 32 by the end of 2022 (On-Street Electric Vehicle Charging Stations - Pilot Conclusion and Next Steps, 2022). New chargers will primarily be installed in residential areas, as home charging is more popular and public

charging can be provided by private companies. These municipal chargers have been and will be used to experiment with pricing. Currently, hourly prices with different rates for night and day have been found to be effective. Current prices are approximately the same as a standard paid spot, but may increase slightly (Toronto & Transportation Services, 2022).

Toronto's Green Strategies



Andrew Robertson, May 16, 2022

Toronto's green strategies are made up of many interlocking parts that together are intended to make life in the City more comfortable and meet the City's 2040 Carbon emission goals (TransformTO - Critical Steps for Net Zero by 2040, 2021).

Toronto's green strategies encompass all aspects of city life, with many similar strategies that are intended for different sectors. For example:

- Net Zero Existing Buildings Strategy → Existing Private Buildings
- Net Zero Carbon Plan → City Buildings
- Toronto Green Standard → New Buildings
- Electric Vehicle Strategy → Public Realm

IMPACTS & CHANGES

What could happen in the Financial District?

INFRASTRUCTURE

- Natural gas will be phased out, heat pumps will be phased in (Corporate Services, 2021)
- All parking spots will, eventually, have to have car chargers installed (Pollution Probe & Delphi Group, 2018, p. 30)
- Large buildings should generate their own electricity to help power their new car chargers (Deputy City Manager & Toronto, 2021)
- Public chargers will be installed near washrooms, shelter, green space, businesses, and employers with long-distance commuters; but homes will be prioritized (Dunsky Energy Consulting, 2019, p. 15)
- City of Toronto may offer bulk pricing on new technologies to reduce costs (Deputy City Manager & Toronto, 2021, p. 89)

TRAFFIC

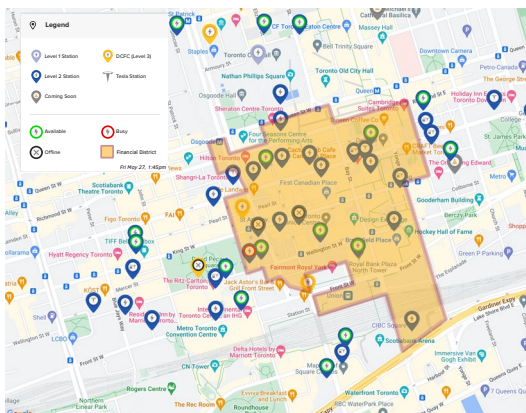
- A LEZ may be implemented (Dunsky Energy Consulting, 2019, p. 21)
- Driving will be encouraged as a last resort after active transportation, public transit, and shared vehicles (Toronto, 2021)
 - » Less street space will be devoted to cars (Toronto & Live Green Toronto, 2021b, p. 54)

- Electric scooters may become more common, and could be available at bike-share stations (Dunsky Energy Consulting, 2019, p. 9)
- Cargo bikes may replace trucks for deliveries, especially in dense areas (Pollution Probe & Delphi Group, 2018)
- Bike parking spots will become mandatory at TTC stations (TransformTO - Critical Steps for Net Zero by 2040, 2021, p. 5)

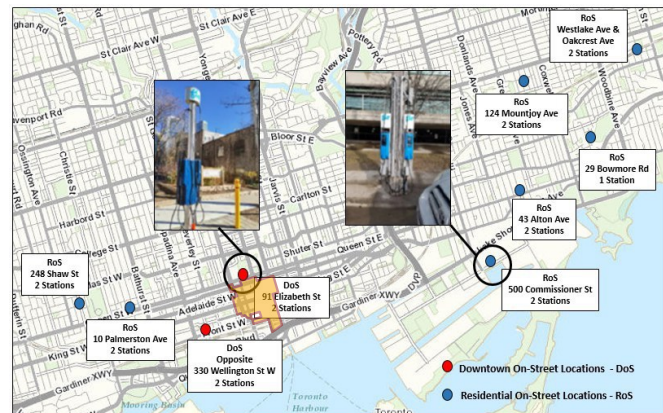
PUBLIC & PRIVATE SPACE

- For new construction, high-quality bike parking will have to be provided (Toronto, 2022)
- Public gardens with bike parking may be formed from reclaimed space (Toronto, 2019, p. 105: *Fairford Parkette*)
- Hard surfaces will be partially phased out to reduce stormwater runoff and to provide more shade as part of “Green Streets” (Toronto, 2022)

“Active transportation” is transportation the way it was for centuries: anything that is self-powered including walking, scootering, cycling, wheelchair rolling, rollerskating, and skateboarding.



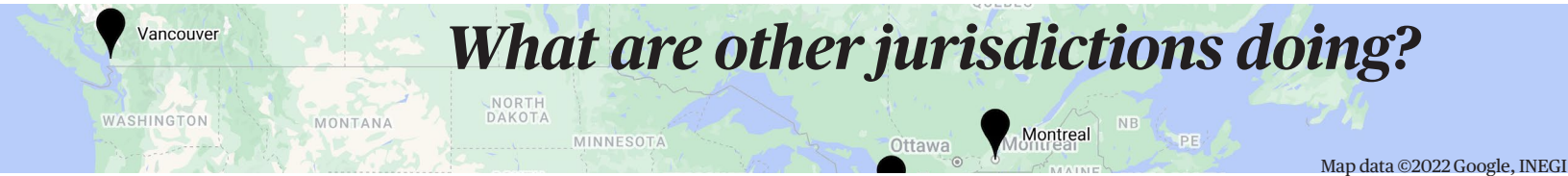
Current location of publicly-accessible private & municipal chargers in downtown Toronto (Google, 2022b). City-run chargers (right) make up a small



subset of this (Toronto & Transportation Services, 2022), with most chargers being in privately-owned parking.

OTHER CITIES

What are other jurisdictions doing?



To an extent, the story is the same everywhere: cities will have to undergo an extensive green retrofit, governments and large land-owners will have to lead the way, and how society thinks of transportation will have to change. However, the implementation of this varies by culture and geography, with each city having its own take. Toronto does not have all the ideas, but is generally on-par with these cities. Some notable features of each city’s strategies are presented here:

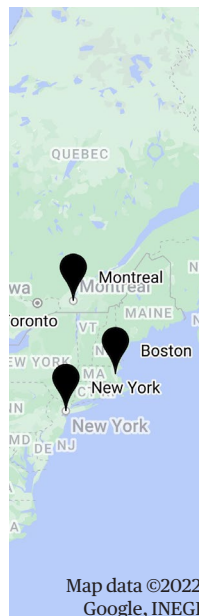
NEW YORK CITY

New York’s plans deviate from Toronto in two significant ways: charging is an urban attraction, not just an at-home activity, and deliveries feature prominently.

New York City currently has an extensive truck management plan, and their new strategy, *Delivering New York*, plans to build on that. BIAs are going to be leveraged to co-ordinate deliveries: buildings will coalesce their deliveries, deliveries will be to central self-serve post-office-like hubs, and off-peak deliveries will be encouraged. New York expects to slowly transition trucks to electric, which will require downtown chargers, and to increase the amount of cargo bikes in the city to reduce the amount of trucks overall (New York City DOT, 2021).

Electrifying New York is the main electric car plan. New York, like Toronto, expects electric cars to be a last resort to be used after all other forms of transport are exhausted. To increase electric car uptake, electric cars will receive toll discounts and access to HOV (◇ diamond) lanes, and exciting electric branding will be used (some-

- Other cities emphasize branding
- Vancouver makes their plans simple and easy-to-follow, with different levels of detail available
- Policy is similar by city (with emphasis on 2050 & 2030 goals), but presentation differs
- Toronto phases out natural gas, other cities phase it in
 - Other cities do not have ready access to nuclear or hydro electricity*
- New York emphasizes trucks & delivery (“goods movement”)



thing Toronto lacks) (New York City Mayor’s Office of Sustainability & New York City DOT, 2021). Electricity will be paid by amount used (New York, 2022), not time, with the potential for drivers to buy a metered cord to plug into any available public hydro pole (New York City Mayor’s Office of Sustainability & New York City DOT, 2021). Level 2+3 quick chargers will be installed in community hubs to attract drivers to local businesses, with the rapid charging encouraging turnover. 80 are expected by 2025 (Gastel & Morales, 2021). There are currently 92 “curbside” Level 2 chargers. This does not include parking-garage chargers, and more chargers are to be installed soon (New York, 2022). The City of Toronto currently sees limited use for municipal Level 3 chargers, although is prepared to upgrade to them in the future (Pollution Probe & Delphi Group, 2018; Dunskey Energy Consulting, 2019).

MONTRÉAL

Montréal’s strategy mainly focuses on shrinking transportation and making new construction more eco-friendly.

Montréal currently has a pilot project that, like New York, uses post-office-like delivery hubs where trucks drop off their wares and small electric trucks or bikes will then complete the delivery in the neighbourhood. Eventually, each neighbourhood will have one of these (Montréal, 2021).

On the passenger side, Montréal is promoting electric bikes, with 725 added to the municipal rental fleet in 2021 for a total of 2100 across the city (Luft, 2021).

In terms of electric cars, 600 new chargers will be added by 2023, plus 60 fast-chargers. There are currently 1000 municipal chargers in the city. By 2023 a LEZ will be established and by 2030 a ZEZ. Montréal hopes to encourage electric industries to come to the city, and hopes to host expos to show electric innovation and to promote electric cars to drivers (Montréal, 2021).

In terms of building construction, like Toronto, Montréal will publicly rate buildings to help ensure compliance. *Bioclimatic* (i.e. integrated and working with its environment) buildings will be preferred in permit approval.

*This may be no longer be true in Toronto if Pickering Nuclear closes in 2025 without replacement (Chown Oved & Lorinc, 2022)

PRESENTATION

HOW DO THESE PLANS LOOK TO THE PUBLIC?

TORONTO

Toronto's GHG emissions. This means that switching from fossil fuel-powered vehicles to electric vehicles is important for reducing GHG emissions in Toronto and meeting the City's goal of achieving net zero GHG emissions by 2040.

Electric vehicles have other benefits, too. They cost less to operate and don't have tailpipe emissions, helping to reduce air pollution. They are also quiet, helping to reduce noise pollution.

More information about EVs is available on the [Plug'n Drive website](#). You can test-drive an EV and learn more about EVs at the [Electric Vehicle Discovery Centre](#). Plug'n Drive is a non-profit organization committed to accelerating the adoption of electric vehicles in order to maximize their environmental and economic benefits.

Environment & Energy Division
City of Toronto
Metro Hall
55 John Street, 2nd Floor
Toronto, ON M5V 3C6
Email: transform@toronto.ca

Related Information

- TransformTO
- Air Quality
- Federal EV Incentive
- Used EV Incentive
- Toronto Green Standard
- Home Energy Loan Program
- Energy Retrofit Loans
- The Pathway to Sustainable City of Toronto Fleets
- TTC Green Initiatives

Electric Vehicle Strategy

Toronto's first [Electric Vehicle \(EV\) Strategy](#) was approved by City Council on January 29, 2020.

With a focus on the electrification of passenger vehicles (cars, vans, trucks and SUVs) the Strategy identifies 10 actions the City can take to: increase charging availability, address cost and convenience barriers, increase public awareness and education, and create economic opportunities that will benefit the local economy. Passenger cars and trucks accounted for about 26 per cent of GHG emissions in Toronto in 2019.

Read the [EV Strategy Staff Report](#) for more information.

Assessment Phase

The City contracted Pollution Probe and The Delphi Group to lead the development of a comprehensive review of the current electric mobility landscape, existing policies, barriers and opportunities, best practice, convene key stakeholders and assess these findings to create a baseline. The assessment phase report was used to inform the Strategy actions. Learn more: [Electric Mobility Strategy Assessment Phase Report](#)

Consultation

The City engaged the public and stakeholders through multiple workshops and a public online survey to help co-create the Electric Vehicle Strategy. Learn more: [Electric Vehicle Strategy Consultation Summary](#)

TransformTO – Toronto's Climate Action Strategy

TransformTO is Toronto's ambitious climate action strategy. Unanimously approved by City Council in July 2017, it includes a set of long-term, low-carbon goals and strategies to reduce local greenhouse gas emissions and improve our health, grow our economy, and improve social equity.

On October 2, 2019, City Council voted unanimously to declare a climate emergency and accelerate efforts to mitigate and adapt to climate change, adopting a stronger emissions reduction target of net zero by 2050 or sooner.

NEW YORK

NYC Resources 311 Office of the Mayor

MOTORISTS & PARKING

Electric Vehicles

Benefits
EVs in NYC
Charging EVs
Curbside Level 2 Charging Pilot
DC Fast Charger Program
Map of EV Charging Stations
Presentations
Reports

There has never been a better time for car owners to go electric. Electric vehicles (EVs) are becoming much more affordable, battery range is increasing, and more models are hitting the market.

EVs run at least partially on electric energy. Much like vehicles that run on fossil fuels such as gasoline or diesel, EVs include cars, trucks, and buses. EVs may run entirely or partially on battery power or on electricity generated from a hydrogen fuel cell.

EVs run at least partially on electric energy. Much like vehicles that run on fossil fuels such as gasoline or diesel, EVs include cars, trucks, and buses. EVs may run entirely or partially on battery power or on electricity generated from a hydrogen fuel cell.

Electric Vehicle Charging in NYC

Watch on YouTube

Benefits of EVs

Compared to conventional vehicles, EVs have:

- Lower emissions
- Less noise
- Discounts on tolls (NYC bridge and tunnel and NYS Thruway)
- HOV lane access

EVs are now broadly available at multiple price points, and there are various tax credits, rebates and other incentives available for EV buyers that can bring down the purchase price.

[New York State's Drive Clean Rebate](#)
[Federal Government's Plug-In Electric Drive Vehicle Credit](#)

EVs in NYC

Taking a brief look at the public-facing “homepages” of each of these strategies shows that Toronto’s is very text-heavy (like New York’s).

Conversely, Vancouver and Boston offer friendlier websites with a “choose-your-own-adventure” style of organization.

Branding and communication will be important if the public is to get on-board and such plans are to succeed.

MONTREAL

Last updated May 19, 2022 · Reading time: 2 min

Related [Climate change](#)

By 2023, Montréal wants to increase and diversify the supply of electric transportation by developing more sustainable, affordable and accessible mobility options. The Transportation Electrification Strategy will help the city achieve this goal.

By working with civil society and business, Montréal intends to:

- Shift as many trips as possible to public transit and shared modes of transportation
- Improve the energy performance and efficiency of the transportation system

Six key orientations

The new version of the Transportation Electrification Strategy highlights the diversity of the means deployed and the partnerships involved.

- Focus on active and collective transport
 - Work in collaboration with the Société de transport de Montréal to ensure that 84 per cent of all trips are on electric vehicles, including buses and the subway.
 - Enhance shared electric mobility services by adding 2,100 electric Bixi bikes and 250 electric taxis.
- Make charging electric cars easier by:
 - Installing 600 new level 2 public charging stations and 60 public fast charging stations;
 - Proposing regulation that requires owners of all new residential buildings with parking areas to install basic electrical infrastructure to which charging stations can be connected.
- Reduce the nuisance caused by freight transport by electrifying fleets in urban areas
 - Encourage the electrification of urban freight transportation so that 500,000 packages are delivered annually by electric modes;
 - Establish new urban logistics spaces to serve a larger territory and more boroughs.
- Replace all of the city's end of life sub-compact vehicles with electric models. For other classes of vehicles, opt for electric models, where

BOSTON

I AM LOOKING FOR...

- Boston's Zero Emission Vehicle Roadmap
- How-to guide: Starting a workplace EV charging program
- How-to guide: EV charger installation
- Electric vehicle readiness policy for new developments
- Electric bikes in Boston
- EV 101
- EV incentive programs
- The right to install EV charging

Boston uses a “I want to know about...” format that is common to their municipal website and encourages public interest (Pike, 2021).

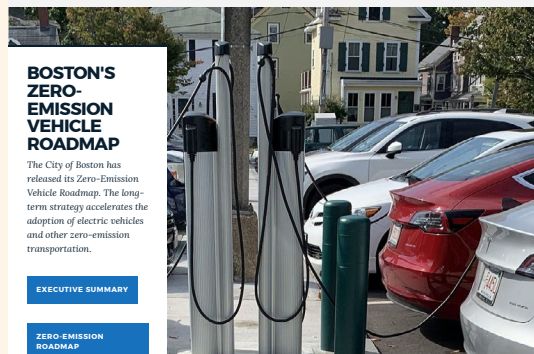
Montréal, while not having a homepage, has a series of easy-to-read lists in press releases, with the full plan attached for those who want more detail (Montréal, 2022).

BOSTON'S ZERO-EMISSION VEHICLE ROADMAP

The City of Boston has released its Zero-Emission Vehicle Roadmap. The long-term strategy accelerates the adoption of electric vehicles and other zero-emission transportation.

[EXECUTIVE SUMMARY](#)

[ZERO-EMISSION ROADMAP](#)



Vancouver's plan is easily laid out with branches and increasing levels of detail as requested.

Summarized translations are available, too.

Goals are given consistent names ("Big Move N^o 7") throughout all Vancouver green strategies so they can be easily cross-referenced and tracked.

VANCOUVER

Home • Streets and transportation • Driving and traffic • Sustainable driving • Electric vehicles

Streets and transportation

- 1 Planning
- 2 Driving and traffic
- 3 Road closures and construction
- 4 Sustainable driving
- 5 Car-sharing, carpooling, and ride-sharing
- 6 **Electric vehicles**

Electric vehicle and cover license

- 1 Electric vehicle charging stations and cellular poles
- 2 Electric vehicle charging for rental buildings
- 3 Curbside Electric Vehicle Pilot Program

Traffic cameras, data, and signal reports

- 1 Trucks, commercial, and on-street vehicles
- 2 Limos, ride-sharing vehicles, and taxis on the street
- 3 Quadricycle route operations
- 4 Report street light issues

Car home safety

- 1 Walk, bike, roll, transit
- 2 Transportation safety
- 3 Streets and sidewalks
- 4 Bicycling
- 5 Transportation 2040 Plan
- 6 New mobility

Electric Vehicles (EVs)

By 2040, all new cars and trucks will be zero emissions in BC.

To support the shift to renewably powered transportation, we're improving and expanding our public EV charging network, implementing policy to support home charging, increasing the number of EVs in our fleet, and working with business and other levels of government to make switching to an EV as easy as possible.

Supporting our goals

How we get around the city will play an important role in how we fight climate change and reduce carbon pollution. We know that we need safe and convenient active transportation, improved transit, and zero emissions vehicles to achieve this.

This aligns with one of our [Climate Emergency](#) goals: By 2030, 50% of the kilometers driven on Vancouver's roads will be by zero emissions vehicles.

Tackling emissions related to transportation, which make up nearly 40% of the city's total carbon pollution.

Vancouver declared a Climate Emergency in 2019, and in 2020 approved the Climate Emergency Action Plan. Accelerated actions to support this goal will focus on:

- Accelerating the expansion of the public EV charging network
- Adding incentives to accelerate the transition to EVs

Charging at home

The most common place to charge an EV is at home, and it's often the least expensive. In Vancouver, any people can charge enough for their daily drive on a wall outlet, also known as Level 1 charging, in 4 hours or less, which works great while your EV is parked overnight. If you have access to a Level 2 charger, 45 minutes is all it takes on average.

To help Vancouverites access home charging as easily as possible, the City has required growing amounts of EV infrastructure as part of new residential construction since 2011. As of January 1, 2019, all new development permit applications require that 10% of residential parking stalls, except visitor stalls, must be EV-ready.

Read the reports:

- [2018 multi-unit residential buildings requirements](#) (0.771 KB)
- [2020 single family home/ duplex updates](#) (0.543 KB)

The technical details of our EV-readiness requirements are detailed in the [Electric Vehicle charging for buildings bulletin](#) (0.214 KB).

We estimate that our requirements create over 5,000 new residential charging circuits each year. But, if your home parking stall doesn't have a place to charge, you do have options.

A carbon budget will be published for the city and its neighbourhoods that will attempt to distribute allowable emissions equitably, and destruction of unsold textiles will be banned to encourage textile recycling (Montréal, 2020).

VANCOUVER

Vancouver is unusual because, unlike the other cities here, it has two levels of government. [Metro Vancouver](#) sets regional goals and leaves implementation to subsidiary municipalities, like the [City of Vancouver](#).

Metro Vancouver sets emissions goals for the region, and their [Clean Air Plan](#) focuses heavily on zero-emission transportation of all kinds. They hope to achieve this by “putting a price on driving” by replacing car parking with bike parking, offering viable alternatives to driving, and by promoting electric vehicles. Companies will be expected to create and keep *comprehensive* carbon budgets. (This includes all emissions: not just building emissions, but employee travel emissions and the like, too.) (Vancouver, 2021)

The City of Vancouver currently has a stopgap solution for electric car owners without a garage to charge in at home: the city is permitting car owners to lay their charge cable across the sidewalk, provided it is approved and covered with a small ramp (Vancouver, n.d.-e).

Vancouver has already experimented with car chargers. There was a program where building owners could request a charger on a first-come, first-served basis (Vancouver, n.d.-a). Three charging hubs have been installed with the help of [TELUS](#) at some of their cell towers in three parks (Vancouver, n.d.-c). Landlords of pre-2011 buildings with a space can request a charger for a fixed price and the City will take care of the rest (Vancouver, n.d.-b). This is in keeping with City policy that requires all new residential parking to be charger-ready (Vancouver, n.d.-d).

By 2030, 90% of Vancouverites should be within a walk of their daily needs, and 2/3 of trips should be by active or public transport. This will require road space reallocation, and by 2025, tolls will be charged to drive downtown. Building car parking minimums will be replaced with maximums, electric car drivers will have access to HOV (◇ diamond) lanes, and permits will be required to park at home (Vancouver, n.d.-g, *Making it happen*; Vancouver, n.d.-d).

Charging hubs are currently limited in Vancouver, as there is British Columbian regulation around who is allowed to sell electricity. However, once this is resolved, charging hubs are expected to be included in community redevelopments & parking lots, and residential chargers can be installed in groups near homes to save costs. In commercial areas, fast chargers will be installed since Vancouver's research shows that regular Level 2 chargers in these areas have little effect on electric car uptake. These will also be useful for commercial fleets with no “home” charger. Car charging is expected to become a competitive advantage landlords and employers can offer, and Vancouver expects that car charging will eventually be completely privatized (Vancouver, 2016).

In terms of buildings, like Toronto, Vancouver has slowly tightening emissions standards, although Vancouver's apply to larger buildings first. All buildings are expected to be net zero by 2040, like Toronto, although unlike Toronto, renewable natural gas is included in this strategy (Vancouver, n.d.-f).

BOSTON

Boston's goals, while similar, are conveyed much more **boldly**. Boston is focusing on reducing solo drivers' numbers drastically, like Toronto, but is much more up-front about it (Boston, 2022).

70 new plugs are expected to be installed this year, at a discounted cost of \$2400ea. for the City, provided by their electricity supplier, [Eversource](#). Charging will be 25¢/kWh, not by time. By 2023, Boston would like a charger in each neighbourhood (Wintersmith, 2021). By 2025, Boston should have a total of 1055 chargers and 320 fast chargers. And by 2040, each house should be within a 10-minute walk of a free charger or electric car share.

As such, Boston sees electric chargers as neighbourhood hubs. Grouping chargers will make installation easier and promote community (Boston Transportation Department, 2020).

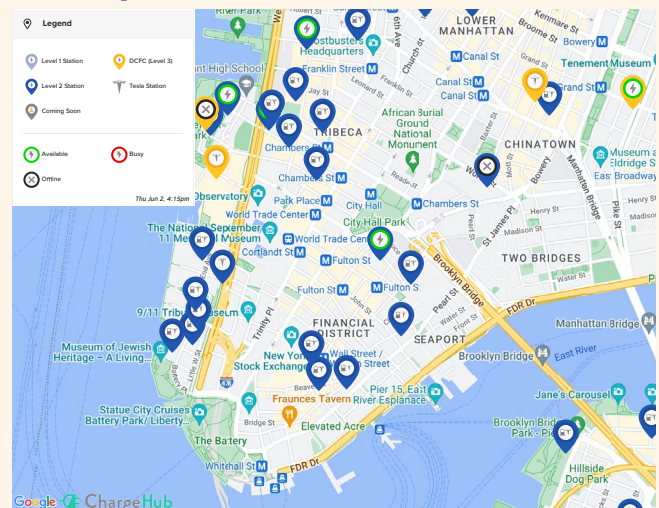
The City of Boston will soon start experimenting with cargo bikes, and will construct 40km (25 miles) of new bus lanes by 2030 to try to reduce solo drives by half. Extensive walking and biking infrastructure will be installed, with communities and hired non-profits assisting. This is something a BIA could help with.

“Flexible curbs” mean street parking spots that are re-used for other purposes, such as cafés or markets, and will be trialled. Toronto currently has a similar, albeit more specific program, [CaféTO](#). Street parking costs will also be automatically adjusted by time and demand (Boston & Walsh, 2019).

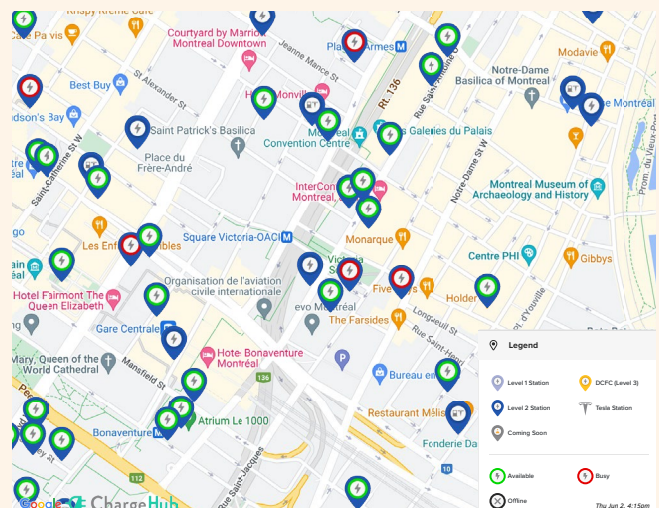
While Boston’s policies are young, their communication is on-point and bold.

CHARGER COMPARISON LOOKING AT FINANCIAL DISTRICTS ACROSS THE UNITED STATES AND CANADA.*

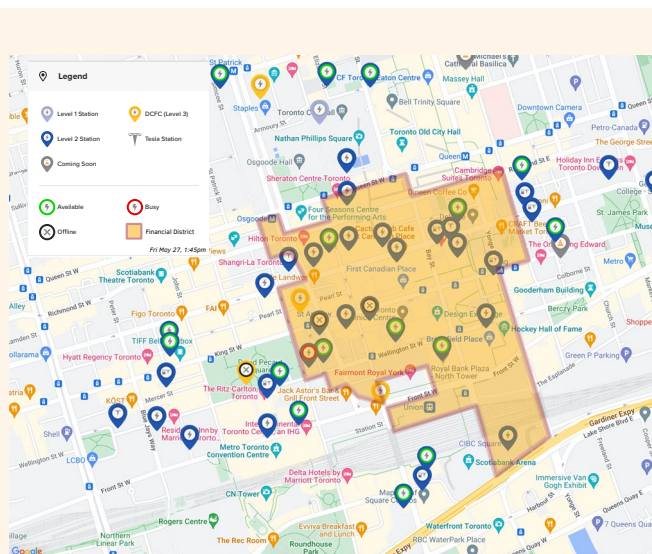
* Maps from ChargeHub <https://chargehub.com/en/charging-stations-map.html>



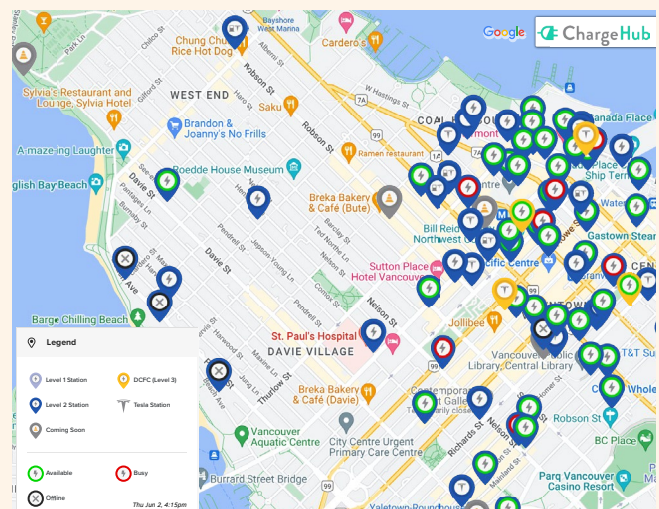
Current location of chargers in downtown New York.



Current location of chargers in downtown Montréal.



Current location of chargers in downtown Toronto.



Current location of chargers in downtown Vancouver.

GOVERNANCE STRATEGIES

WHO IS EXPECTED TO DO WHAT IN DIFFERENT CITIES?

CITY	CHARGERS SHOULD BE MAINLY...	ELECTRICITY IS PROVIDED BY...	CHARGERS SHOULD BE INSTALLED BY...	CHARGERS SHOULD BE INSTALLED...	CHARGING FEE IS...
TORONTO	Public or private with public assistance (eventually)	Public hydro company	Hydro company	On quiet streets in busy areas,* or in parking garages	\$2/h daytime, \$3 flat rate overnight outside downtown†
NEW YORK	Public	Private electricity company‡	Municipality and landowners	In parking lots, on-street, and in community & business hubs	35¢/kWh
MONTRÉAL	Public (provincial)	Public provincial hydro company§	Municipality, with help from provincial hydro company (with exceptions)	On-street¶	\$3/h or less; or up to \$10 flat rate**
VANCOUVER	Privatized††	Public provincial hydro company‡‡	Private developers (with assistance from City)	At home and in community hubs	12¢-27¢/minute§§
BOSTON	Public	Private electricity company¶¶	Hydro company (mainly)	In neighbourhoods	25¢/kWh, then \$1/h when not charging

* This apparent contradiction could be why the City of Toronto has not installed many chargers.

† Subject to slight increase soon (Toronto & Transportation Services, 2022, p. 10).

‡ <https://www.conedison.com/en/about-us/corporate-governance/political-engagement>

§ <https://www.hydroquebec.com/about/governance/acts-regulations.html>

¶ <https://montrealgazette.com/news/local-news/montreal-unveils-electric-car-charging-network>

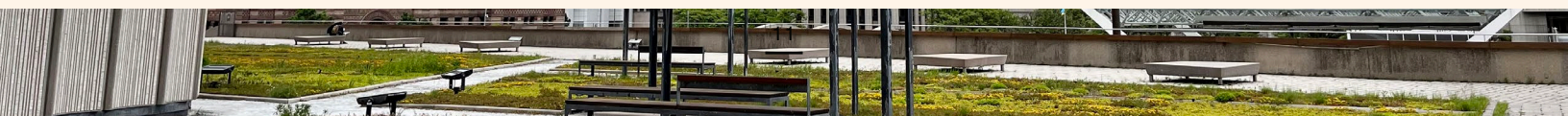
** <https://lecircuitelectrique.com/en/cost/>

†† BC legislation currently restricts who can sell electricity, so while Vancouver foresees chargers being private, currently chargers are run by BC Hydro.

‡‡ <https://www.bchydro.com/toolbar/about.html>

§§ <https://electricvehicles.bchydro.com/how-use-our-fast-chargers/how-much-does-it-cost-charge-fast-charging-station>

¶¶ <https://www.nyse.com/quote/XNYS:ES>



REFERENCES

- Boston, C. of. (2022, August 2). *Recharge Boston: Boston's Zero Emission Vehicle Program* [Municipal]. Boston.Gov. <https://www.boston.gov/departments/transportation/recharge-boston-electric-vehicle-resources>
- Boston, C. of, & Walsh, M. M. J. (2019). *2019 Update* (No. 4; Climate Action Plan). City of Boston. https://www.boston.gov/sites/default/files/embed/file/2019-10/city_of_boston_2019_climate_action_plan_update_4.pdf
- Boston Transportation Department. (2020). *Zero-Emission Vehicle Roadmap*. City of Boston. https://www.boston.gov/sites/default/files/file/2020/10/Boston%20ZEV%20Roadmap_1.pdf
- ChargeHub. (2020). *Electric Vehicle Charging Guide*. <https://chargehub.com/en/electric-car-charging-guide.html>
- Chown Oved, M., & Lorinc, J. (2022, May 9). Ontario energy grid emissions set to skyrocket 400% as Ford government cranks up the gas. *Toronto Star*. <https://www.thestar.com/business/2022/05/09/ontario-energy-grid-emissions-set-to-skyrocket-400-as-ford-government-forced-to-crank-up-the-gas.html>
- Con Edison, Drexel University, Energy Futures Initiative, ICF, National Grid, & New York City Mayor's Office of Sustainability. (2021). *Pathways to Carbon-Neutral NYC: Modernize, Reimagine, Reach*. New York City Mayor's Office of Sustainability. <https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/Carbon-Neutral-NYC.pdf>
- Corporate Services, D. C. M. (2021). *TransformTO Net Zero Strategy Short-term Implementation Plan 2022-2025*. City of Toronto. <https://www.toronto.ca/legdocs/mmis/2021/ie/bgrd/backgroundfile-173757.pdf>
- Deputy City Manager, C. S., & Toronto, C. of. (2021). *Net Zero Existing Buildings Strategy* [Report for Action].
- Dunsky Energy Consulting. (2019). *City of Toronto Electric Vehicle Strategy* (IE11.17-Attachment 1). Environment & Energy Division. <https://www.toronto.ca/wp-content/uploads/2020/02/8c46-City-of-Toronto-Electric-Vehicle-Strategy.pdf>
- Eshel, K. (2021, January 14). *City of Boston 2019 Climate Action Plan Update*. ArcGIS StoryMaps. <https://storymaps.arcgis.com/stories/cd9140272cf74aa9997836b3cf1d5349>
- Gastel, S., & Morales, A. (2021, September 8). *NYC DOT Releases Plan to Create One of the Largest Municipal Electric Vehicle Charging Networks*. DOT Press Releases. <https://www1.nyc.gov/html/dot/html/pr2021/plan-create-largest-municipal-electric-vehicle-charging-networks-september-08-2021.shtml>
- General Motors of Canada Company. (n.d.). *Electric & Plug-In Hybrid Cars, Vehicles*. Chevrolet Canada. Retrieved June 1, 2022, from <https://www.chevrolet.ca/en/electric>
- Google. (2022a). *C40 Cities* [World]. C40 Cities. <https://www.c40.org/cities/>
- Google. (2022b). *Find every public charging station for electric cars* [Map]. <https://chargehub.com/en/charging-stations-map.html>
- Luft, A. (2021, August 16). Plante administration unveils plan to increase electric transportation in Montreal. *CTV News*. <https://montreal.ctvnews.ca/plante-administration-unveils-plan-to-increase-electric-transportation-in-montreal-1.5549162>
- Montréal. (2019, May 6). *Carbon Neutrality Objective | The city announces a first step towards carbon neutrality for its real estate assets* [Municipal]. Ville de Montréal - Official City Portal - News Releases; Ville de Montréal. http://ville.montreal.qc.ca/portal/page?_pageid=5977,43117560&_dad=portal&_schema=PORTAL&id=31553
- Montréal. (2020). *Climate Plan 2020-2030*. Montréal. https://portail-m4s.s3.montreal.ca/pdf/climate_plan_2020_2030_vdm.pdf
- Montréal. (2021). *Transportation Electrification Strategy 2021-2023*. Ville de Montréal. https://portail-m4s.s3.montreal.ca/pdf/strategie_electrification_des_transports_2021-2023_ang_finale.pdf
- Montréal. (2022, May 19). *Transportation Electrification Strategy 2021-2023: Toward Sustainable Mobility* [Municipal]. <https://montreal.ca/en/articles/transportation-electrification-strategy-2021-2023-toward-sustainable-mobility-17859>
- New York City DOT. (2021). *Delivering New York: A Smart Truck Management Plan for New York City*. NYC DOT. <https://www1.nyc.gov/html/dot/downloads/pdf/smart-truck-management-plan.pdf>
- New York City Mayor's Office of Sustainability & New York City DOT. (2021). *Electrifying New York*. NYC Department of Transportation. <https://www1.nyc.gov/html/dot/downloads/pdf/electrifying-new-york-report.pdf>
- New York, C. of. (2022, May 18). *Electric Vehicles*. NYC DOT. <https://www1.nyc.gov/html/dot/html/motorist/electric-vehicles.shtml#/find/nearest>
- Pike, A. (2021, August 1). How to Write Docs People Read. *Allen Pike*. <https://allenpike.com/2021/how-to-write-docs-people-read>
- Pollution Probe, & Delphi Group, T. (2018). *City of Toronto Electric Mobility Strategy Assessment Phase* [Final]. City of Toronto. <https://www.toronto.ca/wp-content/uploads/2021/12/932d-Toronto-Electric-Mobility-Strategy-Assessment-Phase-Report.pdf>
- Toronto Green Standard Review and Update, PH25.17 (2021). <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2021.PH25.17>
- TransformTO - Critical Steps for Net Zero by 2040, IE26.16 (2021). <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2021.IE26.16>

- Toronto, C. of. (2019). *Toronto's First Resilience Strategy* (Resilience Strategy). <https://www.toronto.ca/services-payments/water-environment/environmentally-friendly-city-initiatives/resilientto/>
- Toronto, C. of. (2021). *Summary of Public and Stakeholder Consultation* (City of Toronto Electric Vehicle Strategy). Toronto Environment and Energy Division. <https://www.toronto.ca/wp-content/uploads/2021/12/9339-Toronto-EV-Strategy-Engagement-Summary.pdf>
- Toronto, C. of. (2022). *TGS Version 4.0 Checklist: Mid to High Rise Residential and all New Non-Residential Development* (Toronto, Ontario, Canada). City of Toronto. <https://www.toronto.ca/city-government/planning-development/official-plan-guidelines/toronto-green-standard/toronto-green-standard-version-4/mid-to-high-rise-residential-non-residential-version-4/checklist-templates/>
- On-Street Electric Vehicle Charging Stations—Pilot Conclusion and Next Steps, IE30.11 (2022). <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2022.IE30.11>
- Toronto, C. of & Live Green Toronto. (2021a). *Technical Report* (TransformTO Net Zero Strategy). City of Toronto. <https://www.toronto.ca/wp-content/uploads/2022/01/8f16-Technical-Report.pdf>
- Toronto, C. of & Live Green Toronto. (2021b). *TransformTO Net Zero Strategy* (Toronto, Ontario, Canada). City of Toronto. <https://www.toronto.ca/services-payments/water-environment/environmentally-friendly-city-initiatives/transformto/>
- Toronto, C. of, & Transportation Services, G. M. (2022). *On-Street Electric Vehicle Charging Stations—Pilot Conclusion and Next Steps* (IE30.11) [Report for Action]. Infrastructure and Environment Committee. <https://www.toronto.ca/legdocs/mmis/2022/ie/bgrd/backgroundfile-225839.pdf>
- U of T Mississauga. (2020, March 31). *Eco Park Program*. Parking. <https://www.utm.utoronto.ca/parking/alternative-transportation/eco-park-program>
- Vancouver, M. (2021). *Clean Air Plan*. Metro Vancouver. <http://www.metrovancouver.org/services/air-quality/about/clean-air-plan/Pages/>, <http://www.metrovancouver.org:80/services/air-quality/about/clean-air-plan/Pages/default.aspx>
- Vancouver, C. of. (n.d.-a). *Curbside Electric Vehicle Pilot Program* [Municipal]. City of Vancouver. Retrieved May 19, 2022, from <https://vancouver.ca/streets-transportation/curbside-electric-vehicle-pilot-program.aspx>
- Vancouver, C. of. (n.d.-b). *Electric vehicle charging for rental buildings* [Municipal]. City of Vancouver. Retrieved May 19, 2022, from <https://vancouver.ca/streets-transportation/electric-vehicle-charging-for-rental-buildings.aspx>
- Vancouver, C. of. (n.d.-c). *Electric vehicle charging station and cellular poles in English Bay parks* [Municipal]. City of Vancouver. Retrieved May 19, 2022, from <https://vancouver.ca/streets-transportation/electric-vehicle-charging-stations-and-cellular-poles.aspx>
- Vancouver, C. of. (n.d.-d). *Electric Vehicles (EVs)* [Municipal]. City of Vancouver. Retrieved May 19, 2022, from <https://vancouver.ca/streets-transportation/electric-vehicles.aspx>
- Vancouver, C. of. (n.d.-e). *EV charging extension cords on sidewalks* [Municipal]. City of Vancouver. Retrieved May 19, 2022, from <https://vancouver.ca/streets-transportation/electric-vehicle-cord-cover-licence.aspx>
- Vancouver, C. of. (n.d.-f). *Green large commercial and multi-family buildings* [Municipal]. City of Vancouver. Retrieved May 20, 2022, from <https://vancouver.ca/green-vancouver/green-large-commercial-and-multi-family-buildings.aspx>
- Vancouver, C. of. (n.d.-g). *How we move* [City of Vancouver]. Climate Emergency Action Plan. Retrieved May 20, 2022, from <https://vancouver.ca/green-vancouver/how-we-move.aspx>
- Vancouver, C. of. (2016). *Vancouver's EV Ecosystem Strategy*. City of Vancouver. <https://vancouver.ca/files/cov/ev-ecosystem-strategy.pdf>
- Wintersmith, S. (2021, December 17). Boston aims to tamp down vehicle emissions with more electric charging stations. *GBH*. <https://www.wgbh.org/news/politics/2021/12/17/boston-aims-to-tamp-down-vehicle-emissions-with-more-electric-charging-stations>

