Charged Up:
Everything you need to know about EV Charging

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GREEN ENERGY CONSUMERS ALLIANCE
Formerly known as People's Power & Light/Mass Energy

Webinar logistics

Everyone is muted to avoid background noise.
We will have regular breaks for questions.
Send questions to me via chat.

Our mission

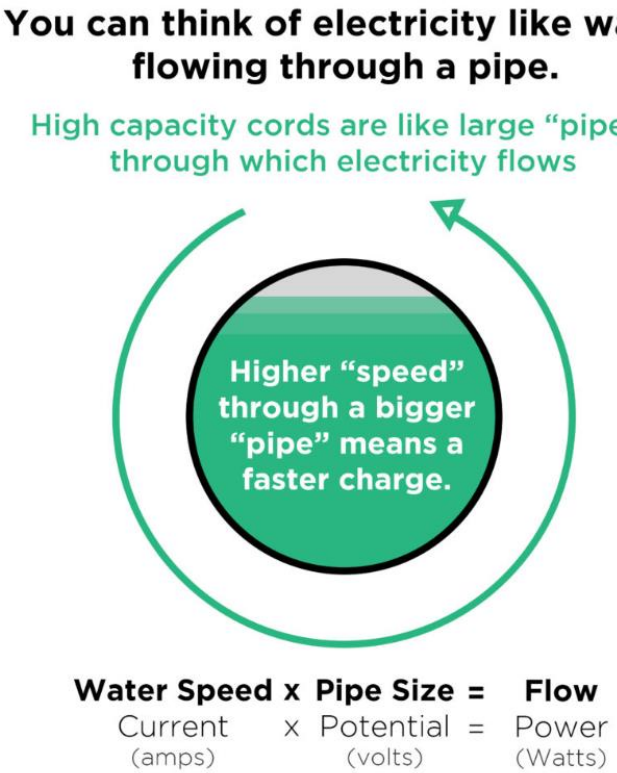
To harness our power as energy consumers to speed the transition to a low-carbon future.

Agenda

- How charging works
- Level 1 and Level 2 charging
- Installing a charging unit at home
- Public charging networks
- DC fast charging
- “Smart” charging

The basics of electricity

- **Voltage** is determined by the power source and is measured in volts.
- **Current** is drawn by the electrical device and limited to a safe level by circuit breakers; measured in amps
- **Power** is the amount of energy delivered in a given amount of time and is measured in kilowatts.
- **Energy** is the total available capacity to do work and is measured in kilowatt-hours.



Source: Plugless

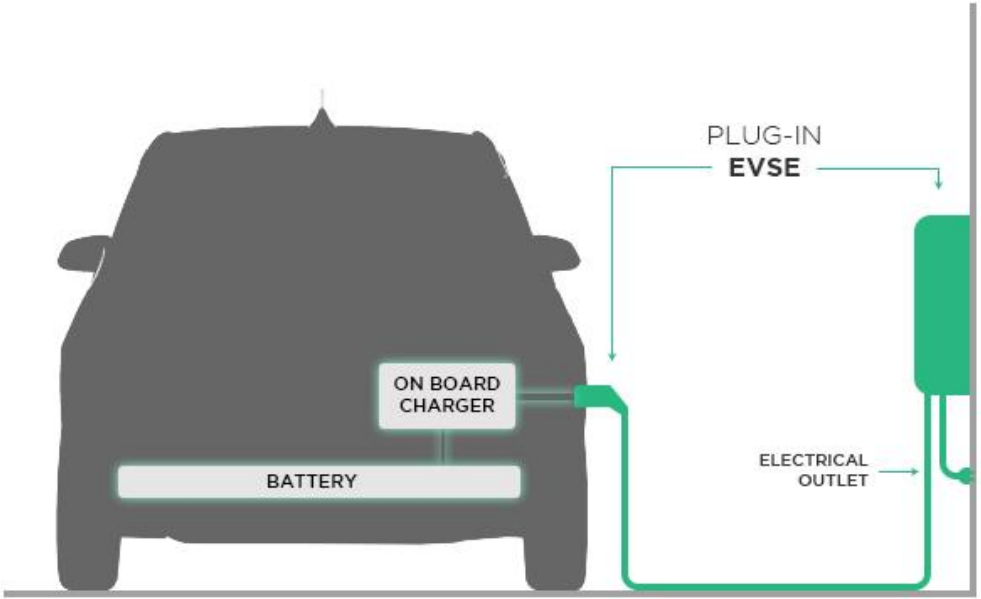
Driving range and charging speed

How far can I go?

- Size of battery
- Efficiency
- Weather

How fast can I charge?

- Power source
- Onboard charger
- Weather



Source: Fastned

Level 1 charging

- 4 miles of range per hour of charging
- Plug in anywhere with a standard 120-volt outlet
- 2 ports: J1772 and Tesla

J1772

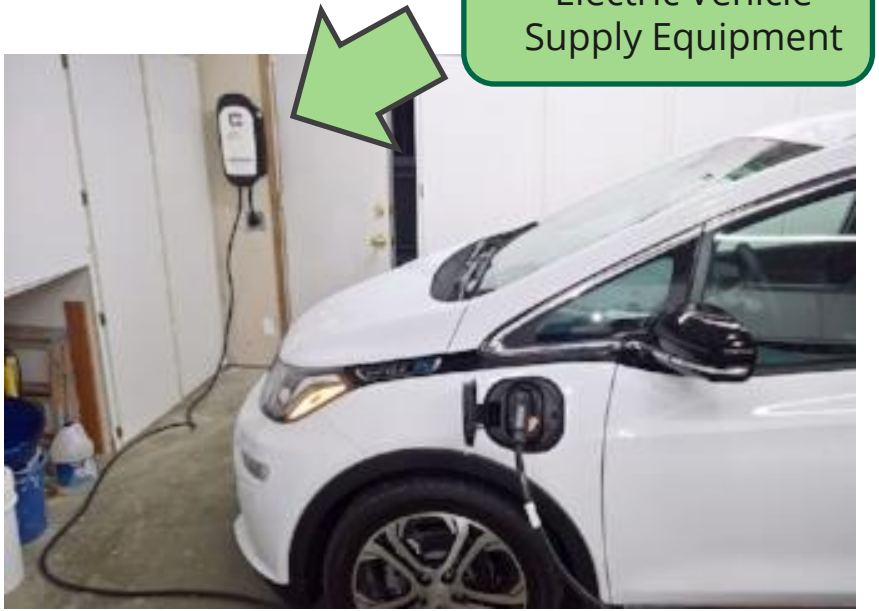
Tesla

Level 2 charging

- 11 – 25 miles of range per hour of charging
- Requires a specialized charging station unit and a 240-volt outlet
- Public and at-home

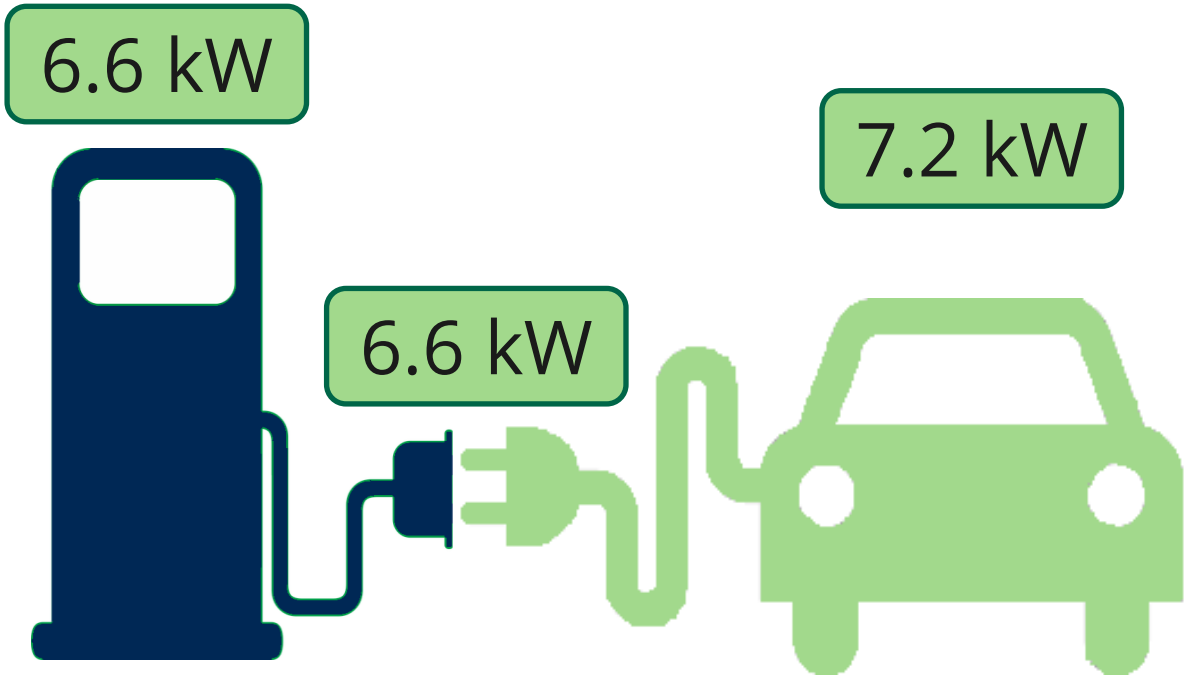
J1772

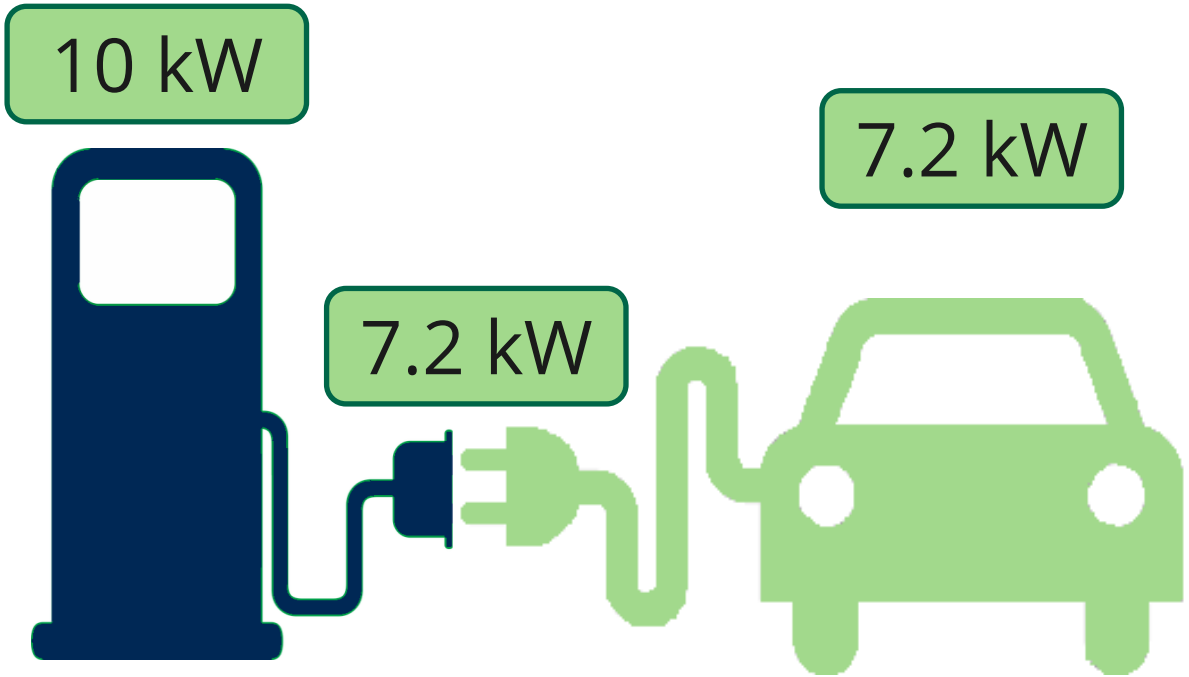
Tesla



How fast can my EV charge?

Onboard charger capacity	Maximum level 2 charging speed	Cars
7.7 – 10 kW	25 – 30 miles of range per hour of charging	Tesla Model S, Tesla Model X, Tesla Model 3
7.4 kW	24 miles of range per hour of charging	BMW i3
6.6 – 7.2 kW	22 – 24 miles of range per hour of charging	Nissan LEAF, Chevrolet Bolt, Hyundai Kona EV, Kia Niro EV, Volkswagen eGolf, Hyundai Ioniq EV, Chrysler Pacifica
3.3 – 3.7 kW	11 miles of range per hour of charging	Toyota Prius Prime, Honda Clarity PHEV, Mitsubishi Outlander PHEV, Kia Niro PHEV, Chevrolet Volt


6.6 kW
7.2 kW
6.6 kW


10 kW
7.2 kW
7.2 kW

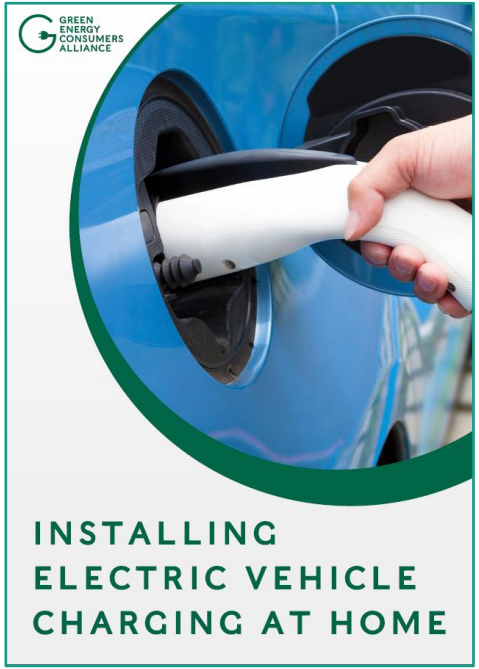
Up next: Charging at home and in public

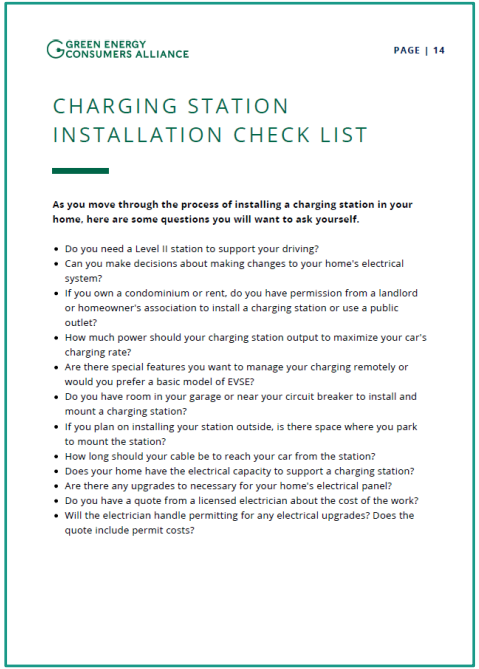
It’s easy to charge at home!

Check out our “Installing Electric Vehicle Charging at Home” guide to learn…

- How to determine your charging needs
- How to pick a charging station unit
- What you need an electrician for

It typically costs between $600 - $1,200 for the purchase and installation of a charging unit, including electrician’s labor

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CHARGING STATION INSTALLATION CHECK LIST

As you move through the process of installing a charging station in your home, here are some questions you will want to ask yourself.

- Do you need a Level II station to support your driving?
- Can you make decisions about making changes to your home's electrical system?
- If you own a condominium or rent, do you have permission from a landlord or homeowner's association to install a charging station or use a public outlet?
- How much power should your charging station output to maximize your car's charging rate?
- Are there special features you want to manage your charging remotely or would you prefer a basic model of EVSE?
- Do you have room in your garage or near your circuit breaker to install and mount a charging station?
- If you plan on installing your station outside, is there space where you park to mount the station?
- How long should your cable be to reach your car from the station?
- Does your home have the electrical capacity to support a charging station?
- Are there any upgrades to necessary for your home's electrical panel?
- Do you have a quote from a licensed electrician about the cost of the work?
- Will the electrician handle permitting for any electrical upgrades? Does the quote include permit costs?

Electric Vehicle Supply Equipment

There are hundreds of available charging units to choose from.

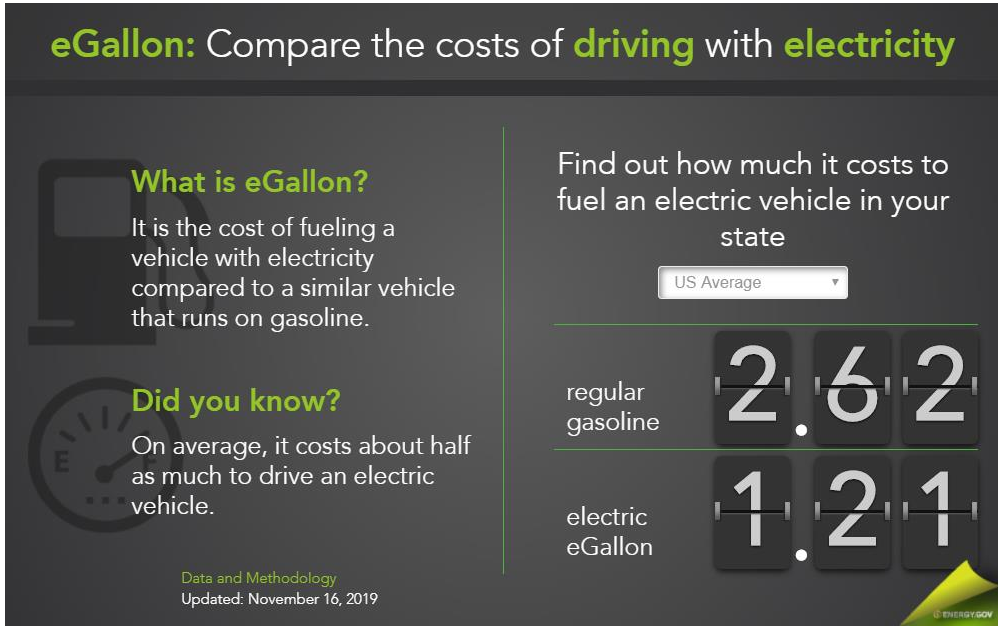
- **Current**– how much power do you want the station to deliver?
- **Connectivity** – do you want to manage or monitor charging from your smartphone?

How much does it cost to charge at home?

Assuming you live in New England and drive 40 miles a day, your annual fuel costs would be

- $847 with an EV
- $1460 with a gas-powered vehicle

More than $3,000 in savings over 5 years!

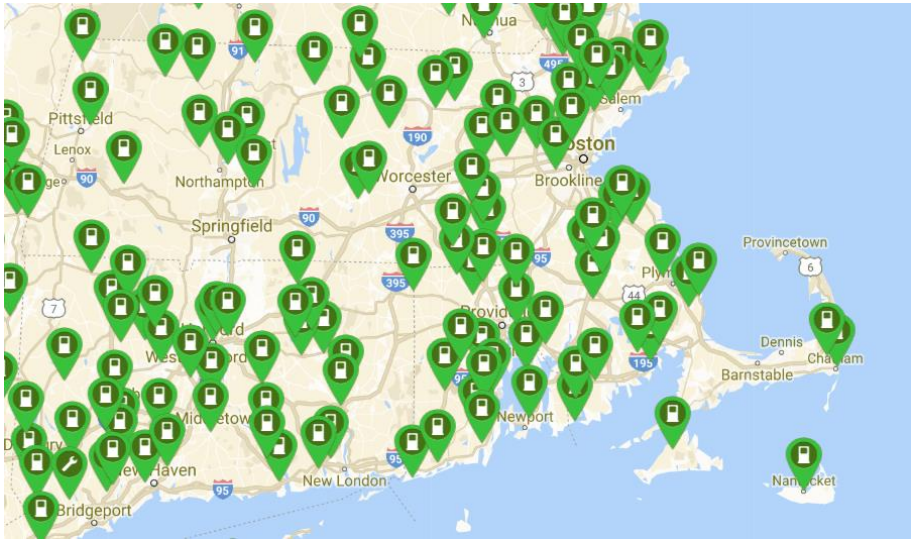


Source: energy.gov

Public Level 2 charging

- Think about your regular driving routes and destinations where you park your car often.
- Use **PlugShare** to see if there charging stations near you.
- Subscribe to a charging network if you anticipate using it frequently.

Unlike gas stations, EV chargers are often hidden from view, so there are probably more charging stations around you than you think!



PlugShare

Public charging networks

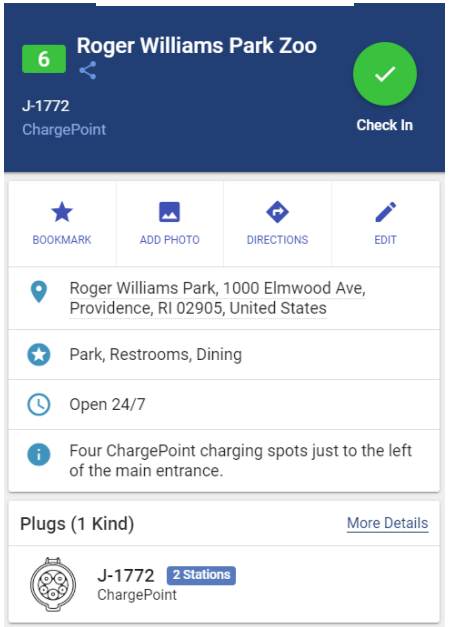
chargepoint greenlots electrify america blink EVgo

- Charging networks use “smart” stations that help you monitor charging, estimate costs, get a notification when charging is done, etc. using your smartphone
- Non-networked stations: no smartphone integration, not part of a greater system

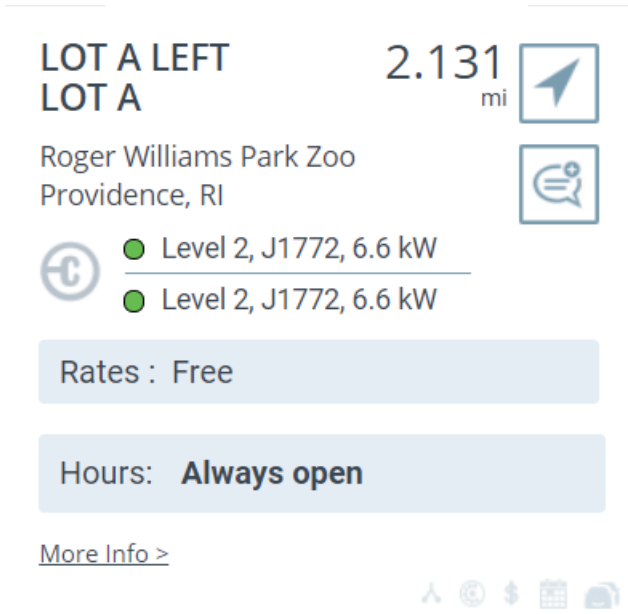
A trip to Roger Williams Park Zoo

- What kind of port is available?
- How many stations?
- Is someone else plugged in already?
- How much will it cost to charge?
- Do I have to pay for parking, too?
- How much power will the station deliver?

PlugShare

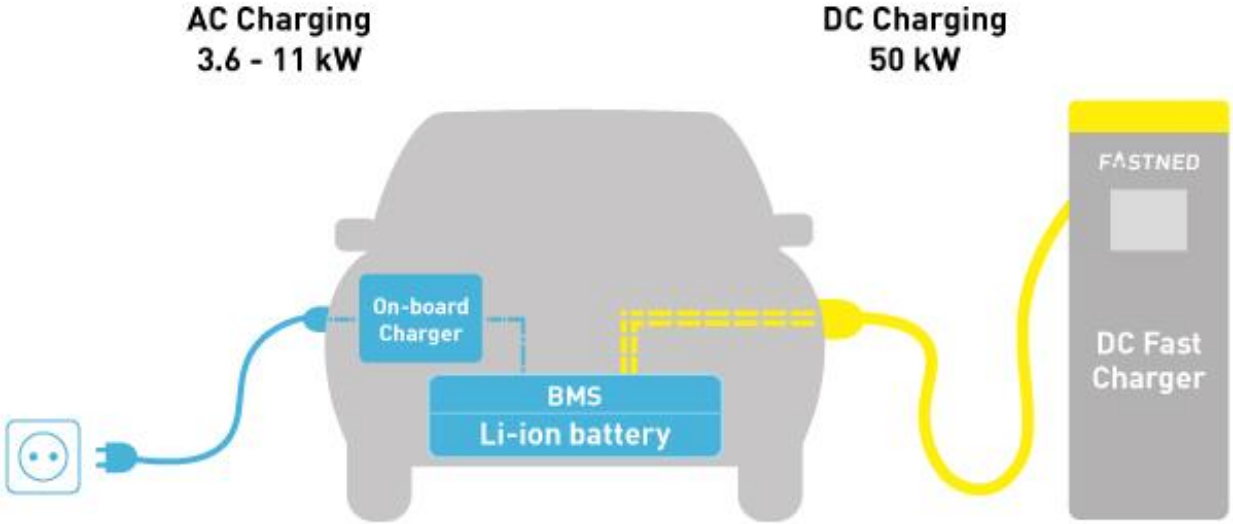


chargepoint

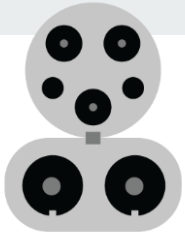


Up next: Fast charging and smart charging

DC fast charging (Level 3)



Source: Fastned



J1772 combo

CHAdeMO

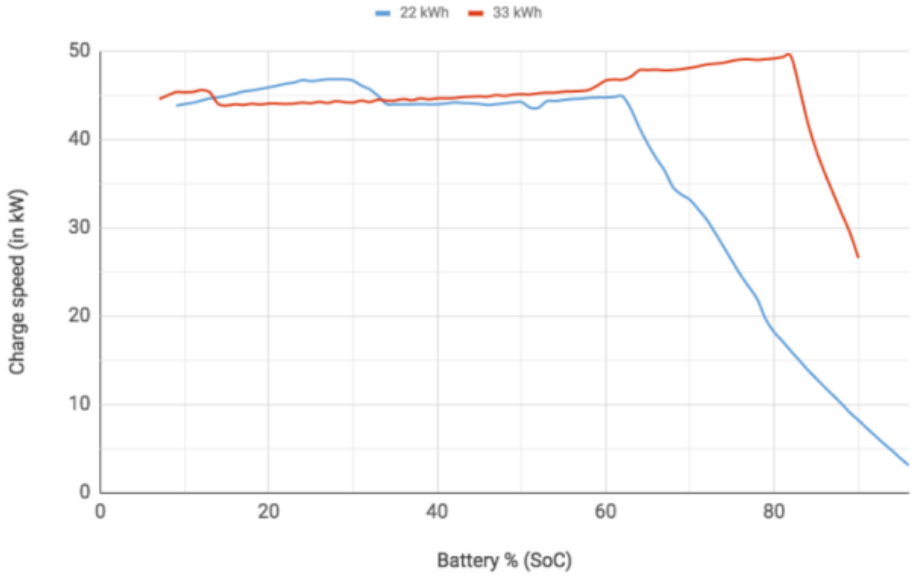
Tesla

What affects the speed of fast charging?

DC fast charging rate will vary according to

- EV's battery management system
- Temperature
- State of charge
- Total battery capacity
- Station power

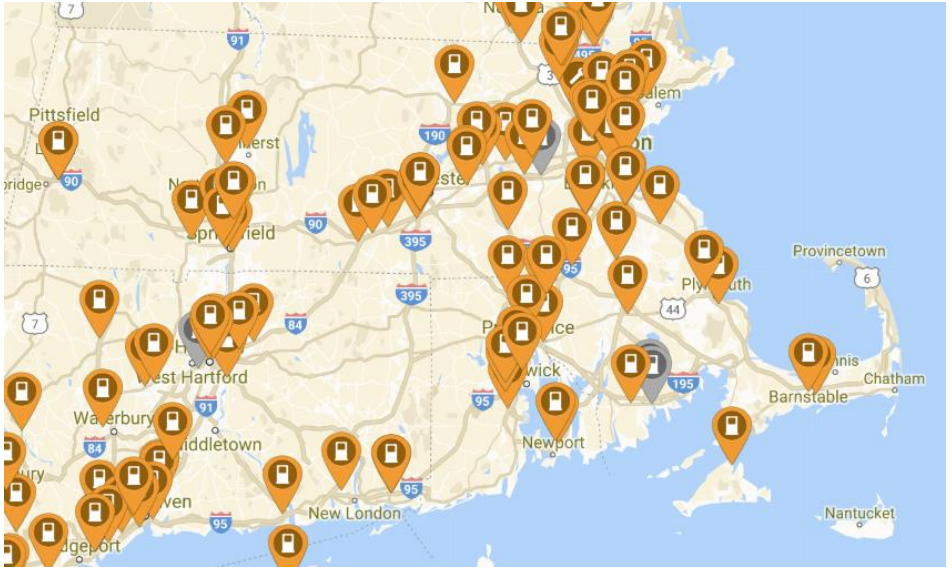
25 kW = 50 miles in 30 minutes
50 kW = 90 miles in 30 minutes
100 kW = 120 miles in 30 minutes
150 kW = 150 miles in 30 minutes



Source: Fastned

How are we building the DC fast charging network?

- It costs $10,000 - $40,000 to install a single DC fast charger, compared to $400 - $6,500 for public Level 2 charging
- Need to prioritize DC fast charging along high-traffic corridors and highways, where drivers are most likely to be making a long distance trip
- Fast charging is not meant to replace the 5-minute refuel time of gasoline



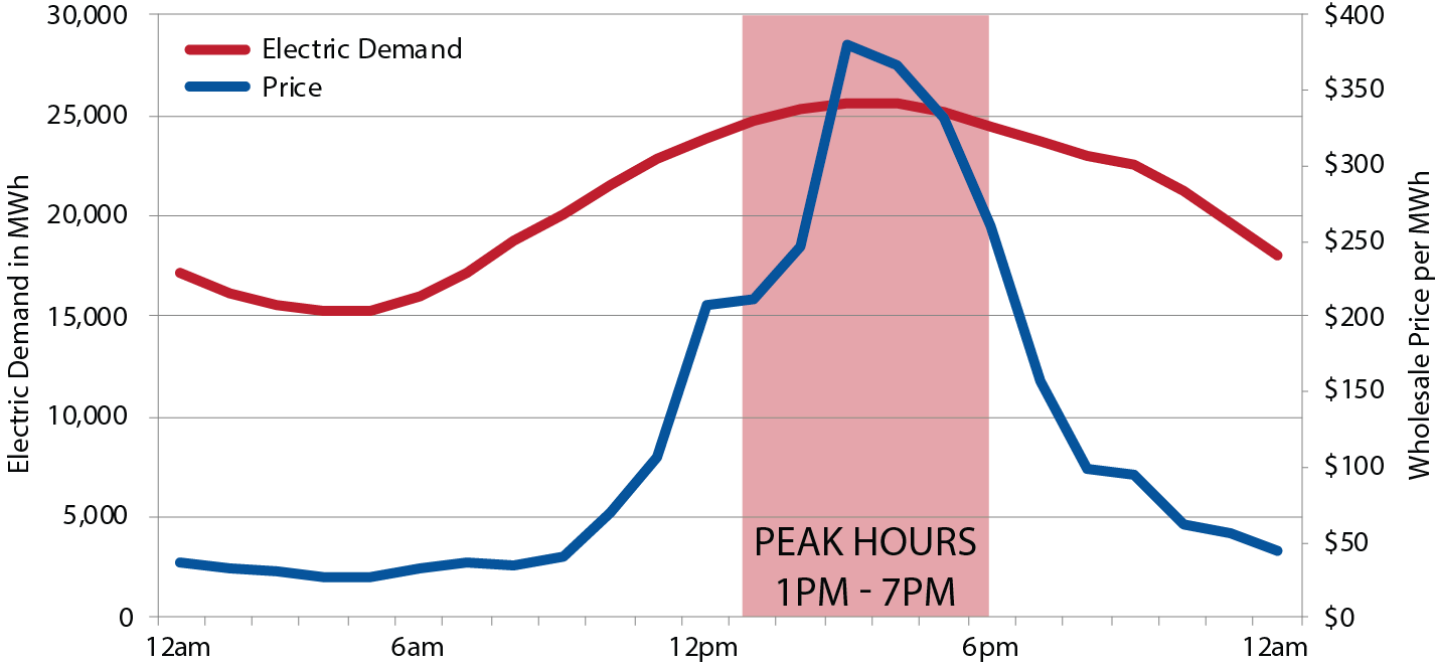
PlugShare

Charging can be *more convenient* than gas

Refuel at a gas station when you're nearly empty, once every 10 days or so

Charge often at home or at work to replenish the miles that you've driven in a day

Peak and off-peak charging



EV HOME CHARGER DEMAND RESPONSE

You can earn rewards of up to $300 by enrolling your home electric vehicle (EV) charger in Eversource's ConnectedSolutions.

nationalgrid fleetcarma a division of GEOTAB

SmartCharge Rhode Island

Source: Plugless

Questions?

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