



Charging Your Electric Vehicle

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Get a copy of this presentation

- ▶ Go to ClimateSmartSaugerties.org/resources.shtml
- ▶ Scroll down to the “Electric Vehicles” section.
- ▶ Click to download this presentation and the companion paper, as PDFs.

Shared Solar
Steve Wehr
Climate Smart Saugerties
climate-smartsaugerties.org

Connecting Residents Of Saugerties To The Solar Farm Developed By East Light Solar

What is Community Shared Solar
by Steve Wehr

How to Connect to the East Light Solar Farm
by Common Energy

Electric Vehicles

Charging Your Electric Vehicle
Companion Paper
Steve Wehr
Climate Smart Saugerties Task Force
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Local Guide to EVs
by Hudson Valley Regional Council

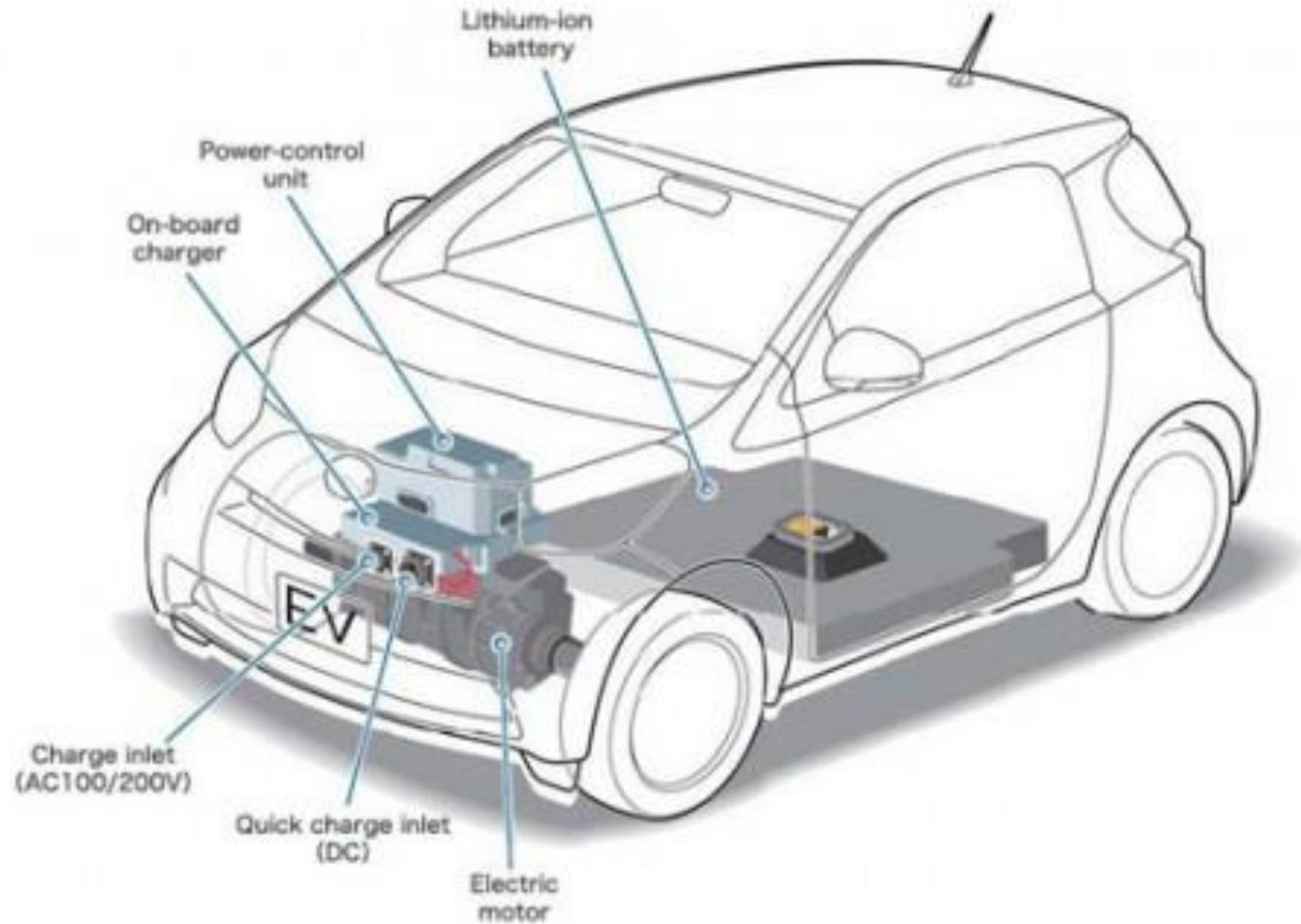
Heat Pumps

2020 Guide to Electric Vehicles
by Plug In America

| Model | MSRP | Range (miles) |
|-----------------------|----------|---------------|
| Tesla Model S | \$79,999 | 18-300 miles |
| Tesla Model X | \$84,999 | 305-351 miles |
| Tesla Model Y | \$51,999 | 250-323 miles |
| Tesla Model 3 | \$37,999 | 315 miles |
| Beverly Bolt EV | \$57,400 | 259 miles |
| Hyundai Kona Electric | \$52,700 | 258 miles |
| Nissan Leaf | \$31,400 | 229 miles |
| Jaguar i-PACE | \$60,800 | 234 miles |

| Category | Details |
|--|---|
| Battery Electric Vehicle (BEV) | • BEV do not have an internal combustion engine • BEV do not require refueling • BEV do not require a gas pump • BEV do not require a gas station |
| Plug-in Hybrid Electric Vehicle (PHEV) | • PHEV have an internal combustion engine and a gas tank • PHEV have a battery pack and an electric motor • PHEV can be charged like a BEV or driven like a gas car |
| EV Charging | • EV charging is done at a charging station • EV charging is done at a charging station • EV charging is done at a charging station |

Basic Components of an Electric Vehicle



Right now it's like the Wild West when it comes to Charging.

- ▶ Several different companies
- ▶ Offer different charging plans
- ▶ Costing different amounts
- ▶ And Using different charging plugs.



Charging Plugs, Where you get power

Level 1

(110 v) (220 v)
1.3 kW 2-6 kW
2-5 Miles/hr 6-25 Miles/hr



J1772
Included Charger

HOME

Level 2

4 - 9 kW
20-40 Miles/hr



J1772

HOME, WORK, SHOPPING

Level 3

DC Fast Charging

50 - 350 kW
150 - 1000 Miles/hr

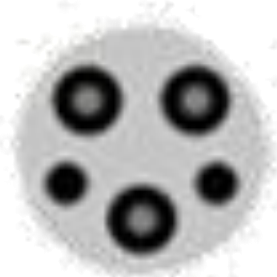


CCS (J1772 Combo), CHAdeMO, Tesla

TRAVELLING

Charging Plugs

What you plug into your car



J1772



J1772
Combo
CCS



CHAdEMO

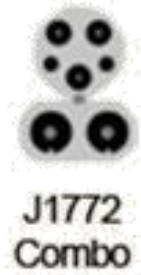
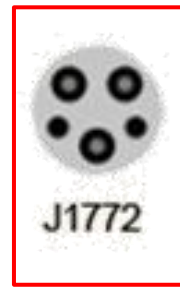


Tesla
Combo

AC Slow

DC Fast

Charging Plugs J1772



J1772

J1772
Combo

CHAdeMO

Tesla
Combo

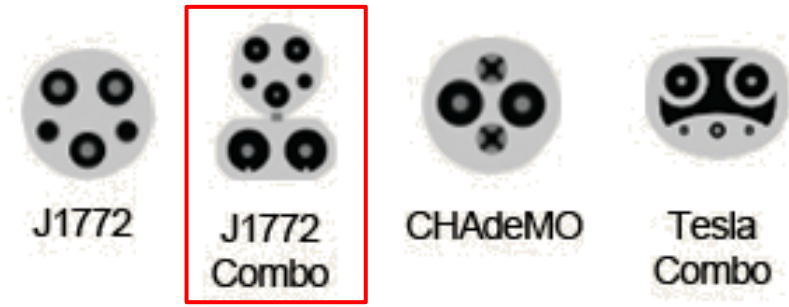


All Electric vehicles can be charged with J1772 Level 2 charger.

Tesla's can be charged with an adapter.

Charging Plugs

J1772 Combo (CCS)

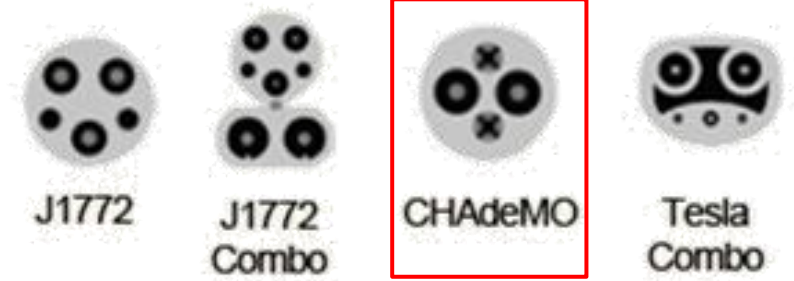


All Electric vehicles can be charged with CCS fast charger.

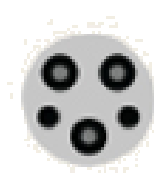
Except:

- ▶ Tesla
- ▶ Nissan Leaf

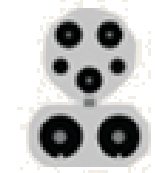
Charging Plugs CHAdEMO



Charging Plugs Tesla



J1772



J1772
Combo



CHAdeMO



Tesla
Combo



Currently cannot use CCS chargers.

Home Charging

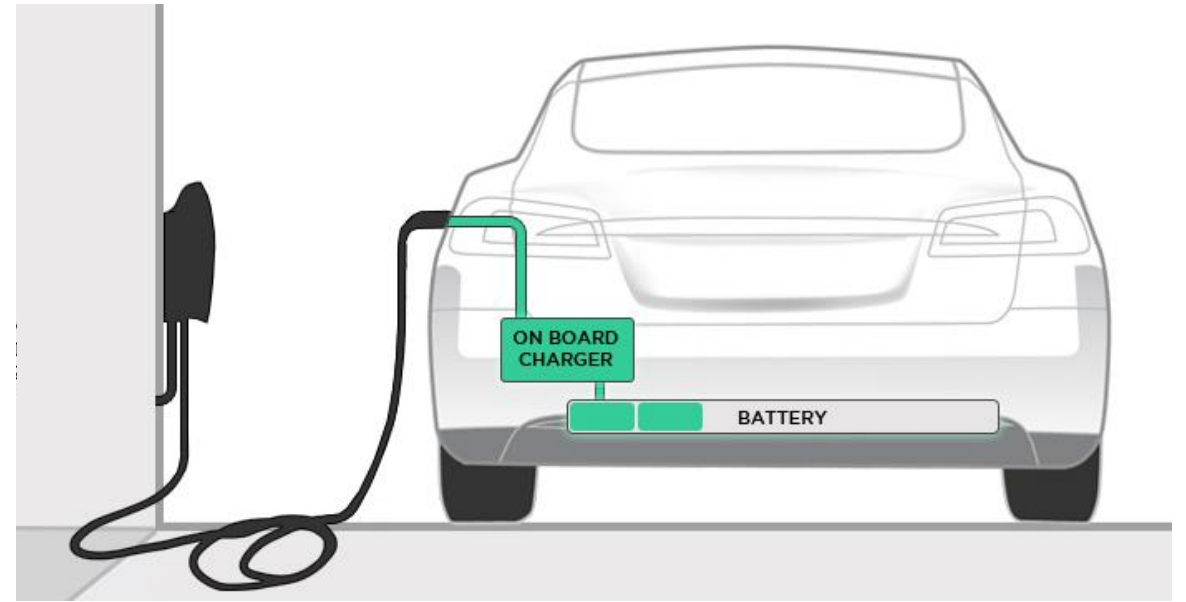
- ▶ Most people will charge at home using the included charge cable and plug that comes with your car.
- ▶ **110v outlet** - Charge rate of approximately 5 miles/hr.
- ▶ **240v (dryer) outlet** - Charge rate of approximately 20-30 miles/hr. (If your included charger has an adapter than can use that outlet.) Cost about \$300 for outlet installation by electrician.
- ▶ **Level 2 Home Charger** - Charge rate of approximately 25-45 miles/hr. Cost about \$500 for charger, and \$500 for installation by an electrician. Federal and State rebates available.
- ▶ No more gas station visits!



How Charging Works

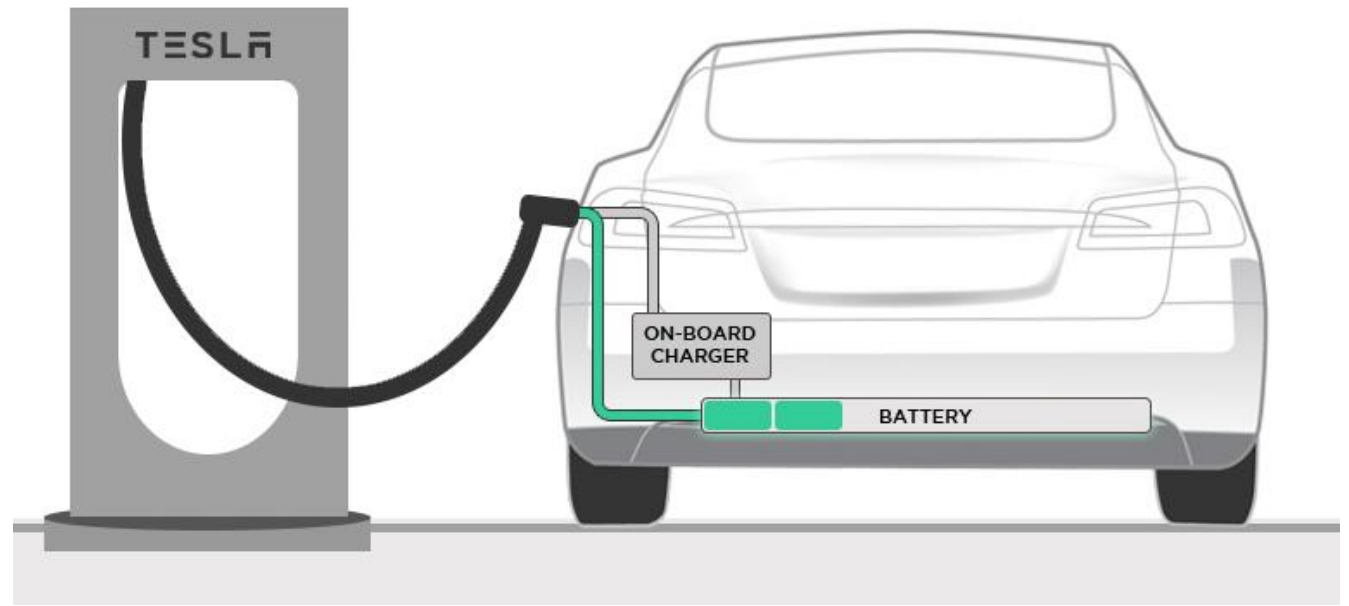
Home Charging

- ▶ Level 1. Full charge from empty in 10-40 hours*
- ▶ Level 2. Full charge from empty in 7 hours*
- ▶ AC
- ▶ Car determines rate of charge, limited by charger output.



Travel Charging

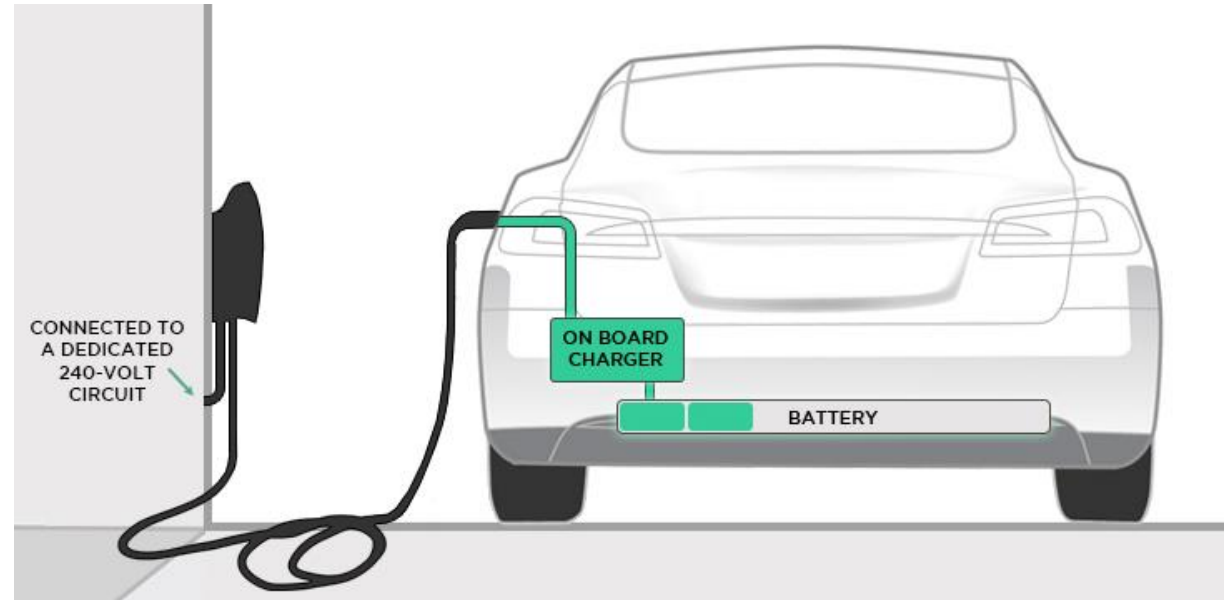
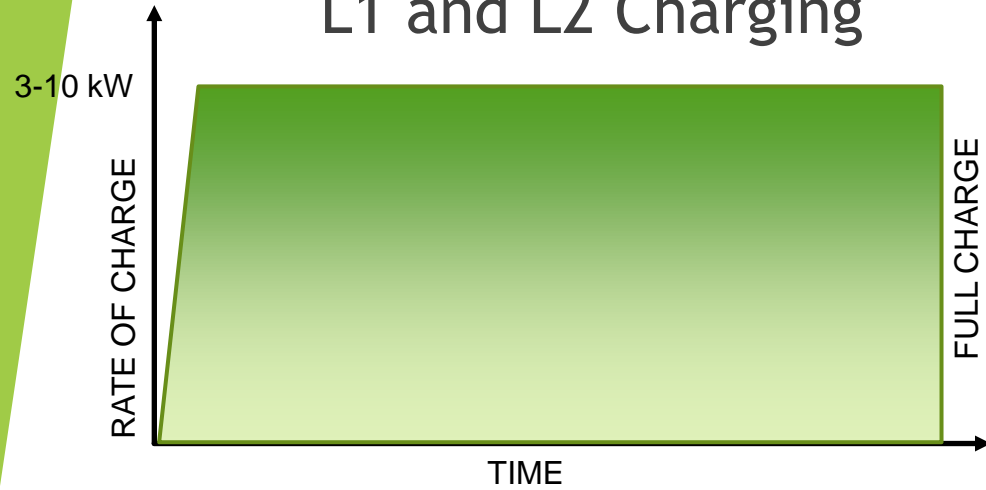
- ▶ Level 3. Full charge from empty in 45 minutes* or less.
- ▶ DC
- ▶ Car determines rate of charge.



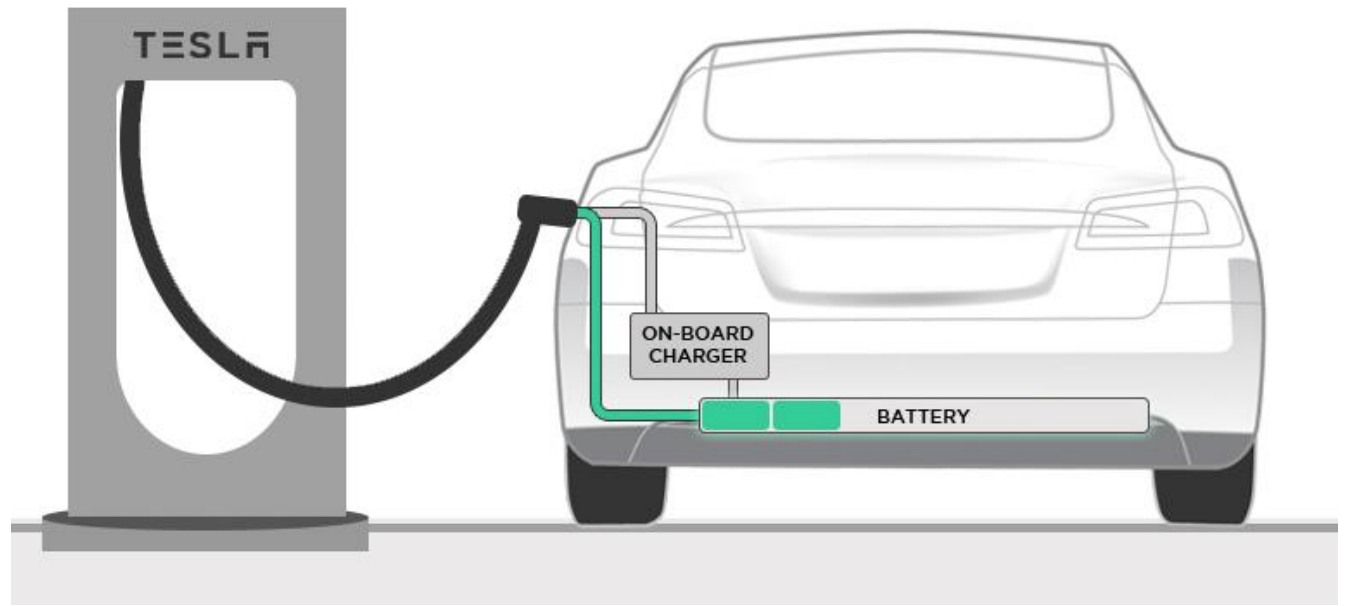
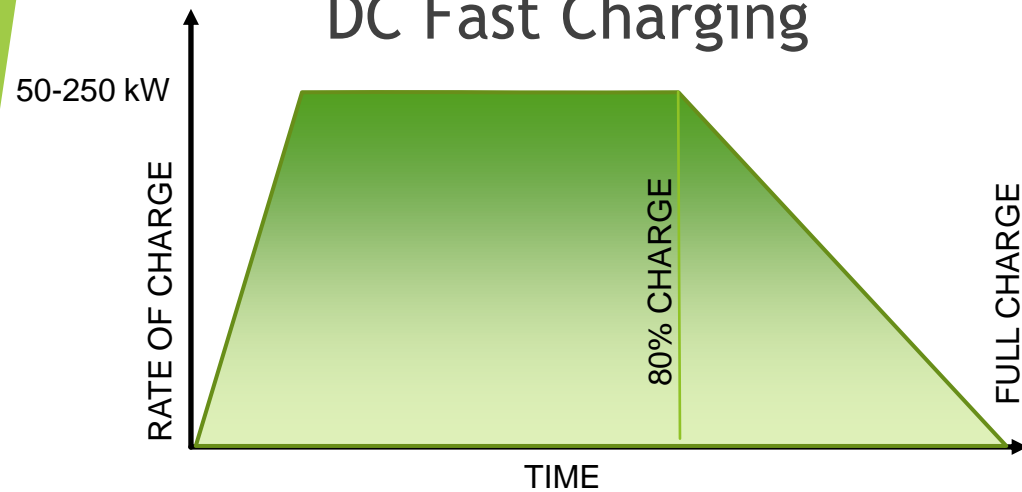
* Depends on Battery Size and charge rate.

How Charging Works

L1 and L2 Charging



DC Fast Charging



Charging Best Practices



- ▶ Your car's battery will degrade over time - meaning that it will no longer charge to its full capacity. Just like any other rechargeable battery.
 - ▶ Expect around 1-2% degradation per 10,000 miles driven - depending on the manufacturer. So... 80-90% capacity remaining after 100,000 miles.
- ▶ Everyday charging...
 - ▶ Charge to between 80-90% full.
 - ▶ You can charge to 100% if taking a trip.
 - ▶ Do not charge to 100% all the time, it will cause more degradation.
- ▶ If leaving your car for more than a week, plug it in. The car's software will keep the battery optimally charged.
- ▶ Don't let your car's battery fully discharge (run to zero). This is bad for the battery and your car.

Get Started with ChargePoint chargers

These are the most prevalent local chargers

Set up

- ▶ Create an account.
 - ▶ Go to ChargePoint.com
 - ▶ Or install their app on your smart phone.
- ▶ You will put a credit card on file for any charges.

Do this same setup for all charging companies you want to join.

Charge

- ▶ Park at a charger.
- ▶ Use the ChargePoint app, or Apple Wallet to connect with the charger.
- ▶ Plug in your car and it will start charging. You will get about 28 miles of range added per hour.

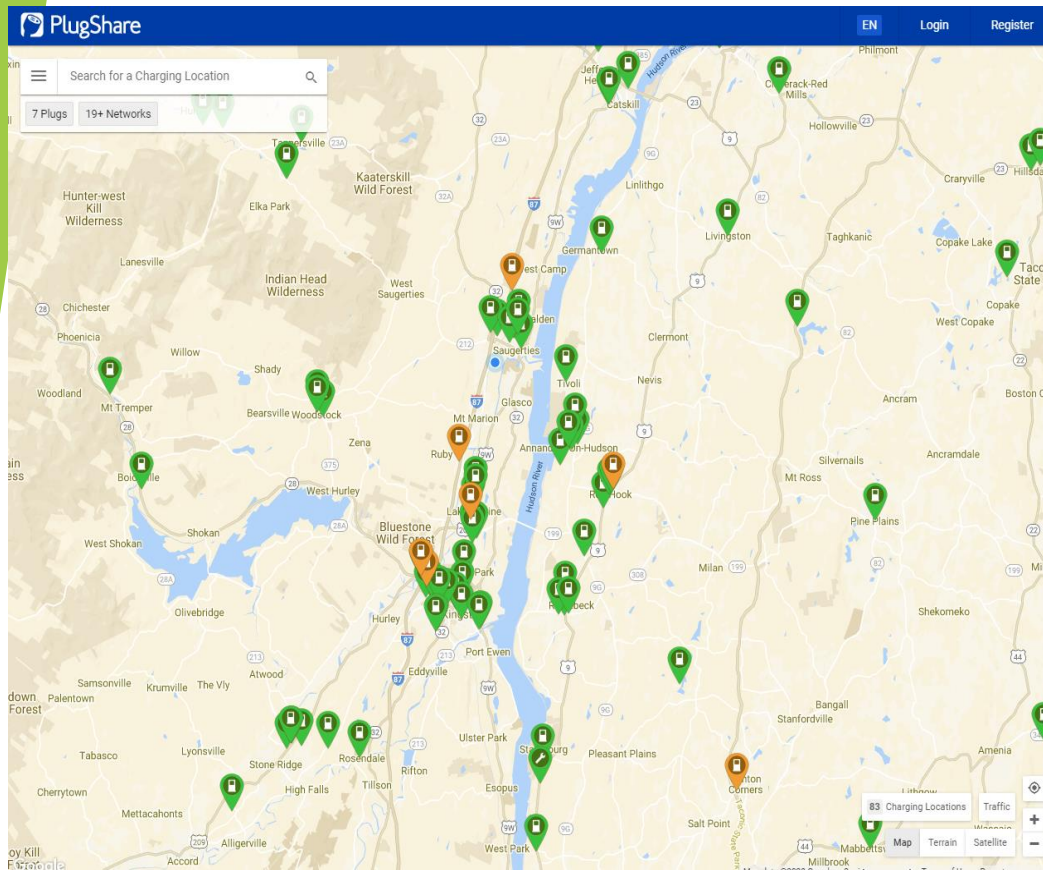


What Charging Costs around here

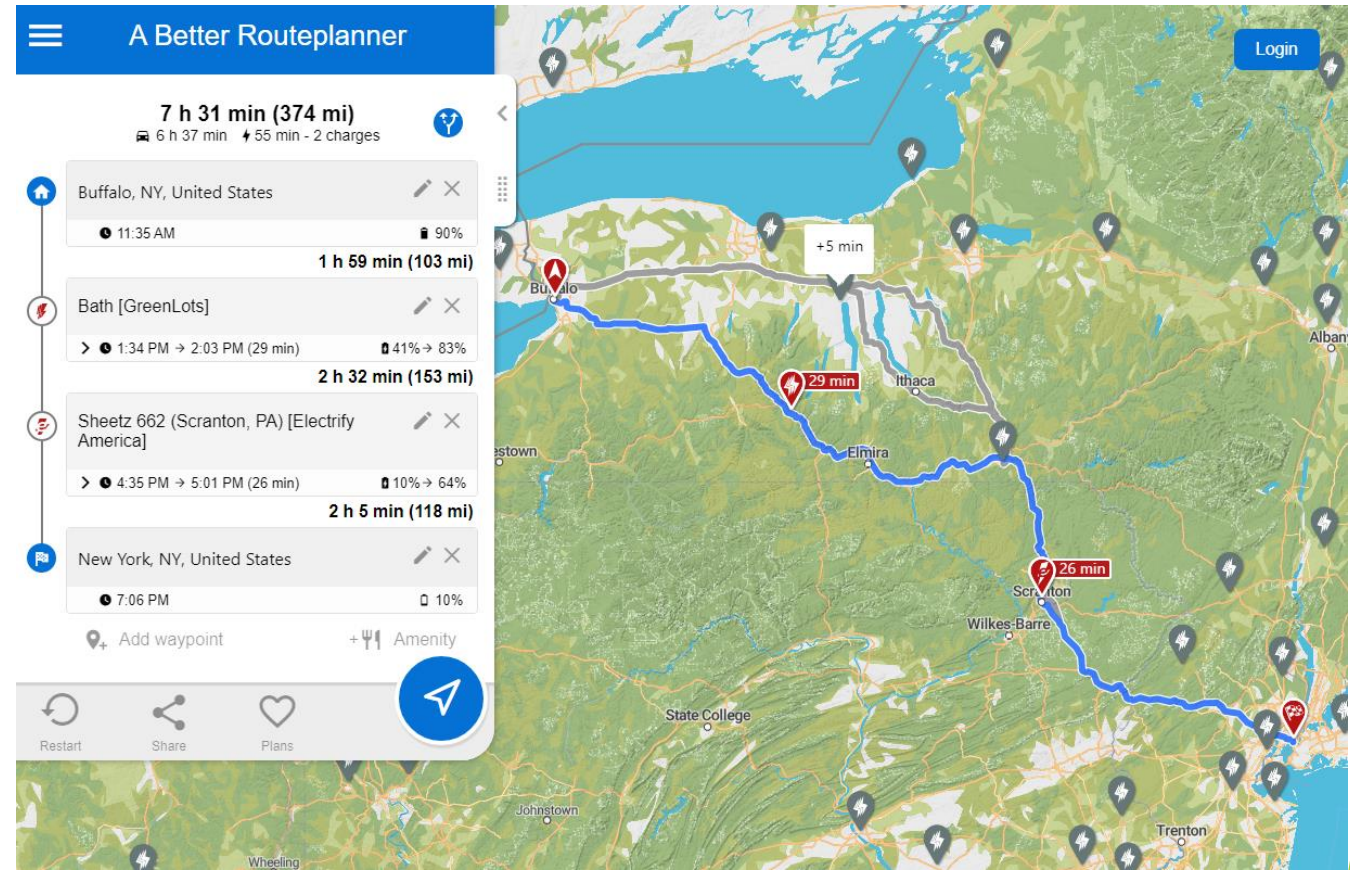
| | Cost in Saugerties / HV | Locations in HV |
|-------------------------|--|----------------------|
| Home Charging | \$0.19 per kwh | |
| “Destination” Chargers | Usually Free | Hundreds |
| Chargepoint (Municipal) | Free - \$1.50 per session. (Cost set by charger owner) | Hundreds |
| Tesla SuperCharger | \$0.35 per kWh | 14 (most are 250 kW) |
| Electrify America | \$0.31 - \$0.43 per kWh | 2 (up to 350 kW) |
| EV Go | \$0.30 per minute | 27 (most are 50 kW) |
| EVolveNY | \$0.35 per kWh | 4 (most are 350 kW) |

“Destination” chargers are free L1 or L2 chargers offered by Hotels, parking garages, restaurants, etc.

Finding Chargers



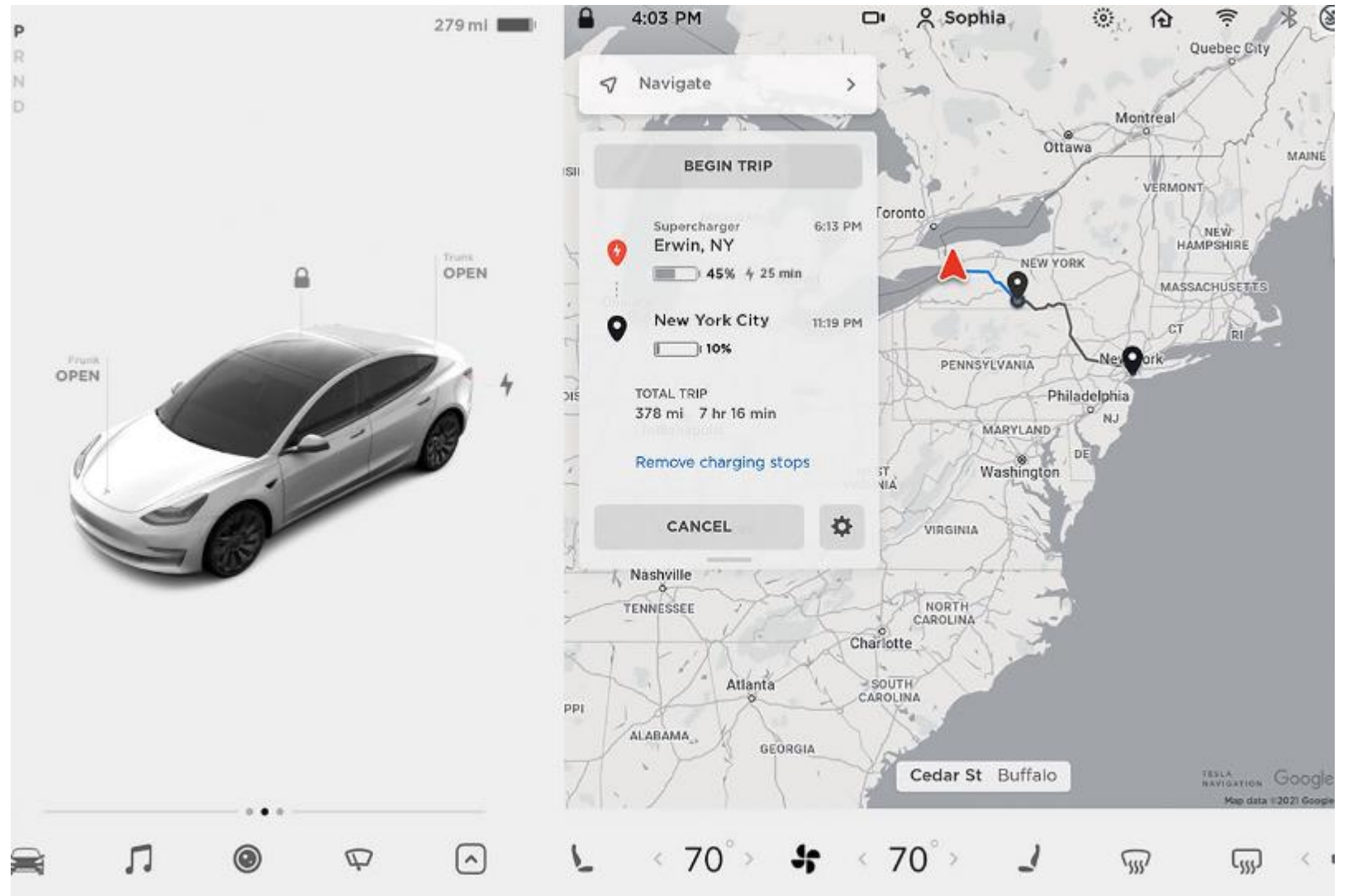
Use the PlugShare website or smartphone app to find charger locations near you.



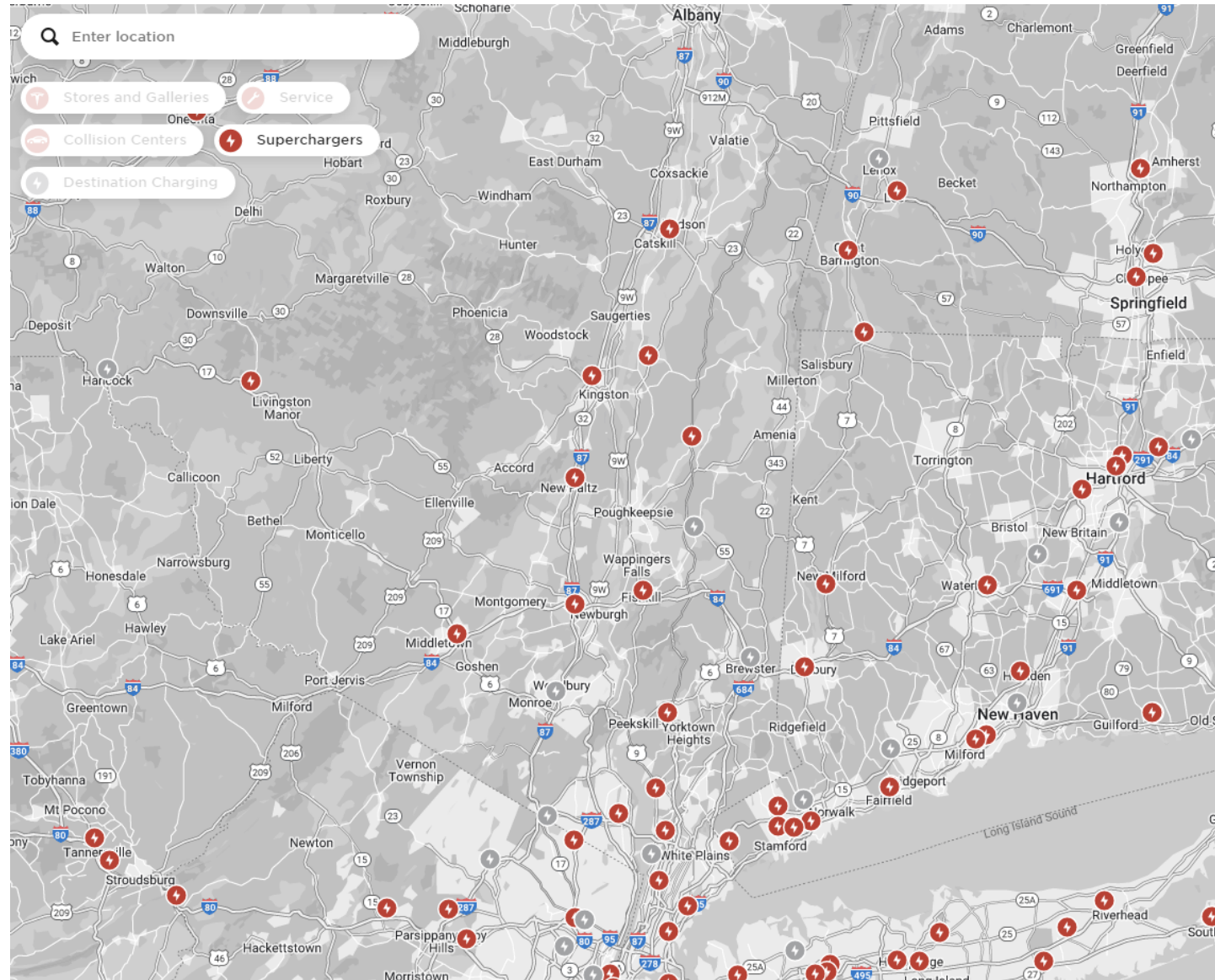
Use "A Better Route Planner" website or smartphone app to plan charging along your route.

Finding Chargers

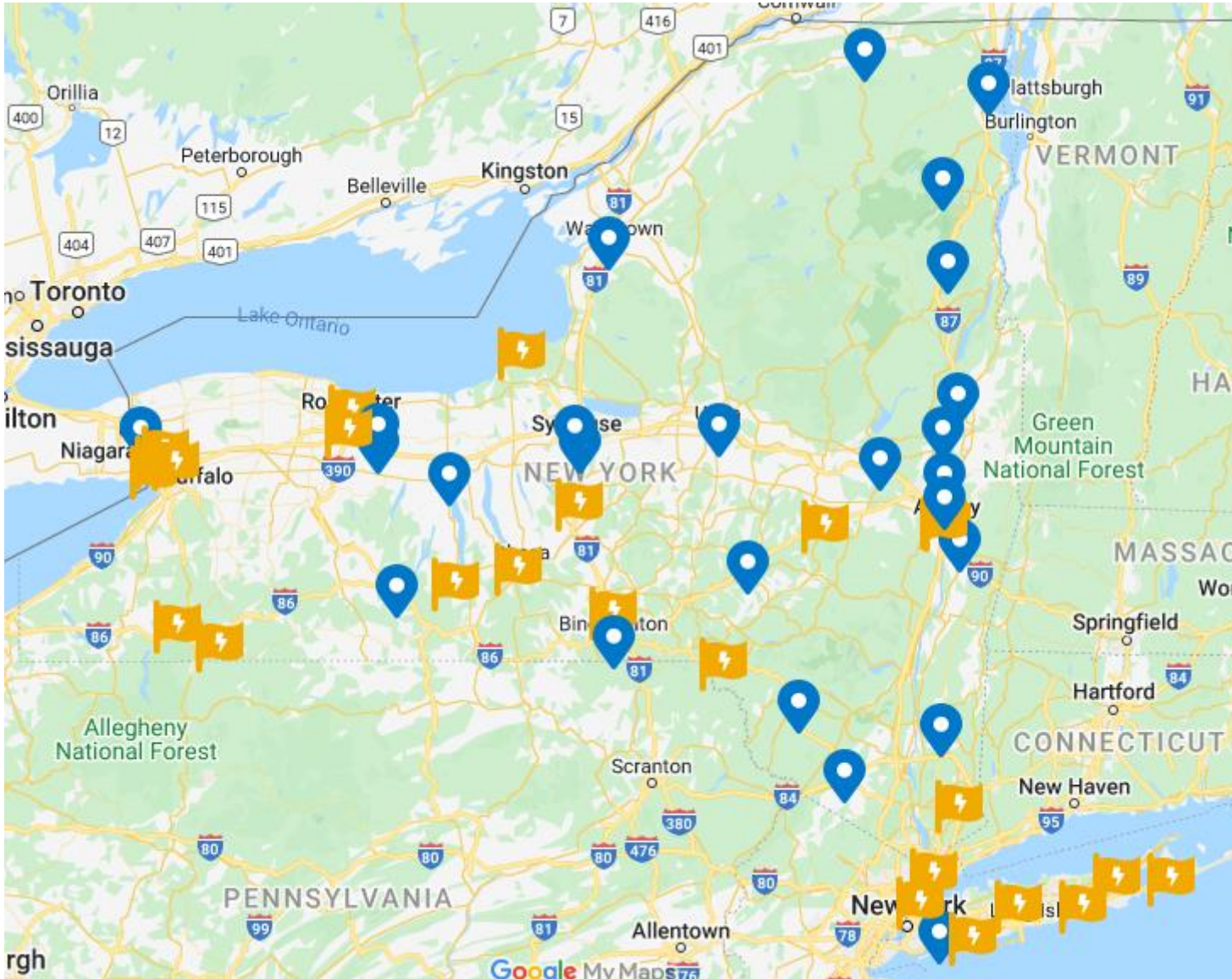
Every EV includes trip planning software in their navigation. This will direct you to needed chargers along your trip.



More chargers are being added every day.



More chargers are being added every day.



EVolve NY - NYS Program to add DC Fast Chargers

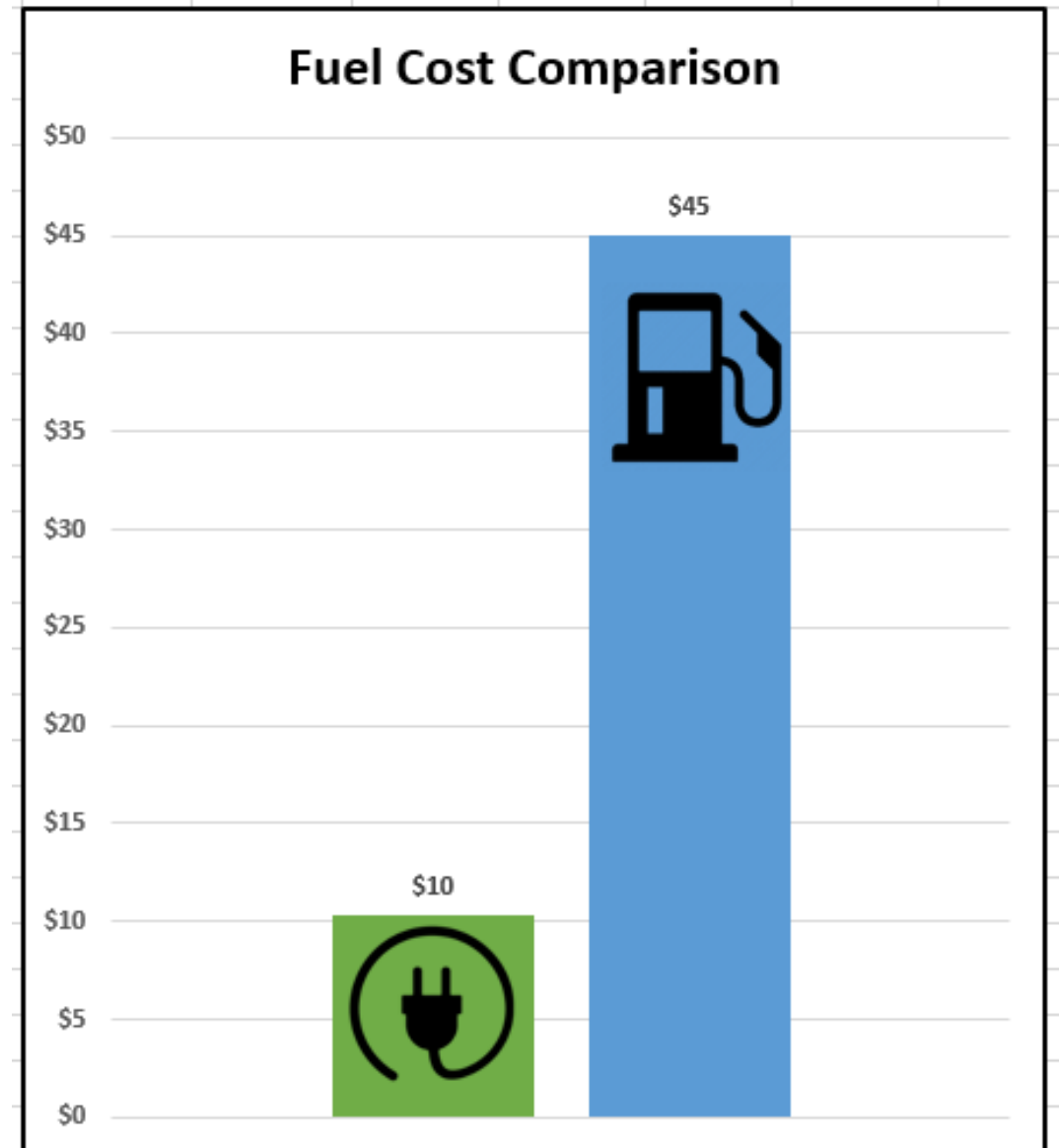
- ▶ 25 sites operational as of June 2022
- ▶ Typically 3x150 kw, 1x350 kw chargers per site
- ▶ JFK charging hub: 10 chargers
- ▶ Charge any electric vehicle - CCS and Chademo.

Saving Money - Cost to drive 300 miles.

| | | | |
|------------------------|--------|---------|------|
| Price of Gas | \$4.50 | Gal | |
| Price of Electricity | \$0.14 | Kwh | |
| EV fuel efficiency | 245 | Wh/mile | |
| Gas fuel efficiency | 30 | MPG | |
| Calculate cost for | 300 | Miles | |
| Cost Comparison | | | |
| | | EV | Gas |
| 300 Miles | | \$10 | \$45 |
| EV Fuel Savings | | 77% | |

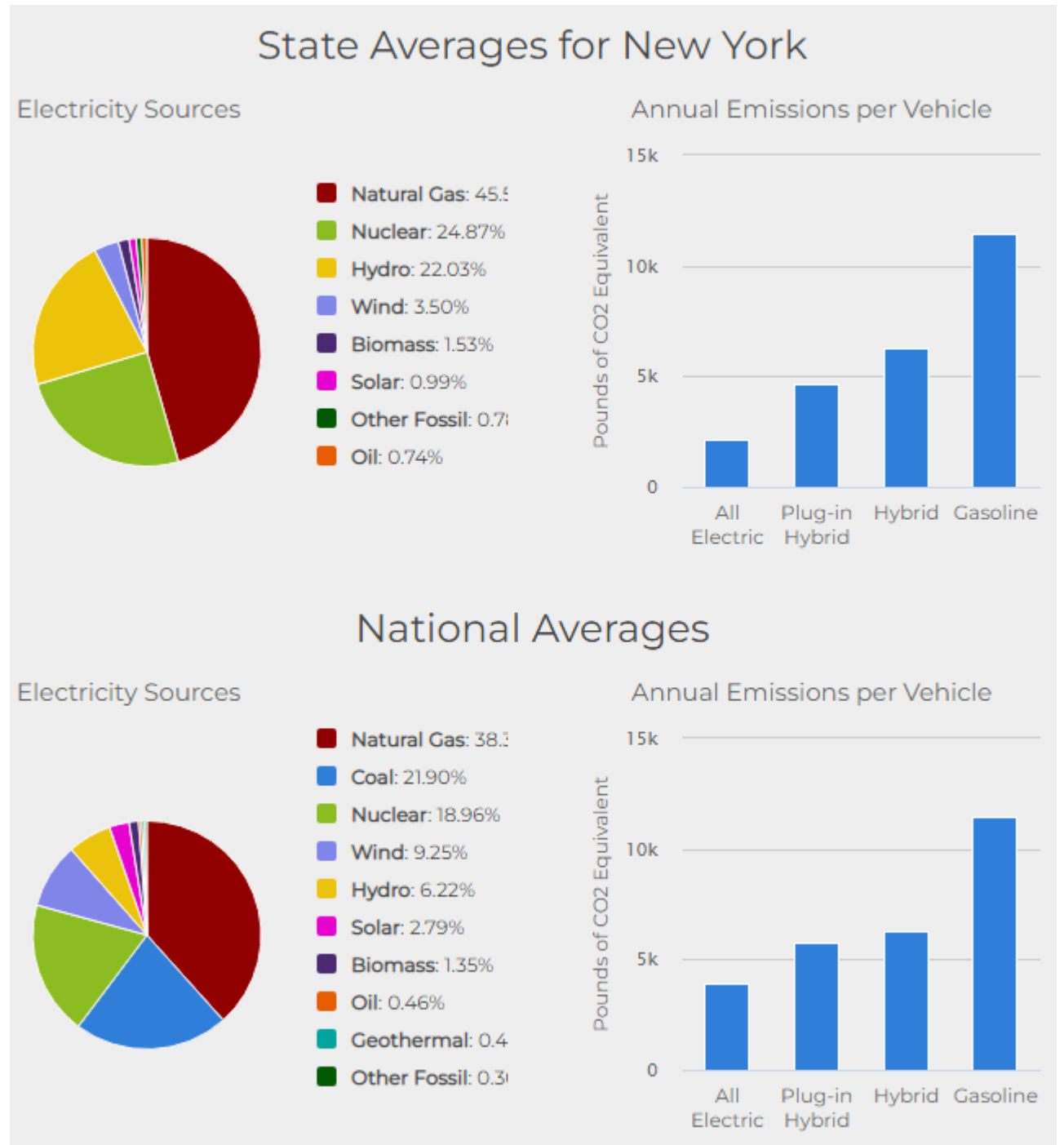
Save \$1157 per year, driving 10,000 miles.

Source: Steve Wehr spreadsheet



Saving Greenhouse Gas Emissions

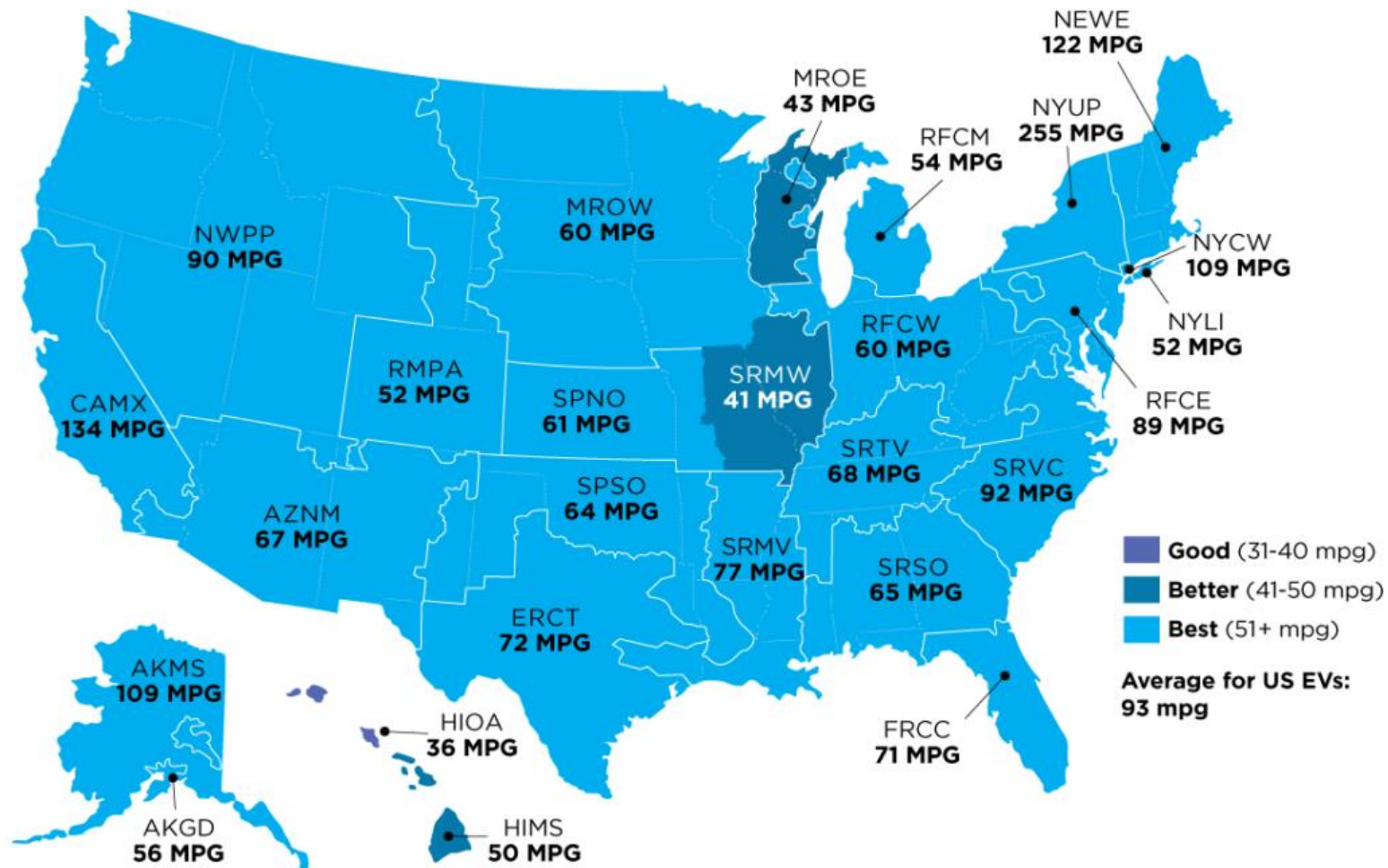
Source:
afdc.energy.gov/vehicles/electric_emissions.html



Saving Greenhouse Gas Emissions

EV Emissions as Gasoline MPG Equivalent

Average EV, 2021*



EVs are Much Cleaner than Gasoline Cars, Especially in NYS

In NYS, EVs have an average efficiency between 52mpg in Long Island - and 255mpg upstate (highest in the nation). Traditional cars have stagnated at ~25mpg. EVs nationwide average 93mpg.

EVs are the only vehicles that get cleaner as you drive them. As the grid gets cleaner, your EV gets cleaner.

* based on 2019 reported electricity generation emissions



Thank You!

Let's see a charger demo.

