

The Electric Revolution Is Here.

Our obsession? Making it easy.

-chargepoint+



Accelerating EV Adoption: A Local Government Approach

Suzanne Goldberg, Canadian Director of Public Policy

Stephen Wickens, Ontario Account Executive

September 30, 2019

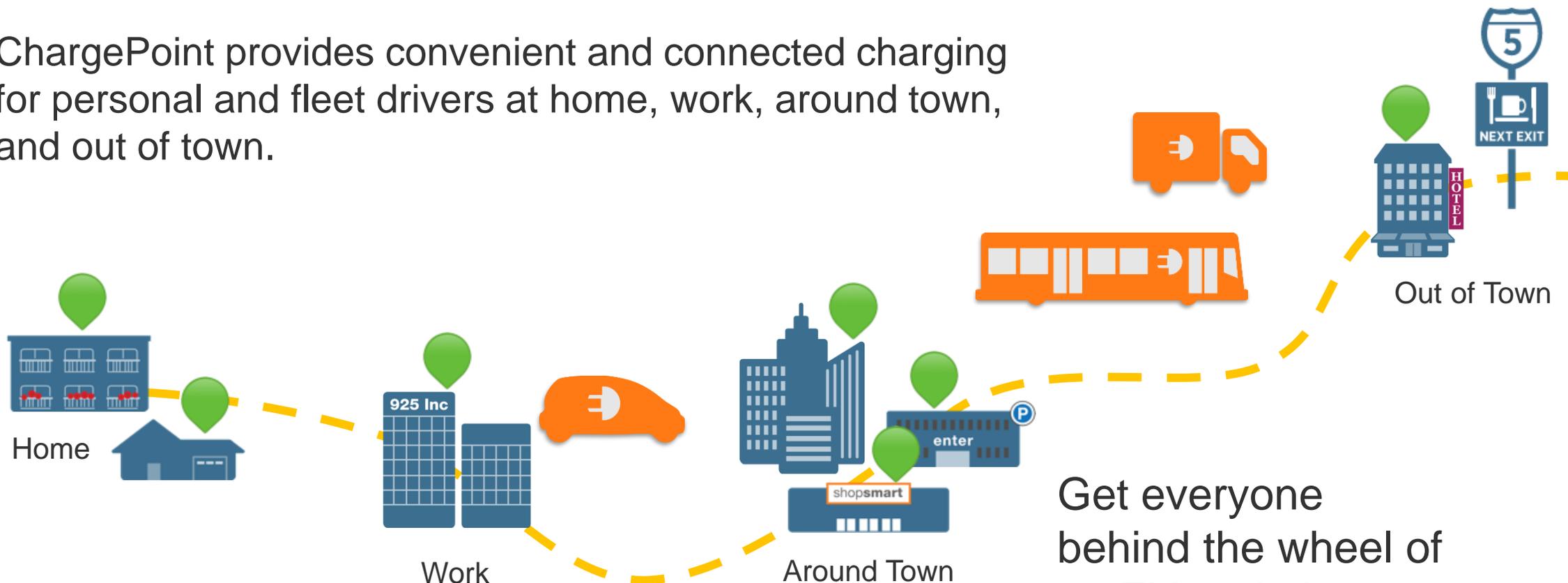
Agenda

1. Electrification Trends
2. EV Charging 101
3. Energy Management
4. Roaming + Smart Charging
5. EV Charging + Municipalities



Our Mission: EV Charging, Everywhere

ChargePoint provides convenient and connected charging for personal and fleet drivers at home, work, around town, and out of town.

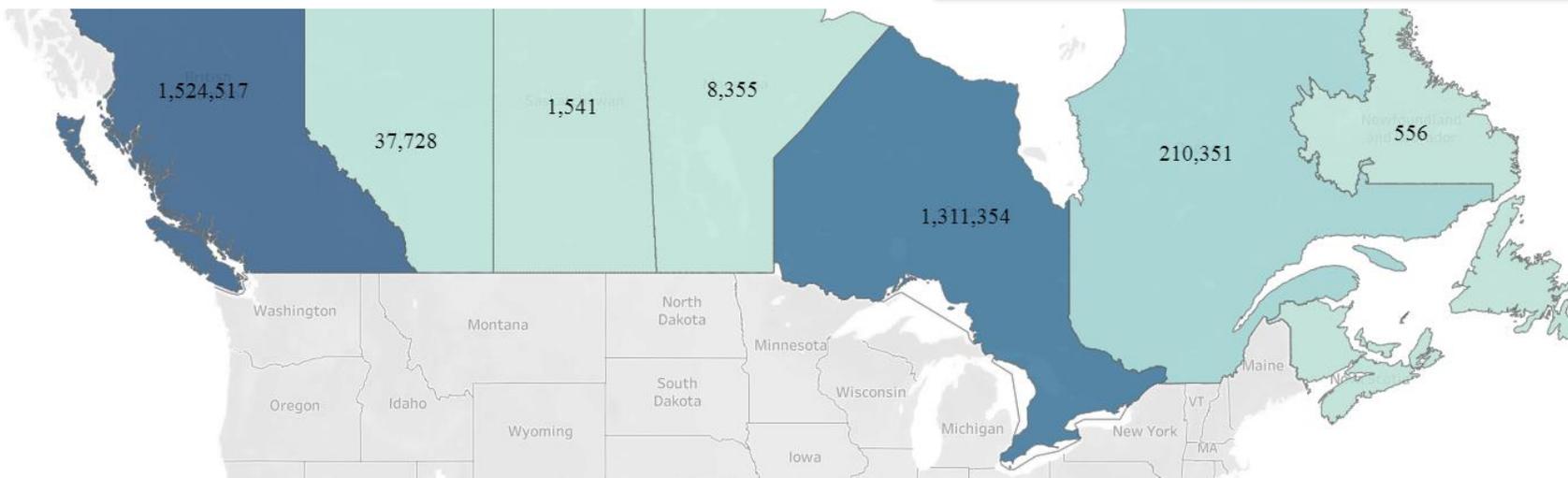


Get everyone behind the wheel of an EV and give them charging wherever they go.

ChargePoint's Growth in Canada

3,200+ Commercial L2 ports 180+ Commercial DC ports 3,000+ CP Home ports

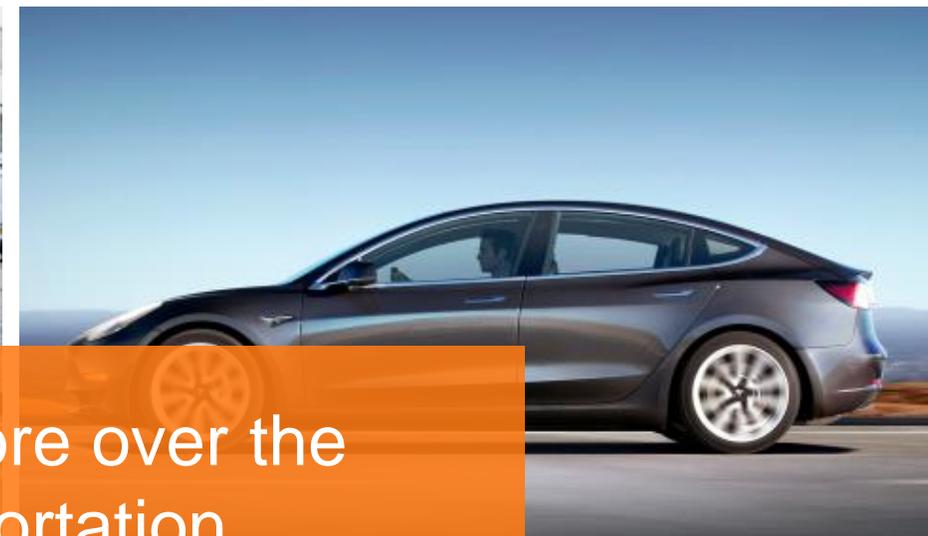
> 3 million CA + 1.3 ON
Charging sessions initiated to date





Electrification Trends

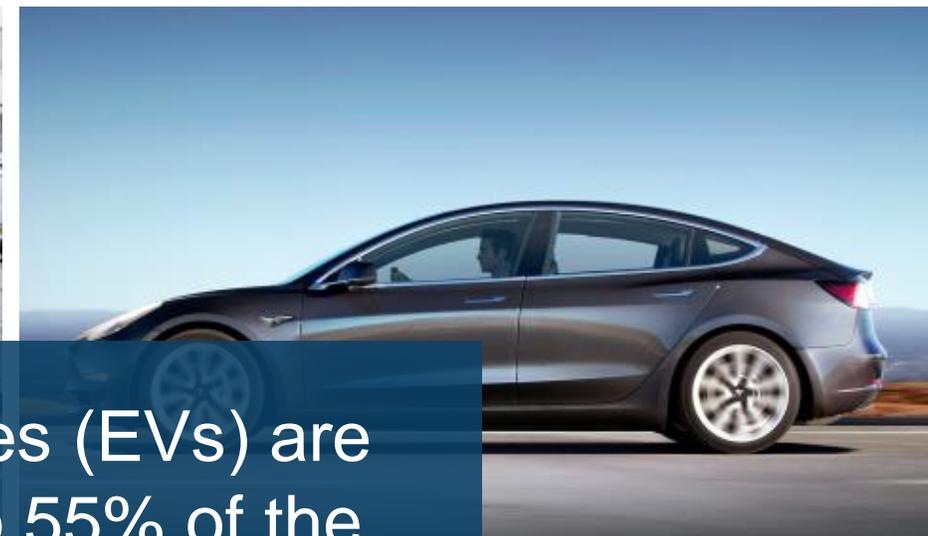
The Future of Mobility Is Electric



No major industry will change more over the next two decades than transportation.

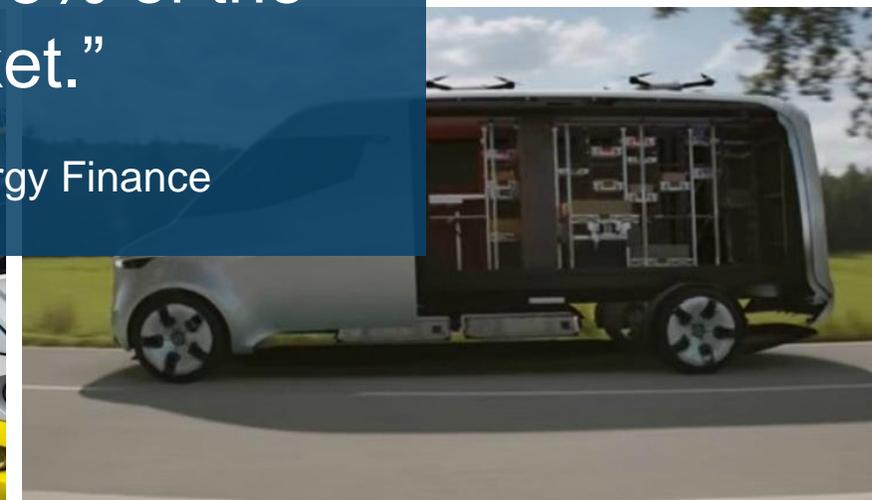


The Future of Mobility Is Electric

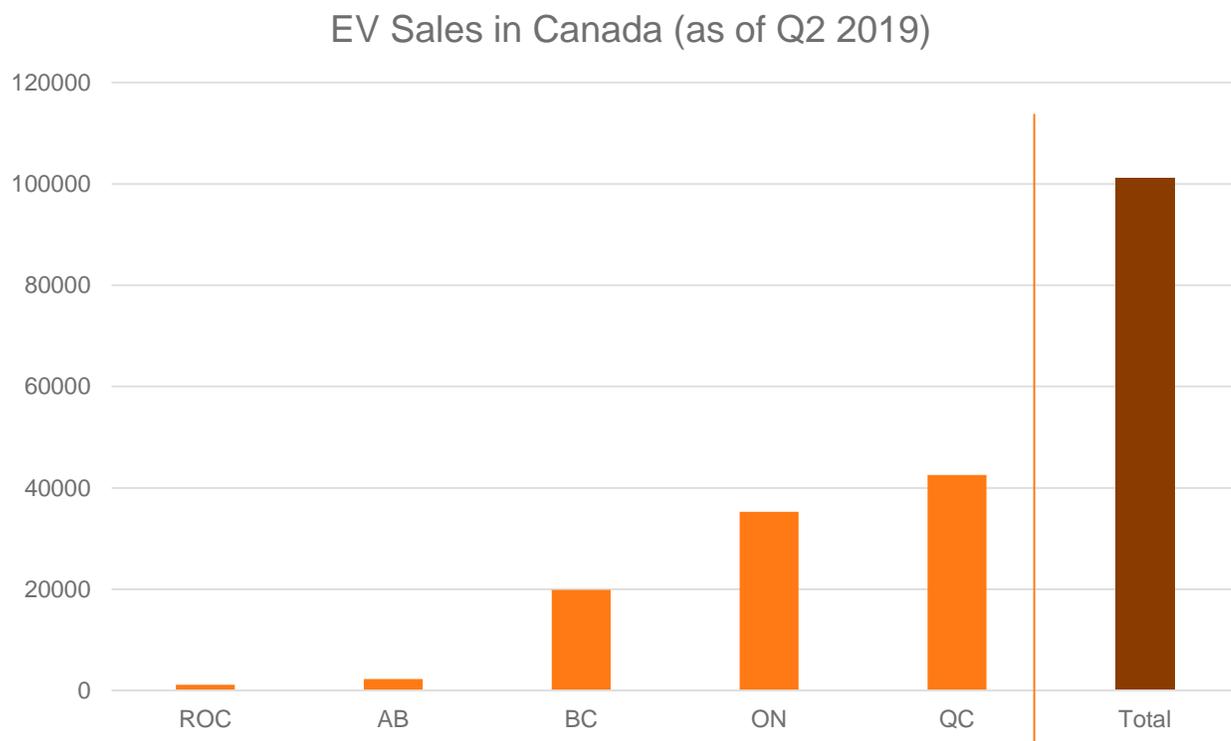


“In 2040, 60 million electric vehicles (EVs) are projected to be sold, equivalent to 55% of the global light-duty vehicle market.”

—Electric Vehicle Outlook 2018, Bloomberg New Energy Finance



Canadian Sales



- ✓ 119,000+ electric vehicles (EV) on the road in Canada
- ✓ EV sales grew by 34% compared to Q2 2018
- ✓ EV sales counted for 3.3% of all passenger vehicle sales

Source: Electric Mobility Canada, 2019

Key Barriers to EV uptake

- + Vehicle availability
- + Vehicle price
- + Access to home or workplace infrastructure
- + Access to public charging





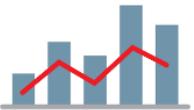
EV Charging 101

Charging Levels



Level	Amperage	Voltage	Kilowatts	Typical Charging Time	Connector	Primary Use
AC Level 1	12–16 amps	120 V	1.3–1.9 kW	12–80 hours 4 – 8 km RPH	J1772 connector	<ul style="list-style-type: none">• Backup charge• Some home use
AC Level 2	6–80 amps	208 V or 240 V	Up to 19.2 kW	2–4 hours 32 - 40 km RPH	J1772 connector	<ul style="list-style-type: none">• Park and charge• Home, commercial, and public charging
DC Fast Charge	70–125 amps	480 V	50–500+ kW	10–45 minutes 320 - 800 km RPH	SAE Combo, Tesla, ChaDeMo connector	<ul style="list-style-type: none">• Commercial, public• Charging while traveling long distances

Value of Networked Charging Stations

	Smart Charger	Non-networked Charger
Dispense Electricity	✓	✓
 Visible to Drivers * through mobile app, turn by turn directions, nearby amenities, real-time availability, 24/7/365 driver support	✓	✗
 Waitlist & Driver Alerts * reserve a station, know when car is fully charged	✓	✗
 Access Control for Owners * public/private, loyalty rewards, fleet services	✓	✗
 Recover Revenue: Session Fees * charge per kWh, hourly, or per driver group	✓	✗
 Data Analytics * station usage, # of unique drivers, charging behavior, utilization, revenue, costs, and GHG offset	✓	✗
 Remote Access and Maintenance * proactive monitoring & fixes, software updates	✓	✗

Best-in-Class Global Hardware Portfolio

Residential and Commercial – AC



Home
7 kW

CPF25
7 kW

CPF32
7.4 kW

CT4000
7 kW

Commercial – DC



CPE250
62.5 kW

Express Plus
500 kW



First EV charging stations
to be ENERGY STAR®
certified

Modular approach simplifies
service and repairs, minimizing
down-time

Level 1 Charging – Limitations

- + Charging at 110 Volts AC – Similar to domestic electric outlet
- + Installation cost as high as Level 2 – No real saving
- + Inconvenient for drivers – Need to carry charger in the car
- + Limits charging to one car per day
- + **Poor Solution** – To get any serious charge from a Level 1 station you have to be plugged in for a whole day or more



50+ Hours
Tesla Model S



18+ Hours
Nissan LEAF



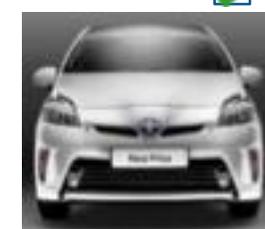
11+ Hours
Chevy Volt



18+ Hours
BMW i3



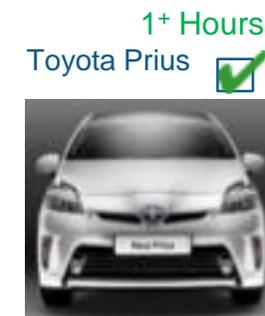
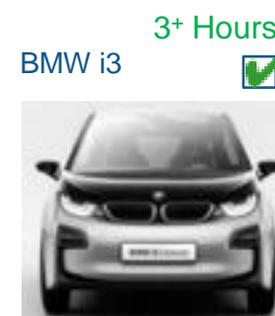
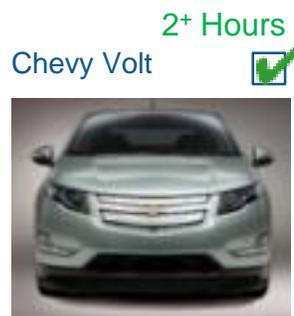
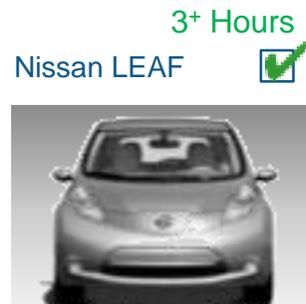
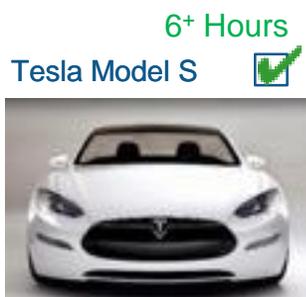
6+ Hours
Toyota Prius



Bottom line: Dissatisfied drivers, no real savings, no control or visibility, and no way to monetize your asset.

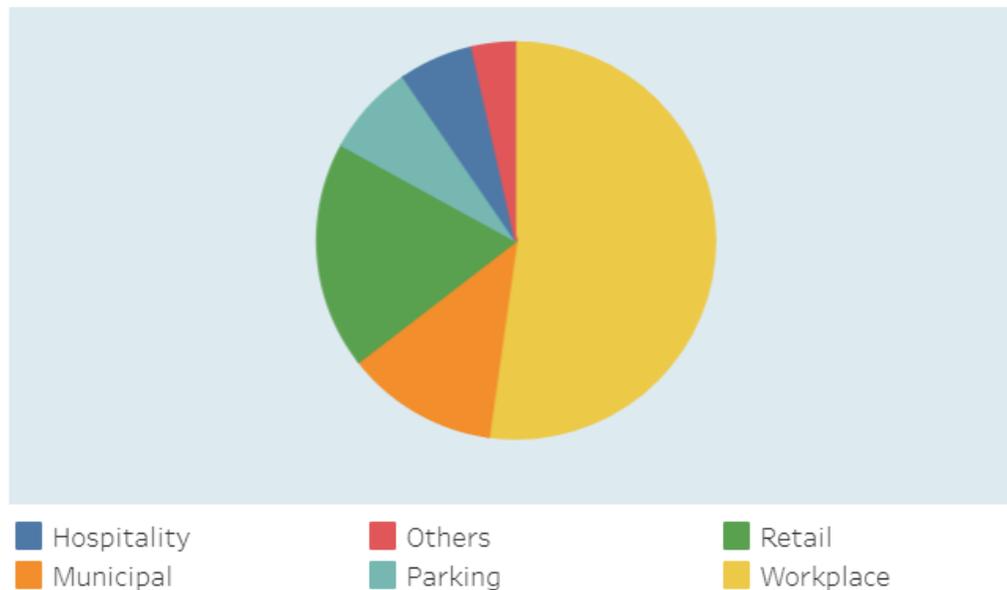
Level 2 Charging – Universal Standard

- + Charging at 240 Volts AC
- + Installation cost as low as Level 1 or Low Amp DC!
- + Convenient for drivers—no need to carry travel cord
- + Charges fast enough to align with top-off model



Networked Solution – compatible with all electric cars on the road today.

How are EVs Being Charged?



Source: ChargePoint Data on Non-Residential Charging in Connecticut

- + EV drivers charge when they arrive at, not on their way to, a destination.
- + 80% of EV charging takes place at home or at work.
- + Faster charging solutions and larger ranges on new vehicles will impact how and when vehicles are charged in the coming years.

Value Proposition

Reduce Expenses and Generate Direct & Indirect Income

<p>Home</p> 	<p>Fleet</p> 	<p>Workplace</p> 	<p>Multi-Family Homes</p>  <p>Commercial Property</p> 	<p>Parking</p> 	<p>Retail & Hospitality</p> 
<p>GAIN GREATER CONTROL & VISIBILITY</p> <ul style="list-style-type: none"> + Track usage and expenses + Charge during off-peak hours + Achieve sustainability goals 	<p>LOWER COST OF TRANSPORTATION</p> <ul style="list-style-type: none"> + Meet government mandates and regulations + Reduce operating expenses with lower fueling and maintenance costs + Achieve sustainability goals + Proactively manage expenses + Manage power in a grid-friendly way 	<p>ATTRACT & RETAIN TALENT</p> <ul style="list-style-type: none"> + Increase employee satisfaction + Improve productivity + Achieve sustainability goals + Provide pricing controls to support your business goals 	<p>ATTRACT & RETAIN RESIDENTS & TENANTS</p> <ul style="list-style-type: none"> + Increase average rent and property value + Provide valued amenity + Meet emerging state and city regulations + Achieve sustainability goals 	<p>ATTRACT NEW CUSTOMERS</p> <ul style="list-style-type: none"> + Drive revenue + Provide differentiating amenity 	<p>INCREASE SALES</p> <ul style="list-style-type: none"> + Attract new and repeat customers + Increase shopping time + Boost customer satisfaction + Achieve sustainability goals + Integrate with loyalty programs

ChargePoint as a Service (CPaaS)

- + Annual subscription model simplifies EV charging market entry
- + Includes charging station, network cloud plan, full warranty and proactive maintenance - all for one annual fee
- + ChargePoint maintains title and operates the charging station on behalf of the site host who sets access and pricing policies and pays the power bill

The Easiest Way to Provide Comprehensive EV Charging

- ✓ Cut your cost of entry to providing EV charging
- ✓ Conserve CapEx funds and use annual OpEx funds to pay for your charging infrastructure
- ✓ Protect and get the most out of your investment: stations are always proactively monitored and never technically obsolete
- ✓ Save time and money with minimal overhead and predictable operational expenses

ChargePoint as a Service - Getting Started

Ready

You

Get the site ready



Set

We

Assemble, install
and **setup** the
station



Go!

Your annual
subscription
begins when
ChargePoint
activates your
station

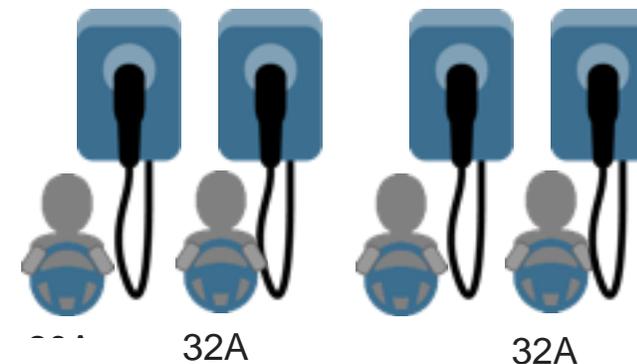
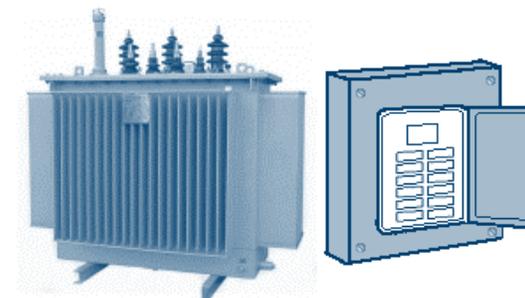


EV Charging 201

Energy Management

Serve More Drivers with Power Management

- + Imagine you have enough capacity to charge 2 cars at the same time at full power.
- + But you don't want to be limited to having only two vehicles plugged in at a time
- + Power Management allows you to install more stations than would otherwise be supported by the electrical service
- + Cars charge normally, up to the point where capacity would be exceeded
- + Power is intelligently distributed to ensure the aggregate load does not exceed the available capacity
- + As cars finish charging the power is rebalanced



How do you manage charging?

+ ChargePoint will offer a configurable policy to manage charging behavior.



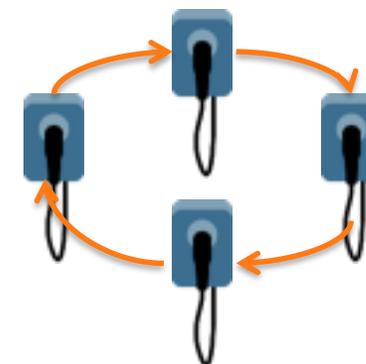
Equal Charge policy

Each active charging session is dynamically adjusted to remain below the cap.



First in First Out (FIFO)*

Cars charge based on when they arrived. When a vehicle becomes fully charged the available power moves to the next in line.



Round Robin*

Cars charge for a configurable amount of time. Charging cycles through each vehicle in turn based on when they arrived.

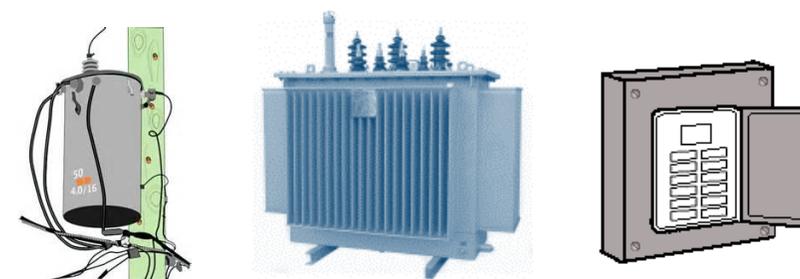
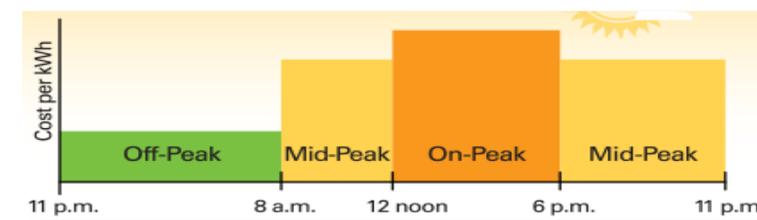
*Coming Soon

Upgradable: ChargePoint's power management algorithms reside in the cloud. We are working on other algorithms, including allowing users to enter their desired range and we will optimize the charging.

Power Management

Save Money with Smart Charging:

1. **Lower Energy Prices:** defer charging to times when Energy prices are cheaper (Fleets, Multifamily, etc.)
2. **Avoid Demand Charges:** set a limit to lower the peak demand during the month; demand charges can make up 30-70% of electricity bills
3. **Avoid Service Upgrades:** install more chargers while deferring or avoiding electrical capacity upgrades to the site





Roaming & Smart Charging

Roaming, seamless charging in Canada and US

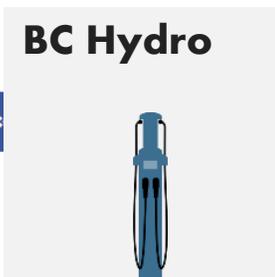
eVgo and Electrify America—2019



Oct 16, 2018
Roaming North America via ChargePoint & FLO networks



Greenlots & ChargePoint Team Up To Make Public Charging Easier In North America



Peer to Peer Roaming

- ✓ Drivers need only one account to charge
- ✓ Eliminates the middleman
- ✓ No additional transaction costs

Power of the Network

Cloud services.....

- + Access control by time, vehicle, individuals or groups
- + Set varied pricing by time, energy or driver
- + Generate usage reports and track environmental figures
- + Remote station services support
- + Manage ROI, energy usage and cost
- + 24/7 remote support for drivers
- + Seamlessly share data with various stakeholders
- + Real-time availability



Data Available from ChargePoint Network



- + Unique drivers charging
- + Energy used
- + Peak Power, Average Power
- + Time charging vs. time plugged in
- + Greenhouse gas savings
- + Gasoline savings
- + Postal code of driver
- + Utilization
- + Revenues generated
- + Charging status of a vehicle
- + All data can be aggregated by station, time, application, etc.





EV Charging + Municipalities

Why are municipalities supporting EV uptake?



- + GHG and air pollution reduction
- + Leading by doing and corporate GHG reductions goals
- + Supporting market development
- + Effective jurisdictional levers
- + Success globally

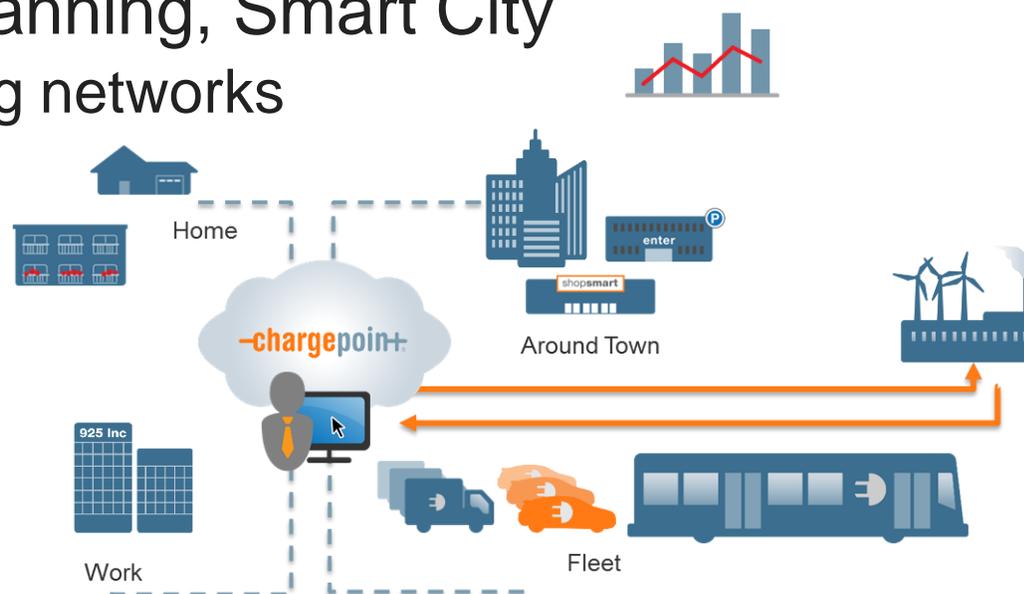
How municipalities are supporting EVs?

+ EV-ready buildings



+ Smart Charging, Smart Planning, Smart City

- Plan & build smart charging networks
- Collect data
- Link to other policy goals
- Open access



+ Fleet electrification

+ Educate and engage



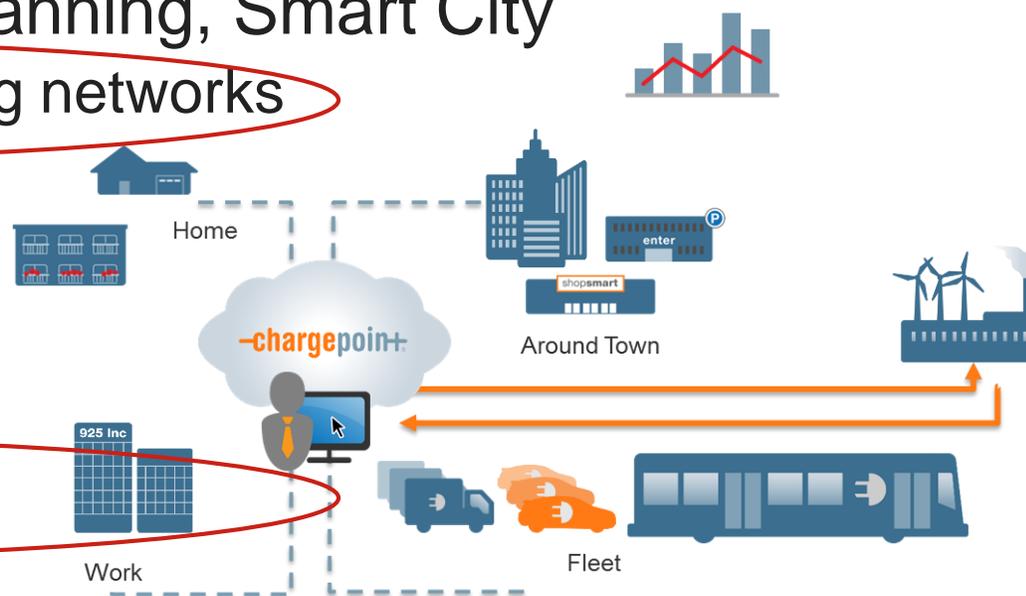
Where are local government starting?

+ EV-ready buildings



+ Smart Charging, Smart Planning, Smart City

- Plan & build smart charging networks
- Collect data
- Link to other policy goals
- Open access

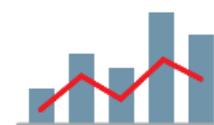


+ Fleet electrification

+ Educate and engage



We partner with municipalities to accelerate EV adoption



Policy and Program Design

Support in developing program or policy design based on best practices and lessons learned in other jurisdictions

Technical Expertise

Support for site and energy management design to minimize cost and maximizing use and integration of cloud services

Grant Support

Dedicated grant team will help identify grant opportunities and provide support

Innovation

As a leader in innovation, partnerships with municipalities help us develop innovative solutions to advance EV adoption

Reporting and Tracking

Advanced and easy to use data platform will generate reports, track utilization in real-time, and assist in planning or policy

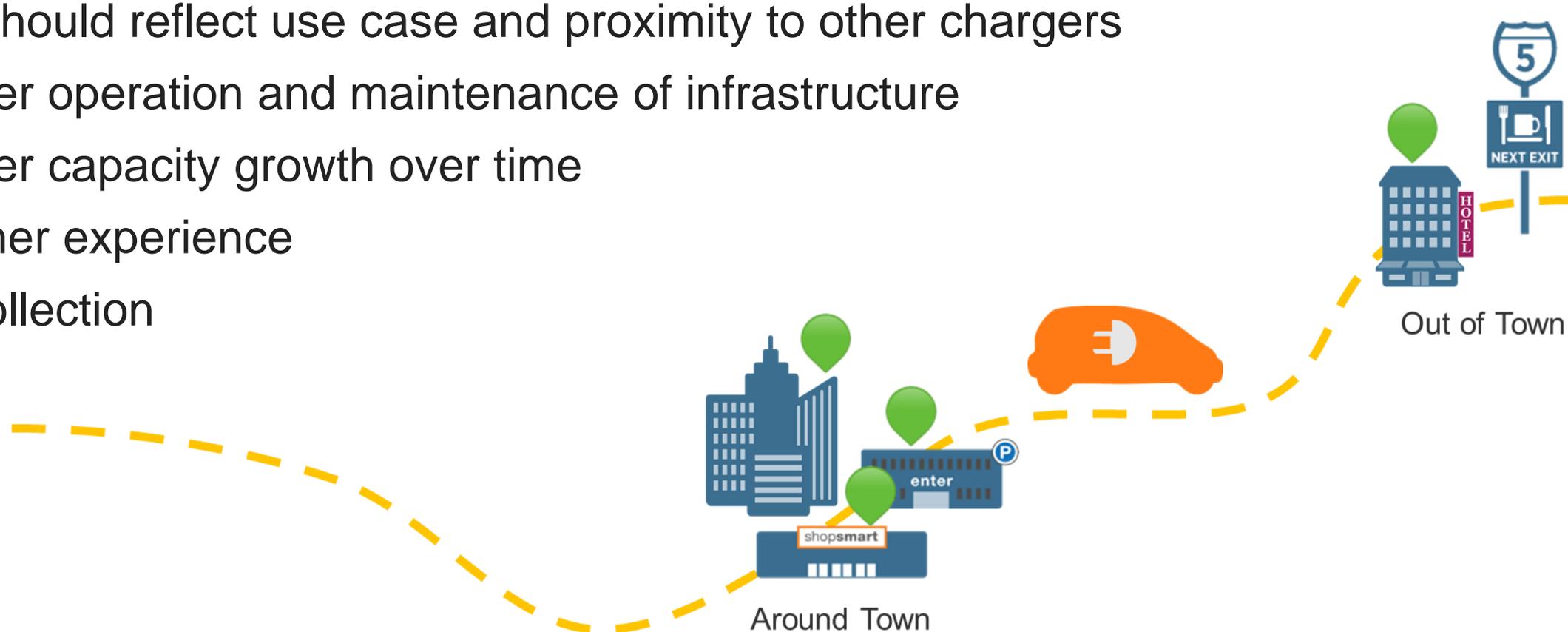
Driver and Site Host Services

Dedicated support for drivers and site hosts supports high utilization and station uptime
We offer support in ENG + FR



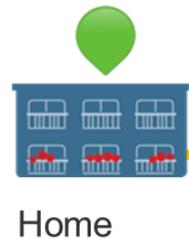
Public L2 and Fast Charging

- + Open-access for all drivers
- + Siting should reflect use case and proximity to other chargers
- + Consider operation and maintenance of infrastructure
- + Consider capacity growth over time
- + Customer experience
- + Data collection



Home Charging

- + EV-ready building codes for new development
 - + Consider building type and parking access
 - + Clearly define EV-ready requirements
 - + Consider networked chargers and power sharing



Thank You

For further information on this topic,
please contact Suzanne Goldberg or Stephen Wickens:

Suzanne.Goldberg@chargepoint.com

Stephen.Wickens@chargepoint.com