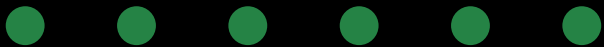
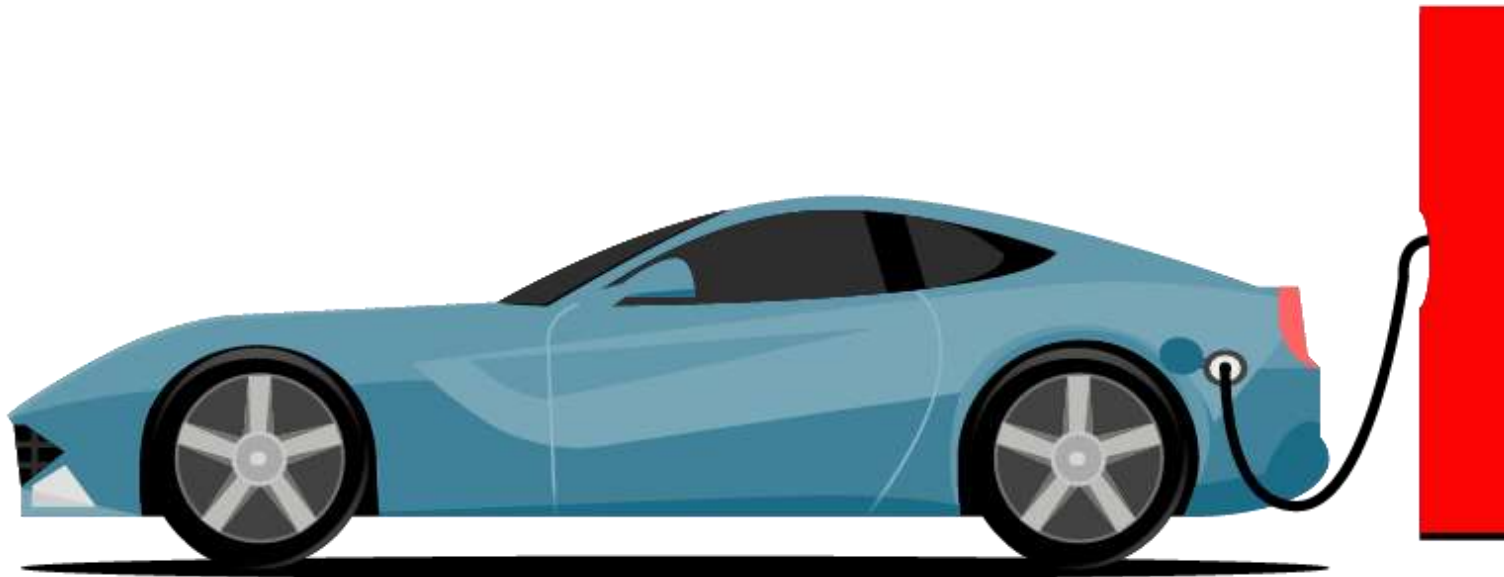


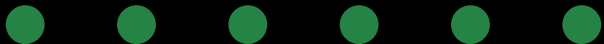
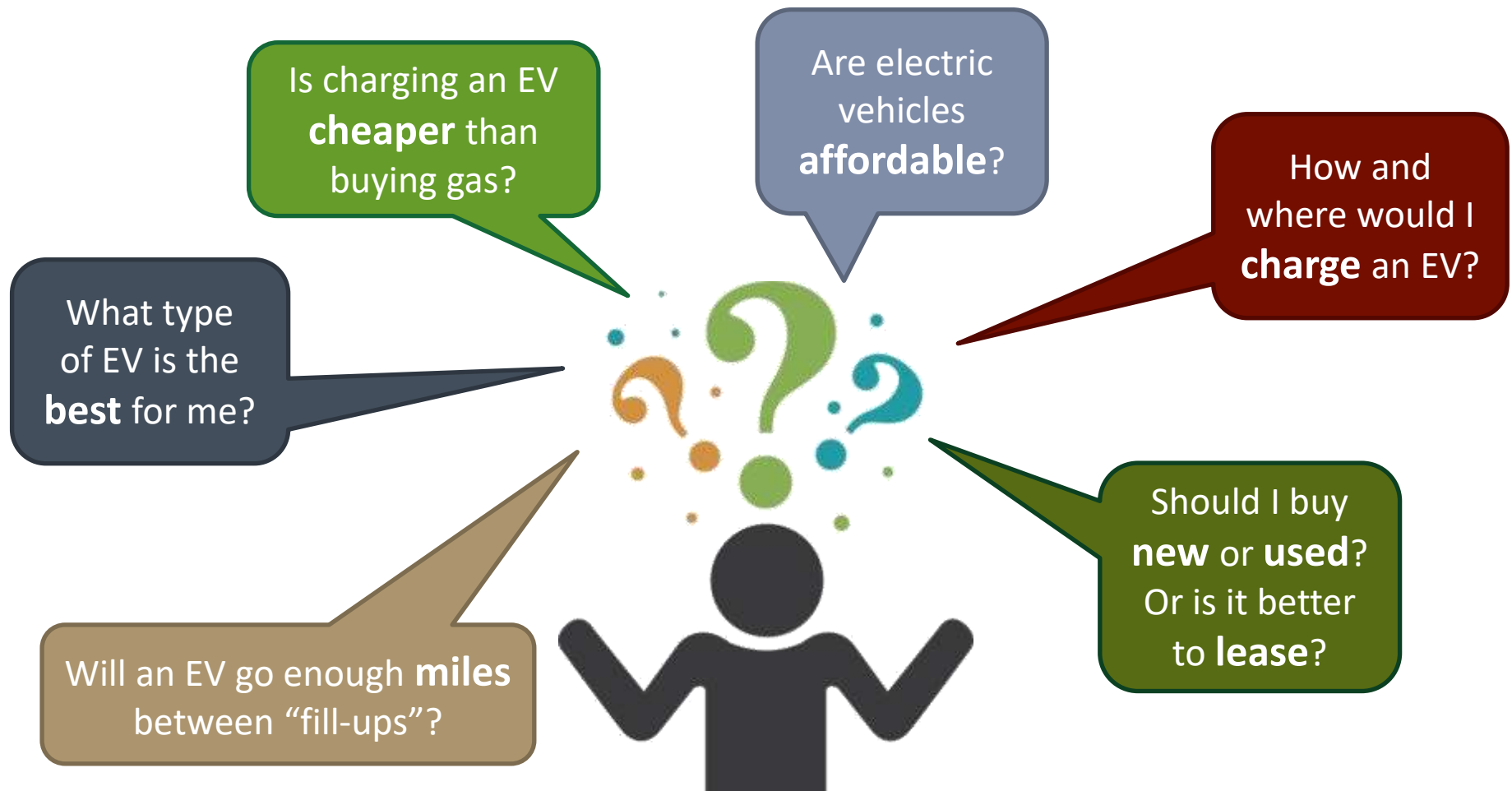
# ELECTRIC VEHICLES 101

JANUARY 20, 2021

Heather Heinbaugh

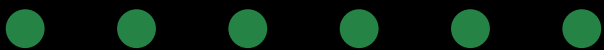


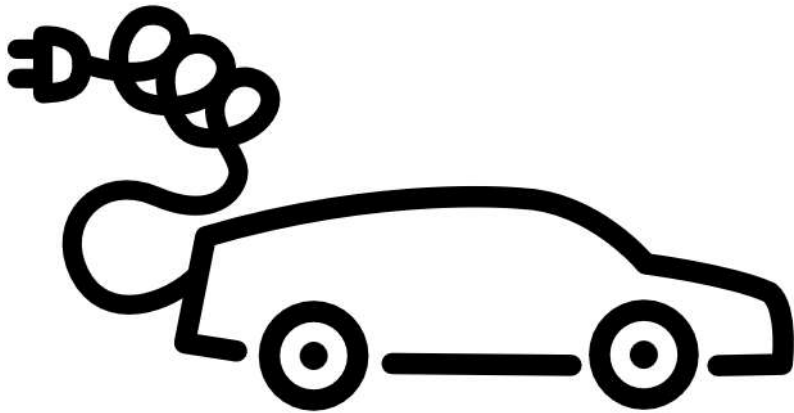
# Is an EV right for me?



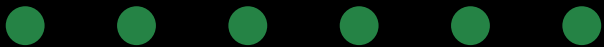
# Tonight's Agenda

- Reasons to Drive an Electric Vehicle
- Choosing Your Electric Vehicle
- Getting Charged
- Paying for Your Electric Vehicle and Charger
- Living with your EV

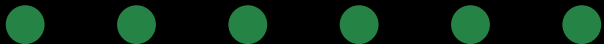
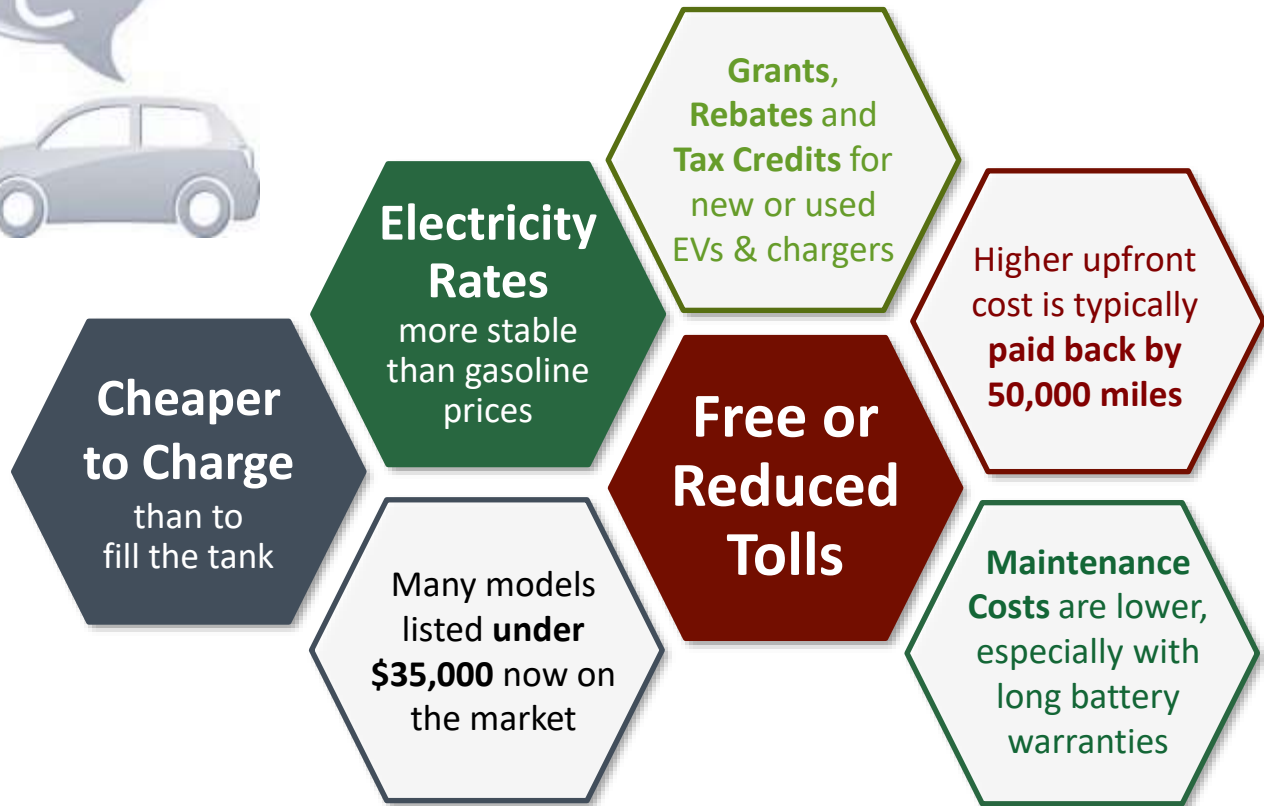




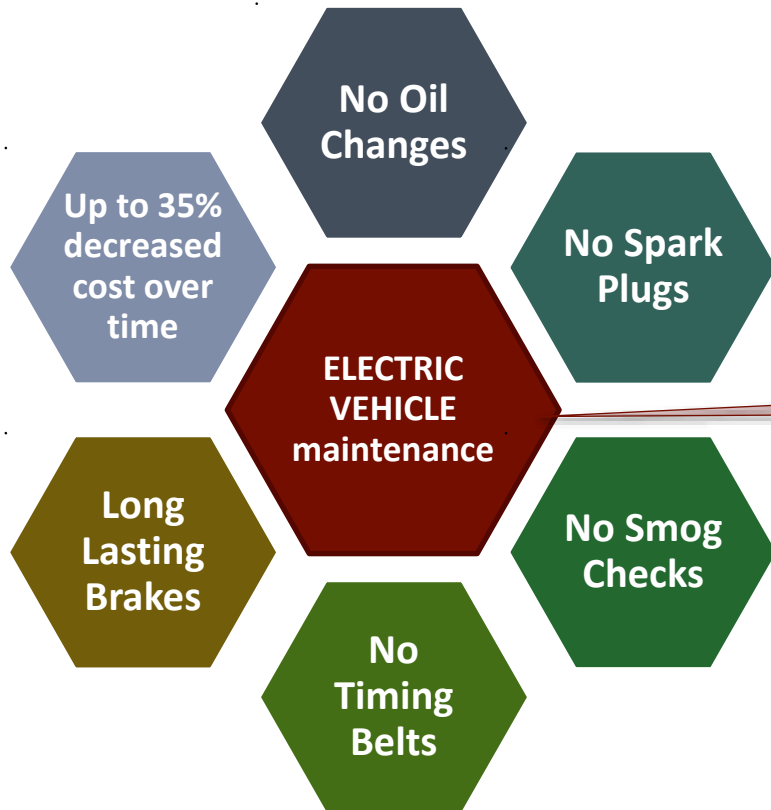
# TOP REASONS TO DRIVE AN ELECTRIC VEHICLE



# Lower Lifetime Cost



# Lower Maintenance (Save \$\$\$)

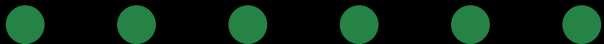
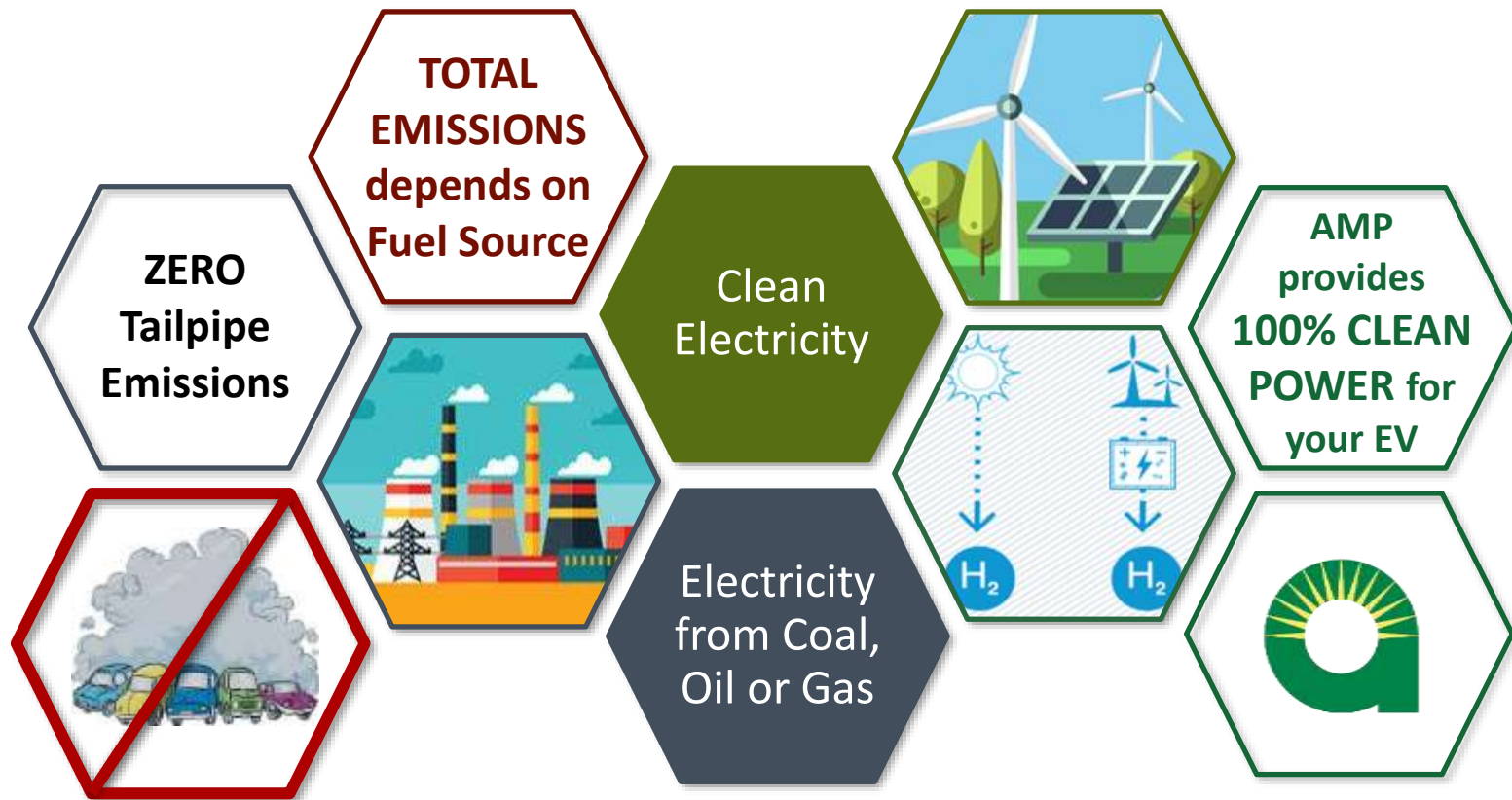


## Top 10 Conventional Car Repairs (Source: 2015 Forbes/Credit: credit.com )

1. Replace Oxygen Sensor - \$249
2. Replace Catalytic Converter - \$1,153
3. Replace Ignition Coils & Spark Plugs - \$390
4. Tightening or Replacing Fuel Cap - \$15
5. Replace Thermostat - \$210
6. Replace Ignition Coils - \$236
7. Replace Mass Air Flow Sensor - \$382
8. Replace Spark Plugs & Wires - \$331
9. Replace EVAP Purge Control Valve - \$168
10. Replace EVAP Purging Solenoid - \$184

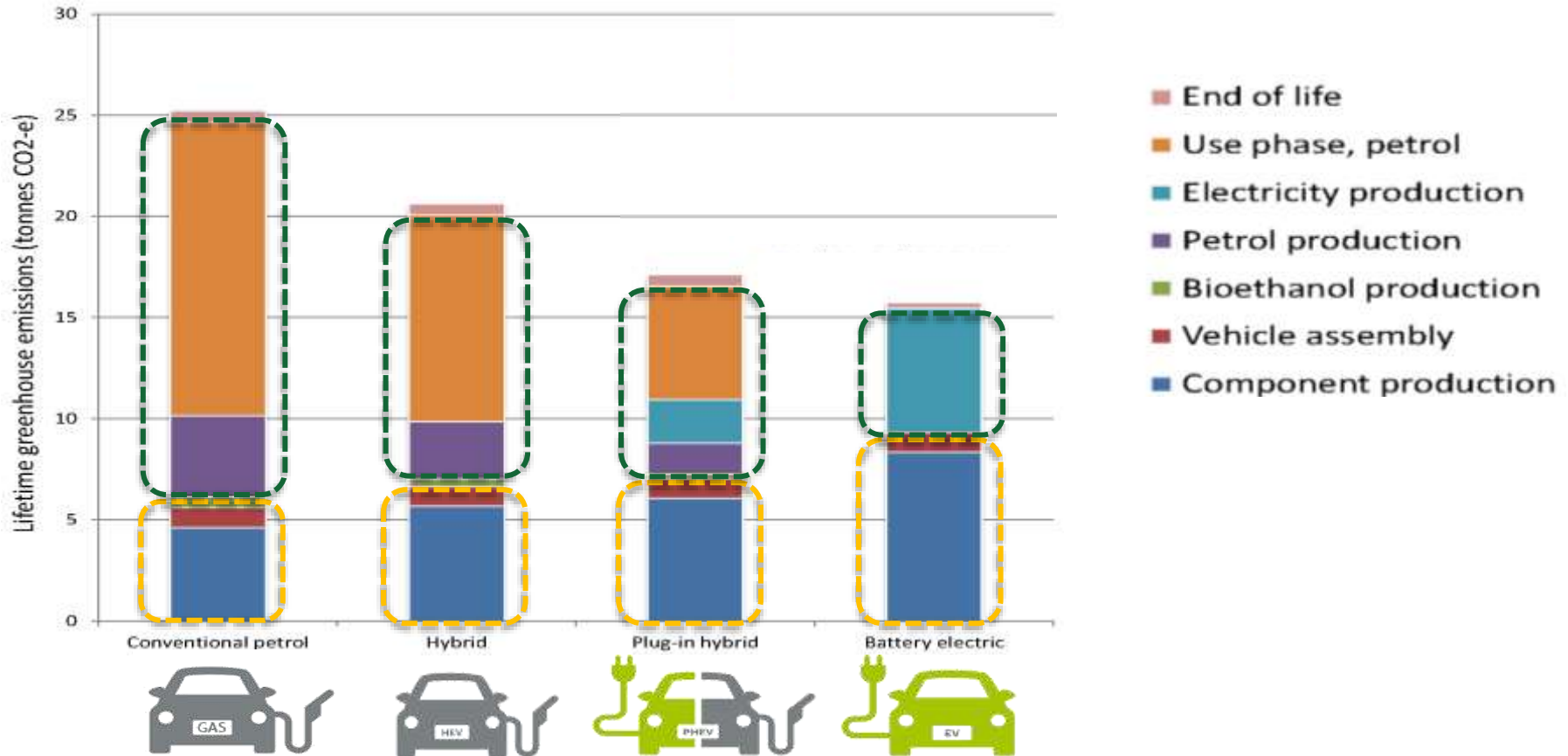


# Lower Emissions



# Lower Emissions

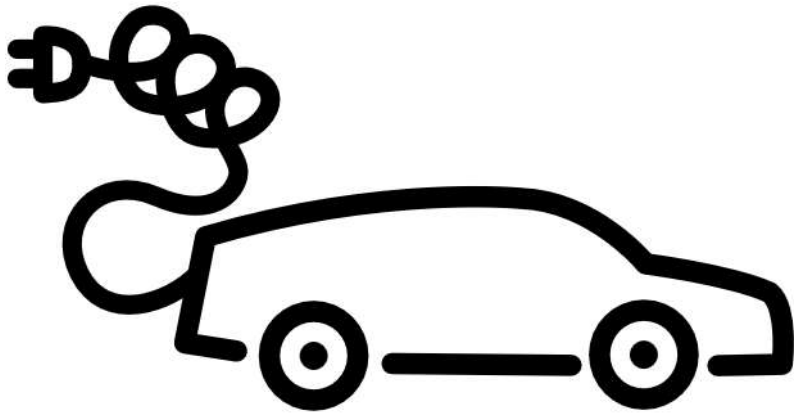
## Average Lifetime Emissions\*



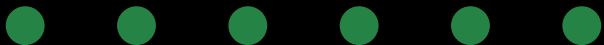
\*Typical scenario from bravenewclimate.com



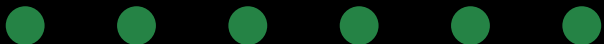
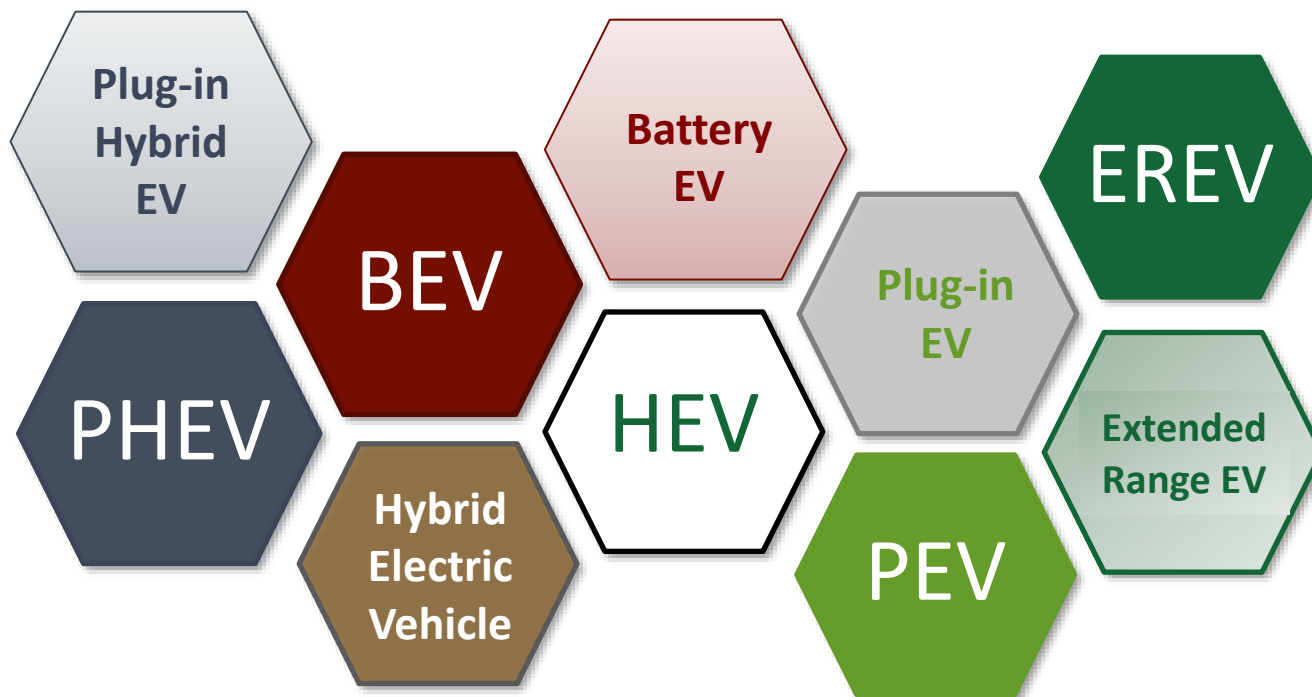




# CHOOSING AN ELECTRIC VEHICLE

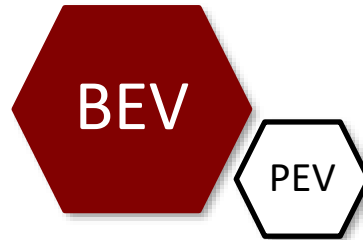


# What kind of EV is right for me?



# BEV: Battery Electric Vehicles

How does it work?



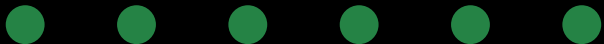
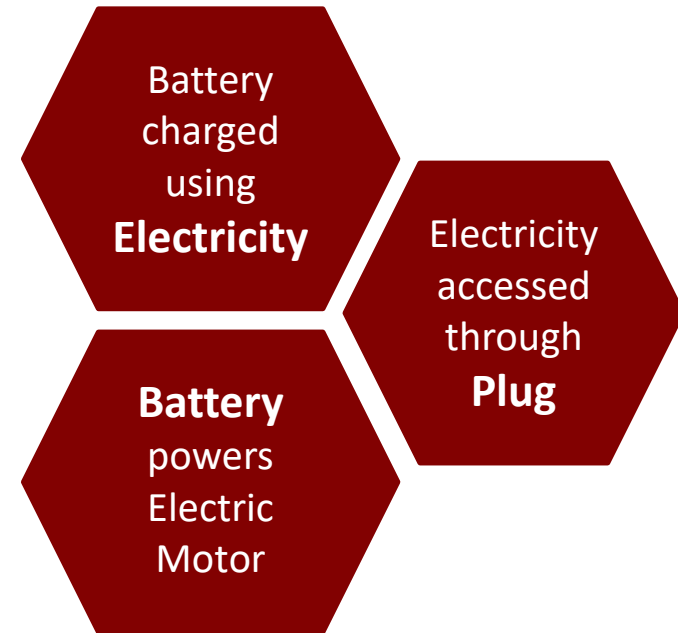
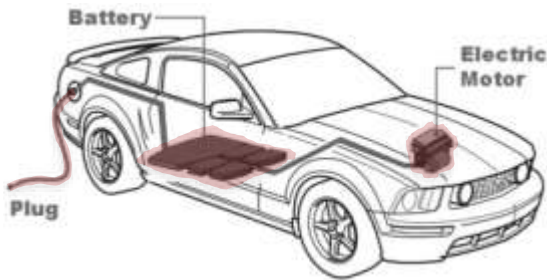
Hyundai Ioniq



Tesla Model S



Chevy Bolt



# BEV: Battery Electric Vehicles

## ADVANTAGES

Simple, low maintenance  
**Electric Motor**

Many  
**Choices**  
of Vehicles

**BEV**

PEV

Hyundai Ioniq



Tesla Model S



Chevy Bolt



## DISADVANTAGES

**Charging Anxiety**

Where will I find a charge?

**Fill-upTime**











Charging takes more time than filling a gas tank

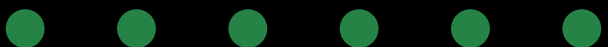
**Range Anxiety**

Can't drive as far between "fill-ups"










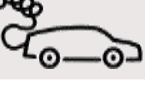


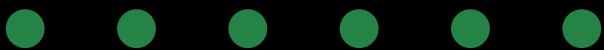
# BEVs Today – Short and Mid Range

Cost		50	60	70	80	90	100	110	120	130	140	150 Miles
\$\$	Smart ED											
\$\$\$	Fiat 500e											
\$\$\$	Honda Clarity Electric											
\$\$	Nissan Leaf 1 <sup>st</sup> Gen											
\$\$\$	Kia Soul EV											
\$\$\$	BMW i3											
\$\$	Ford Focus Electric											
\$\$	Volkswagen e-Golf											
\$\$	Hyundai Ioniq Electric											
\$\$	Nissan Leaf 2 <sup>nd</sup> Gen											



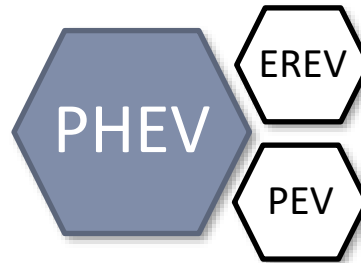
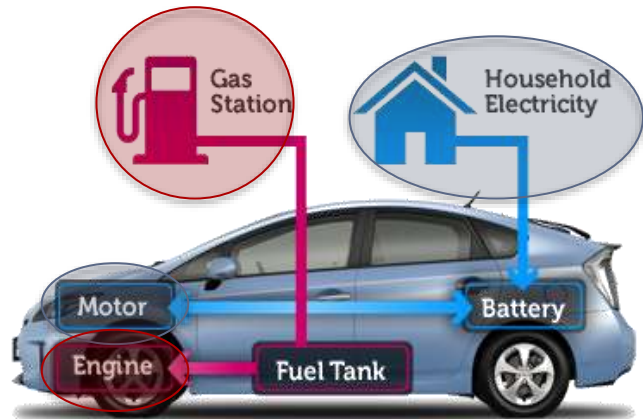
# BEVs Today – Long Range

Cost		200	220	240	260	280	300 Miles
\$\$\$	Nissan Leaf Long Range						
\$\$\$\$\$\$	Jaguar I-PACE						
\$\$\$	Chevy Bolt EV						
\$\$\$	Kia Niro EV (SUV)						
\$\$\$\$\$\$	Audi eTron (SUV)						
\$\$\$	Hyundai Kona Electric (SUV)						
\$\$\$\$\$\$	Tesla Model S 75D						
\$\$\$\$	Tesla Model 3 Mid Range						
\$\$\$\$	Tesla Model X (SUV)						
\$\$\$\$	Tesla Model 3 Long Range						



# PHEV: Plug-in Hybrid Electric

## How does it work?



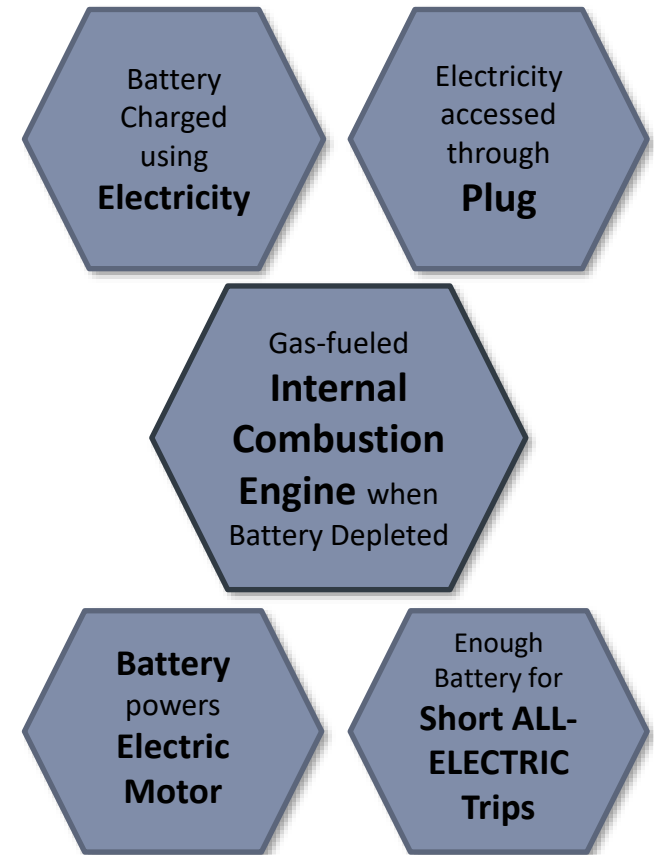
Chevy Volt



Honda Clarity PHEV

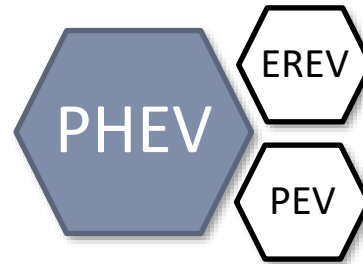
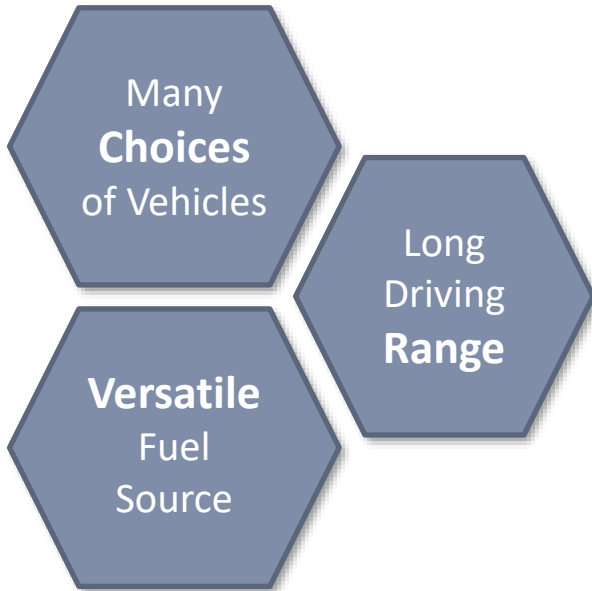


Toyota Prius Prime



# PHEV: Plug-in Hybrid Electric Vehicles

## ADVANTAGES



Chevy Volt



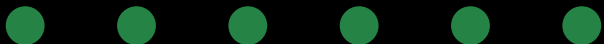
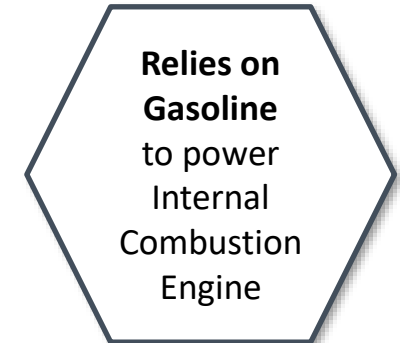
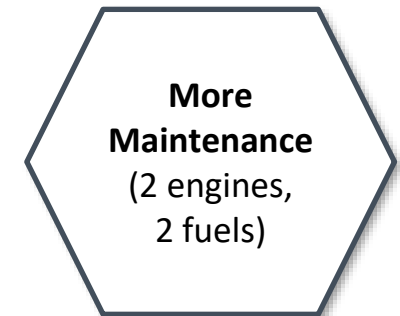
Honda Clarity PHEV



Toyota Prius Prime

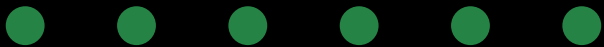
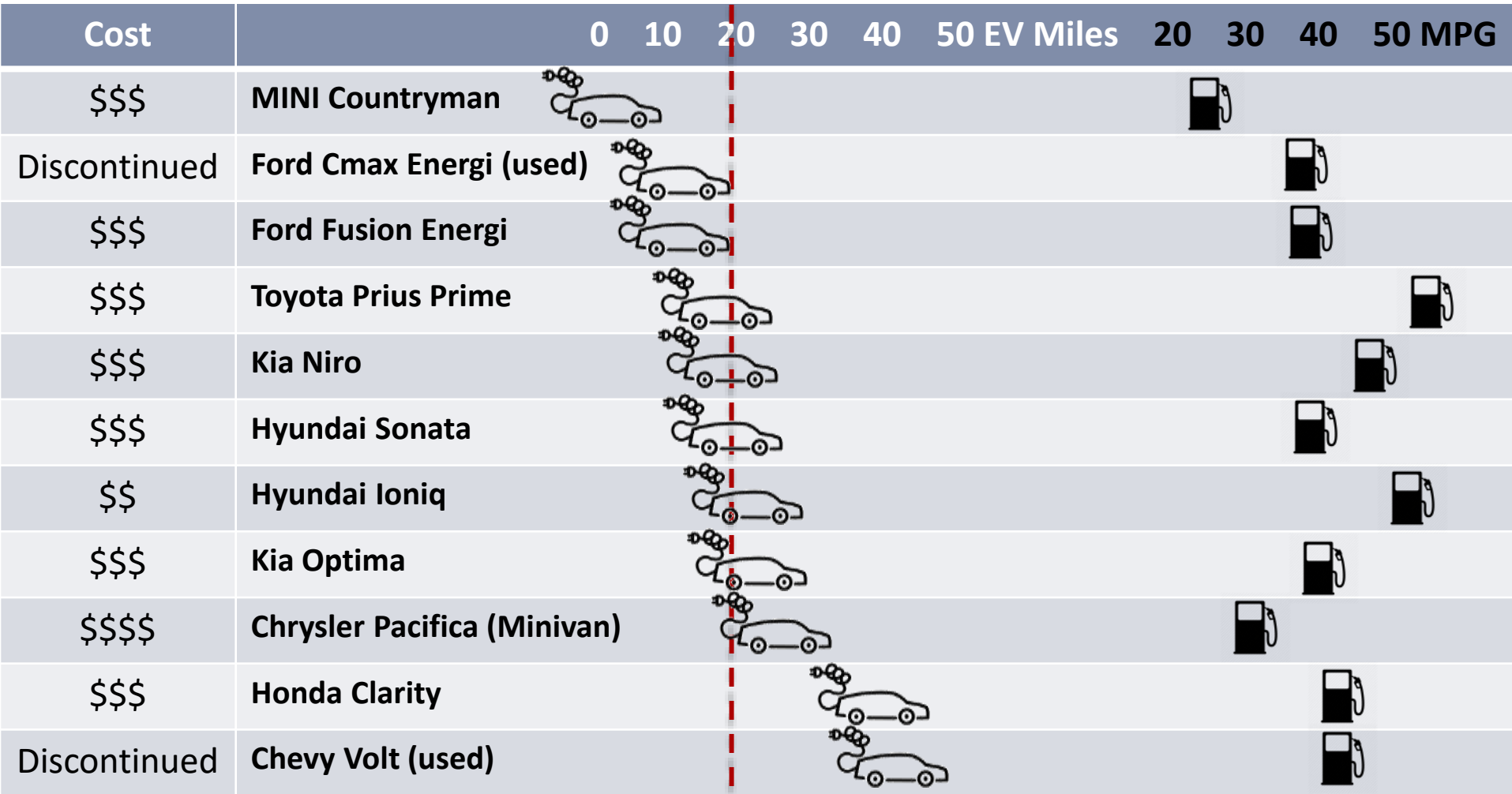


## DISADVANTAGES

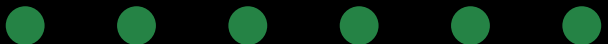
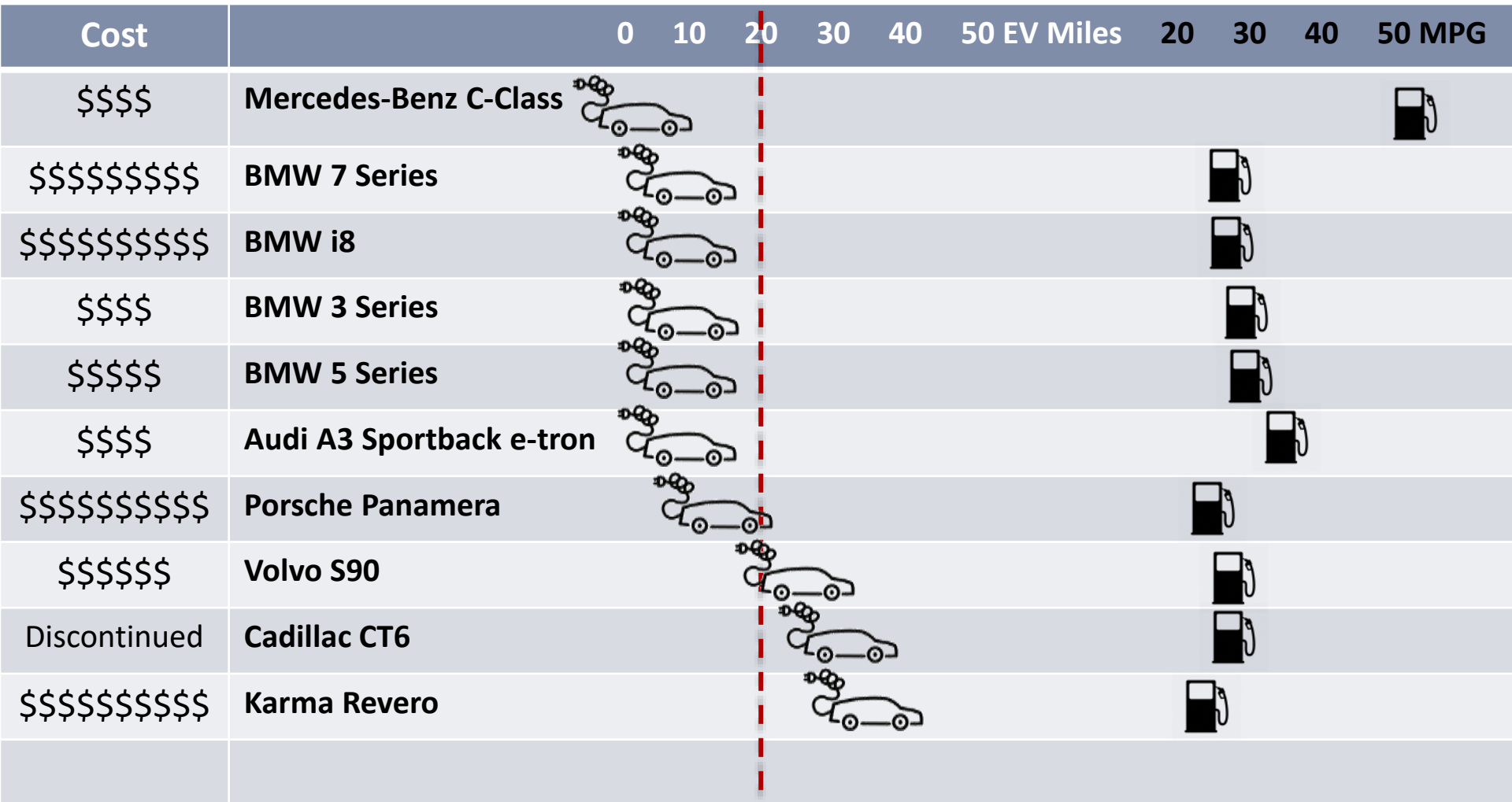
















# PHEVs Today - Sedans, Coupes & Compacts

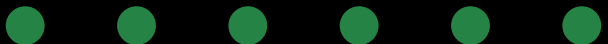


# PHEVs Today – Luxury Cars



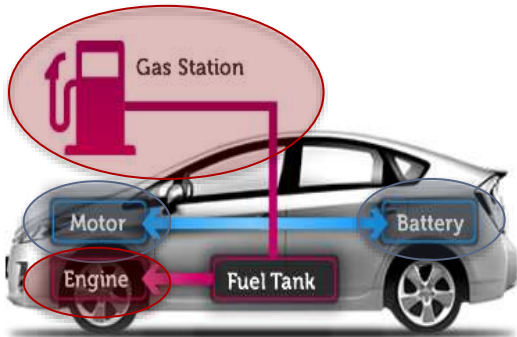
# PHEVs Today - SUVs

Cost		0	10	20	30	40	50 EV Miles	20	25	30	35 MPG
\$\$\$\$\$\$	BMW X5										
\$\$\$\$\$\$\$\$	Porsche Cayenne										
\$\$\$\$\$\$	Volvo XC60										
\$\$\$\$\$\$\$\$\$\$\$\$	Volvo XC90										
\$\$\$	Mitsubishi Outlander										
\$\$\$	Subaru Crosstrek Hybrid										



# What about a “Regular” Hybrid?

## How does it work?



Hybrid

Toyota Prius



Ford Fusion



Kia Niro

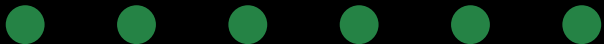


Relies on **Gasoline** to power Internal Combustion Engine

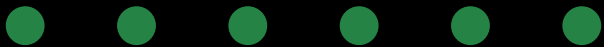
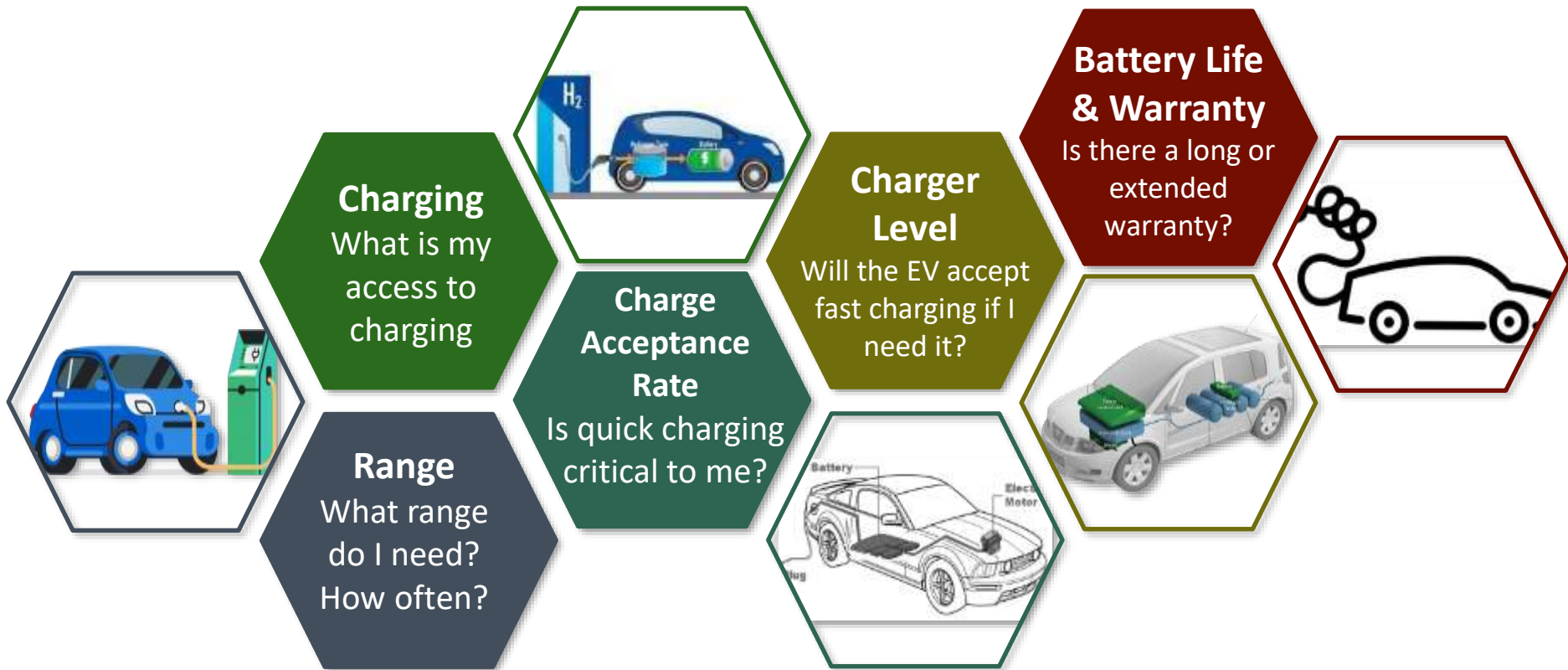
Drive using **Electric Motor** at low speeds and while cruising

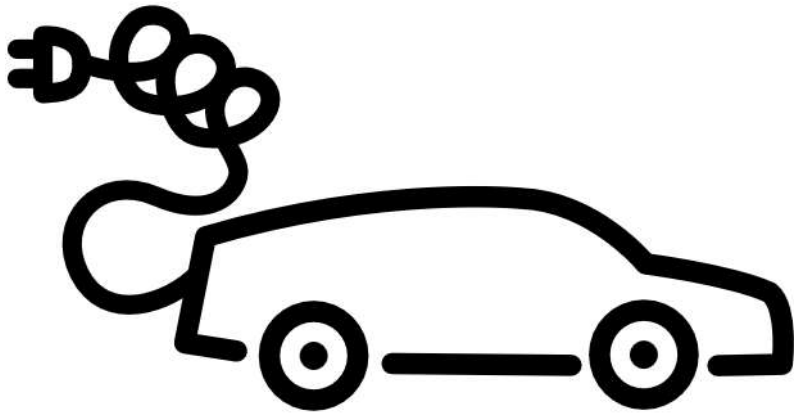
Electric Motor increases **fuel efficiency** and decreases **emissions**

Battery **Automatically Recharges** while Driving

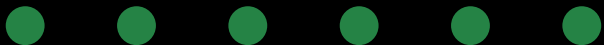


# Comparison Shopping





**GETTING CHARGED!**



# Choosing a Charging Approach

Charging stations are known as **Electric Vehicle Supply Equipment (EVSE)**

Charge speed depends on two things:  
(1) **Charger** and  
(2) **Vehicle Acceptance Rate**

## How Long Does it Take to Charge an EV?

Typical time to fill up an 80-mile battery by charging type

Level 1	overnight	16 hours
Level 2	longer stops	3.5 hours
DC Fast	on the go	30 minutes*



# Home Charging – Level 1

What is needed:

**Dedicated  
120 V circuit,  
Standard Outlet**

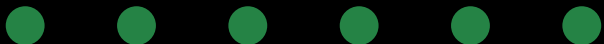
How it works:

Plug in the  
charging cord that  
**comes with the EV**

**Get 4 - 5 miles of  
range per hour,  
regardless of vehicle**

Best for:

**Shorter  
commutes  
(30-40 mi/day)  
and longer  
charge times**





# Home Charging – Level 2

## What is needed:

-Dedicated **240 V**  
15-50 Amp circuit  
(depends on EV) & a  
**Level 2 Charger**

How it works:  
Depends on  
Charger **Delivery Rate**  
& Vehicle **Acceptance**  
**Rate**

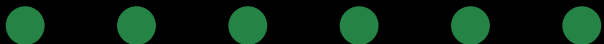
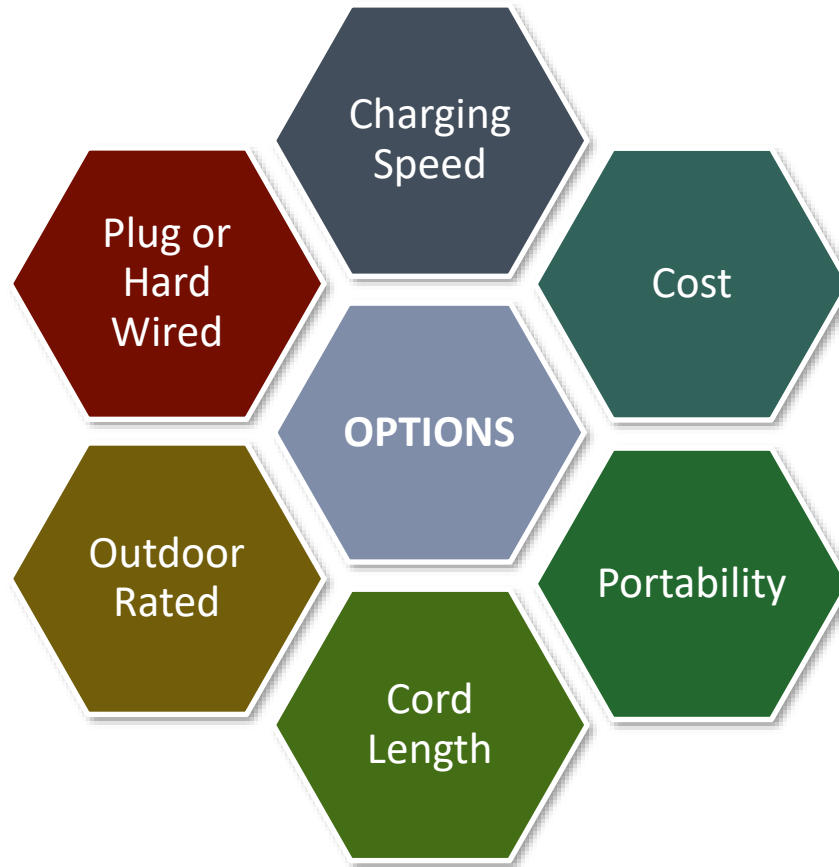
**Get 11 - 32 miles of  
range per hour**

Best for:  
Longer  
Commutes

You may need  
an electrical  
**Panel**  
**Upgrade**



# Home Charging – Level 2



# Level 2 Public Charging

Opportunity  
Charging:  
public chargers  
typically found in  
**parking garages**  
**& lots**

Work  
Charging:  
available for  
**fleet** or  
**employee**  
**vehicles**

Universal  
Plug  
"J-1772"  
(Tesla provides  
adapter)



# Level 3 / DC Fast Charging

## How it Works:

- **High Power**  
(50-300W)
- **Public Only**
- Charges up to 80% in ~30 min, then slows to protect battery

## Best for:

Quick  
charging  
**on the  
road**

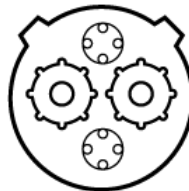
## Things to Watch for:

- PHEVs and some EVs **can't use** DC Fast Charging
- There are **3 types**; know which one you can use
- Routine Fast Charging can shorten **battery life**
- Only use if **battery is low** (<80%)

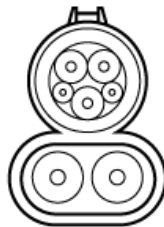


# DC Fast Charger Types

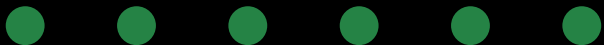
CHAdeMO



SAE Combo  
CCS



Tesla  
Supercharger  
Tesla Only  
(Tesla offers  
CHAdeMO  
adapter)

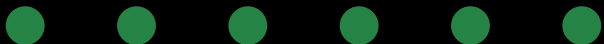


# Finding Charging Stations on the Road



## FREE apps & websites

- Location
- Cost
- Network
- Plug Type
- Amenities



# Finding Charging Stations in Alameda

ALAMEDA MUNICIPAL POWER

MY ACCOUNT | CUSTOMER SERVICE | SUSTAINABILITY | **ELECTRIC VEHICLES**

Public Stations | Advanced Filters | United States

94501 | Electric | Charger Types: Level 2, DC Fa... | Connectors: All | Map a Route

Alameda 0.7 mi  
Alameda Municipal Power  
2000 Grand St  
Alameda, CA 94501  
DC Fast

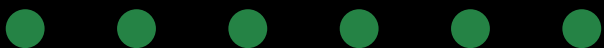
CIRCLE K 0.8 mi  
1716 Webster St  
Alameda, CA 94501

Click to add text

Select Language

**Level 2 & DCFC Chargers**

[Click Here to Check out the EV Website](#)



# Finding Charging Stations on the Road

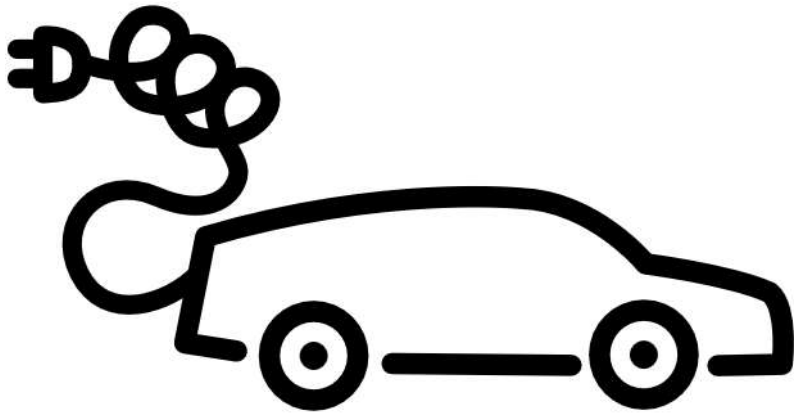
- Sign up online for different networks



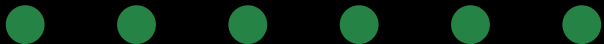
blink Blink	-chargepoint+ ChargePoint	Circuit électrique Circuit Electricq...
electrify america Electrify Ameri...	evconnect EV Connect	EVgo EVgo
flo FLO	GE GE WattStation	greenlots Greenlots
myEVroute myEVroute	SemaConnect SemaCharge	SUN COUNTRY Sun Country
Webasto Webasto	Other *	



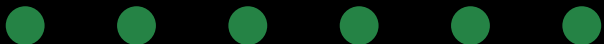
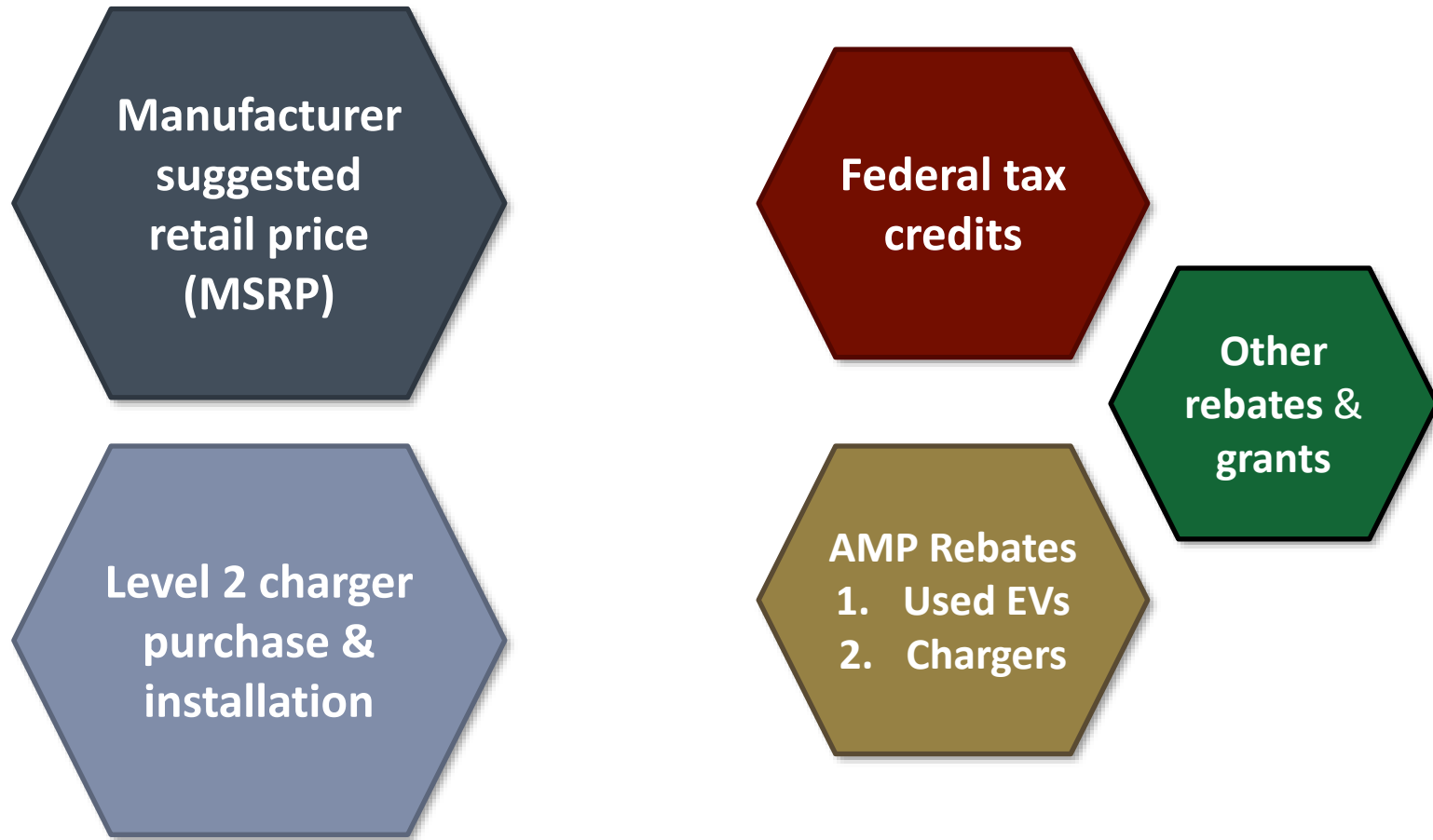




## PAYING FOR AN EV & CHARGER



# Evaluating the Upfront Cost



# Evaluating the Upfront Cost



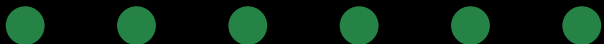
Manufacturer  
Suggested  
Retail Price  
(MSRP)

## Purchase a New EV

- MSRP ranges from \$30,000 to over \$100,000
- Typically can be negotiated with the Dealer

## Purchase a Used EV

- Reputable dealer prices start at around \$5,000



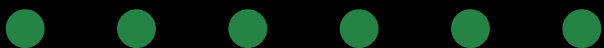
# Evaluating the Upfront Cost



Level 2  
Charger

Level 2 Charger	\$200 - \$1,000
City of Alameda Permit	\$230
Electrician	\$500 - \$3,000
TOTAL	<u>\$930 - \$4,230</u>

\*Coming Soon: AMP Electric Panel Upgrade Rebate



# Evaluating the Upfront Cost

## **PURCHASE A NEW EV**

### **Credit amount based on EV Battery Capacity**

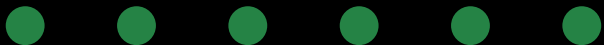
- \$7,500 for BEV and Long Range PHEV
- \$4,000 - \$4,500 for Shorter Range PHEV

**Federal Tax Credit factored into lease**

**Phased out as each manufacturer reaches sales target**



**Federal Tax  
Credits**



# Evaluating the Upfront Cost

## **PURCHASE A NEW EV (cost of vehicle up to \$60,000)**

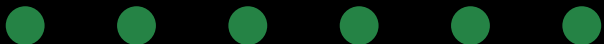
### **Standard Rebate Amounts with Upper Income Limit**

- \$2,000 for BEV
- \$1,000 for PHEV

### **Increased Rebate Amount for Income-qualified Customers**

- \$4,500 for BEV
- \$3,500 for PHEV

\*If purchased or leased >30 months within the previous 3 months

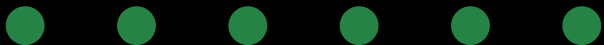


# Evaluating the Upfront Cost

## California Clean Fuel Reward Program

- California Air Resources Board
- Point of sale rebate of \$1,500
- Purchase and lease for a New EV
- Must be registered in CA
- Eligibility at participating dealerships

**New Rebates  
(November  
2020)**



# Evaluating the Upfront Cost

## Used EV Rebate

- Purchase a used EV up to \$22,000 and get \$1,500 rebate

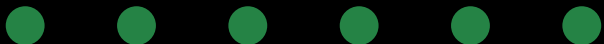
## Standard AMP Rebates:

- Battery Electric vehicle (BEV) \$1,000

## Income Qualified AMP Rebates

- Battery Electric vehicle (BEV) \$1,500

**AMP  
Programs:  
Stackable with  
Other Grants**



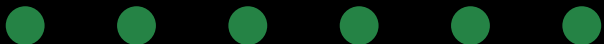


# Evaluating the Upfront Cost

## EV Bonus

**Purchase a used EV and install a Level 2 Charger you can qualify up to a \$2,300 rebate**

- $\$1,000$  (used BEV) +  $\$800$  (L2 Charger) +  $\$500$  Bonus =  $\$2,300$
- **Income Qualified Rebate Bonus (Up to \$3,300)**
  - $\$1,500$  (used BEV rebate) +  $\$500$  bonus =  $\$2,000$
  - $\$1,500$  (used BEV rebate) +  $\$800$  (charger rebate) +  $\$1,000$  bonus =  $\$3,300$



# Evaluating the Upfront Cost

## PURCHASE A NEW OR USED EV

- For income qualified customers only

<p>Plug-in Hybrid</p>  <p>\$5,500 - \$9,500</p>	<p>Battery Electric and Fuel Cell</p>  <p>\$5,500 - \$9,500</p>	<p>Mobility Options</p>  <p>Up to \$7,500</p>
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Hybrid: up to \$2,500

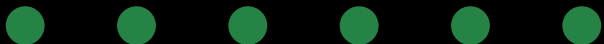
Plug-in Hybrid: up to \$5,000

Battery Electric: up to \$5,000

## California Air Resources Board (CARB) Grants

**Clean Cars for All**  
(trade-in program)

**Clean Vehicle Assistance Program**  
(purchase)



# Evaluating the Upfront Cost

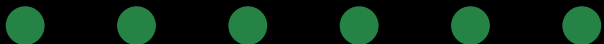
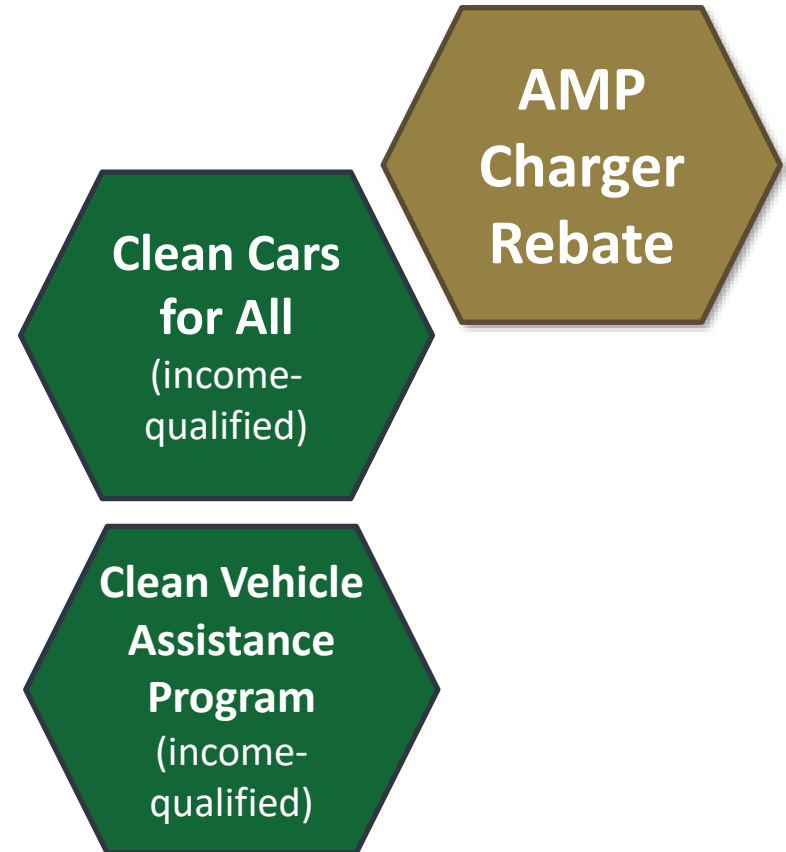
## EV CHARGERS

### AMP Level 2 Charger Rebate

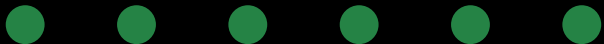
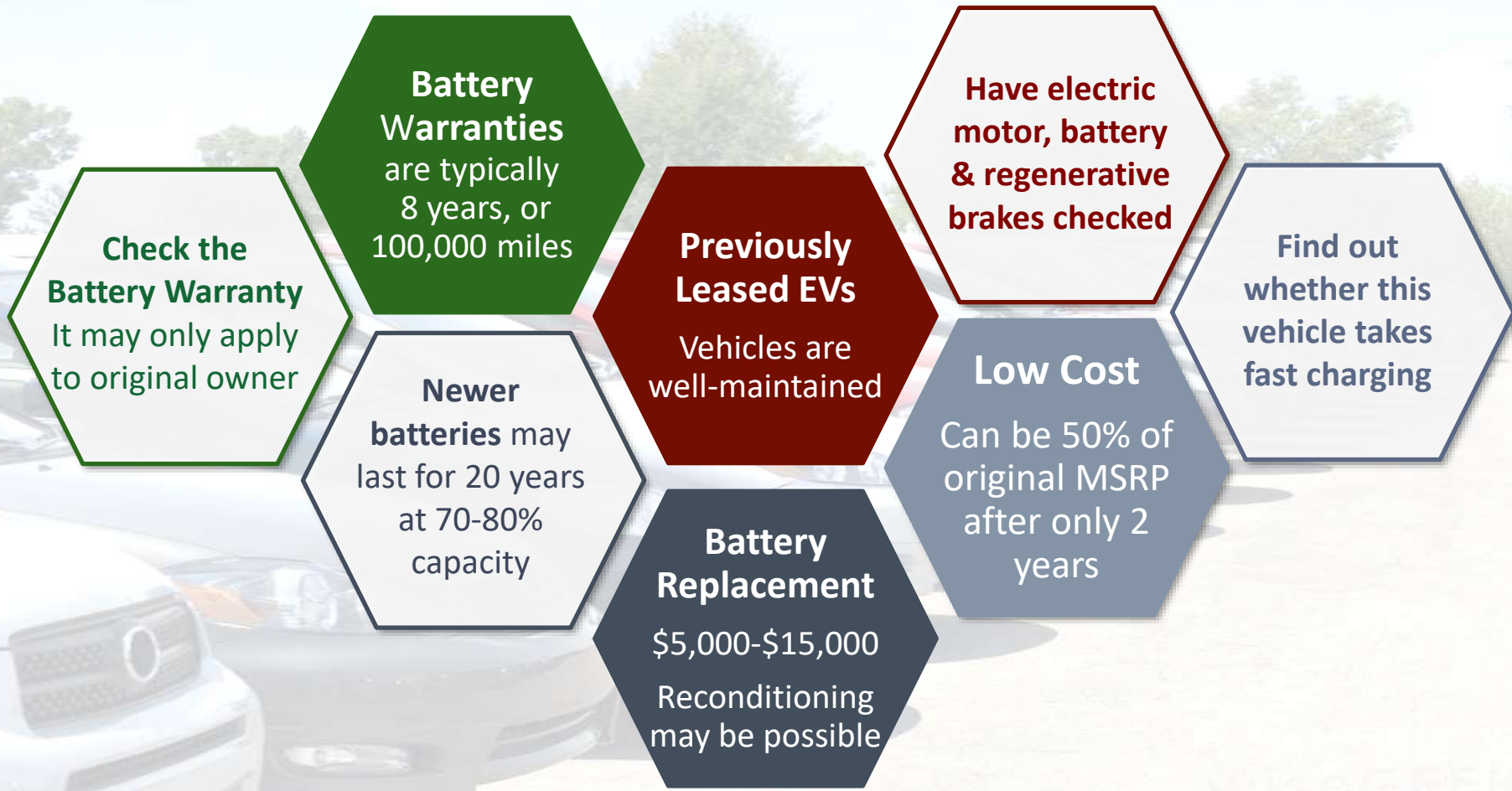
- \$800 toward purchase, permitting and/or installation costs

### CCFA and CVAP

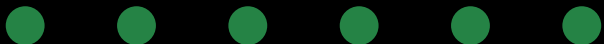
- \$2,000 toward charger purchase and installation with the purchase of an EV through their program

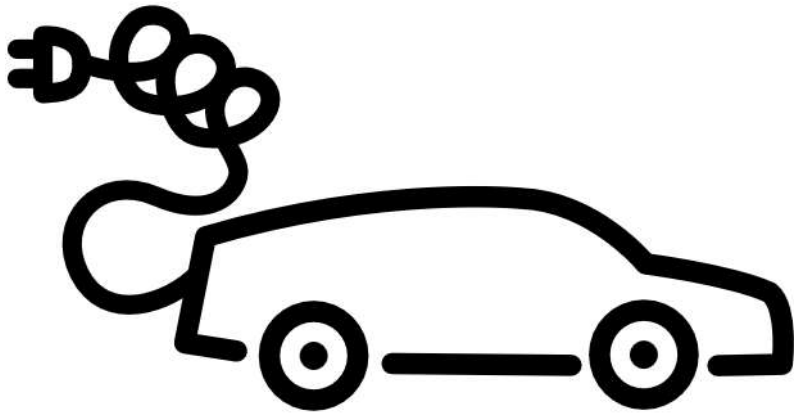


# Buying a Used EV

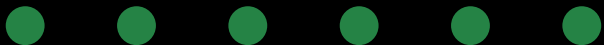


# Leasing an EV (rather than buying)





# LIVING WITH YOUR ELECTRIC VEHICLE



# How will my monthly expenses change?

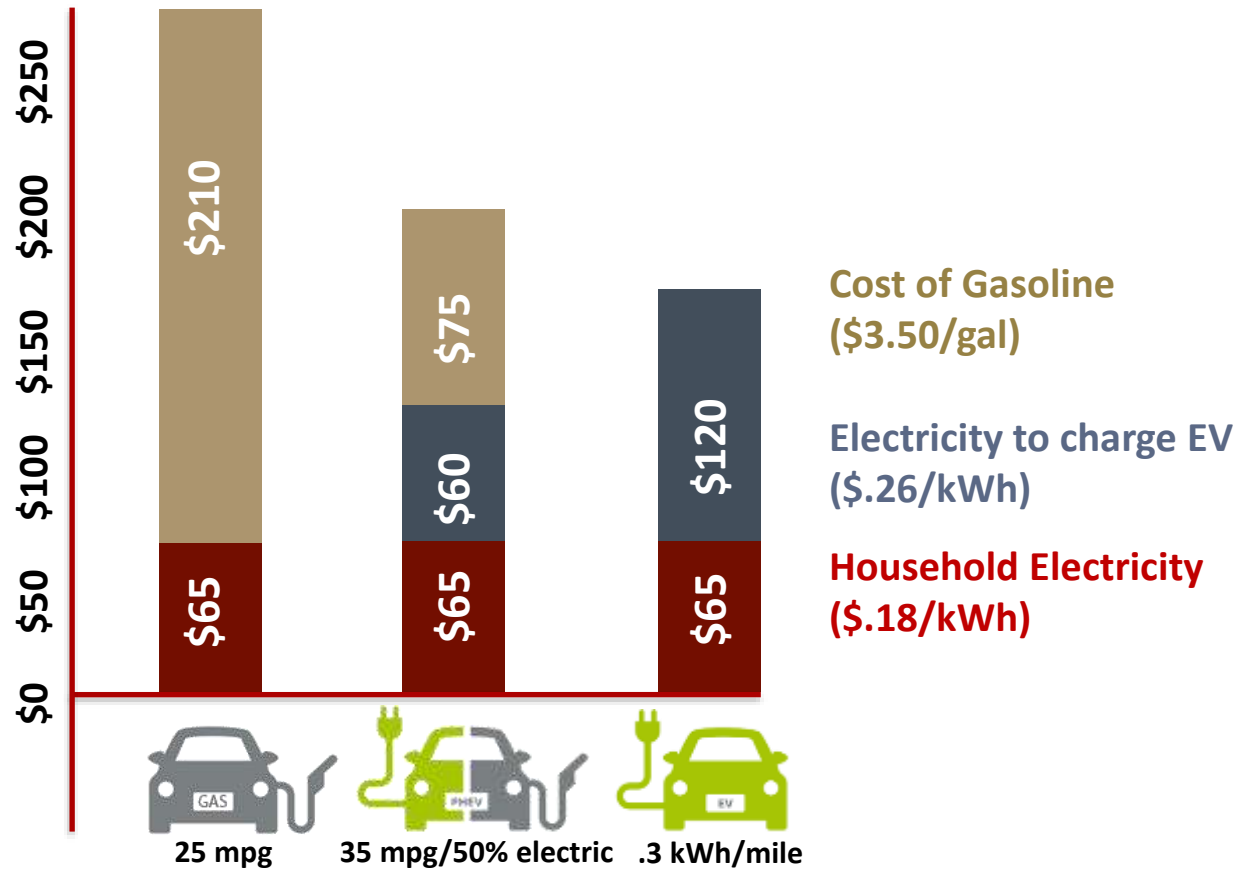
- As gasoline costs go down, electric bills go up



## Alameda Commuter

Drives on average 50 miles/day

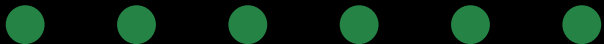
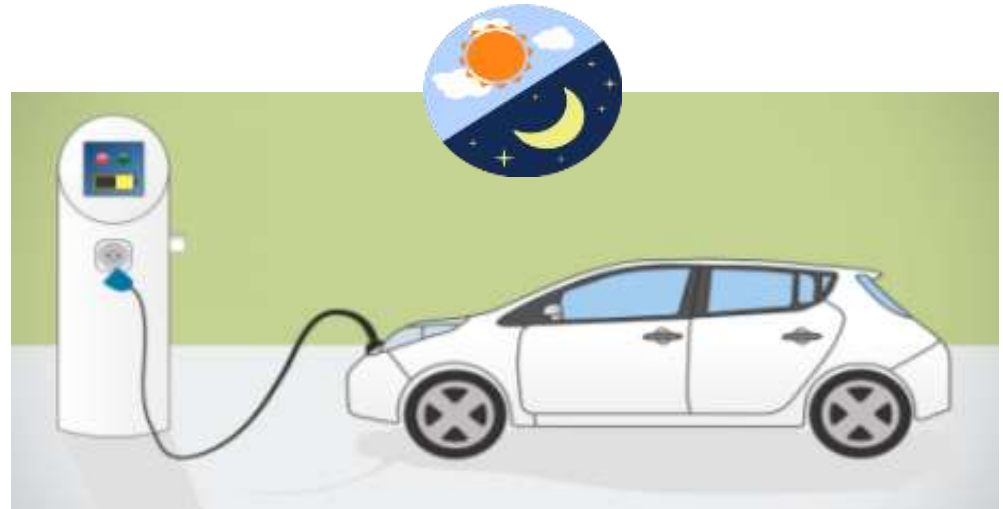
Uses 350 kWh/month of household electricity



# How will my monthly expenses change?

Time of Use  
(TOU) Rates start  
July 2021\*

*\*voluntary rate for  
EV owners only*





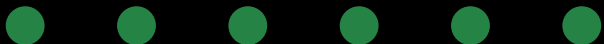
# How does solar work with an EV?



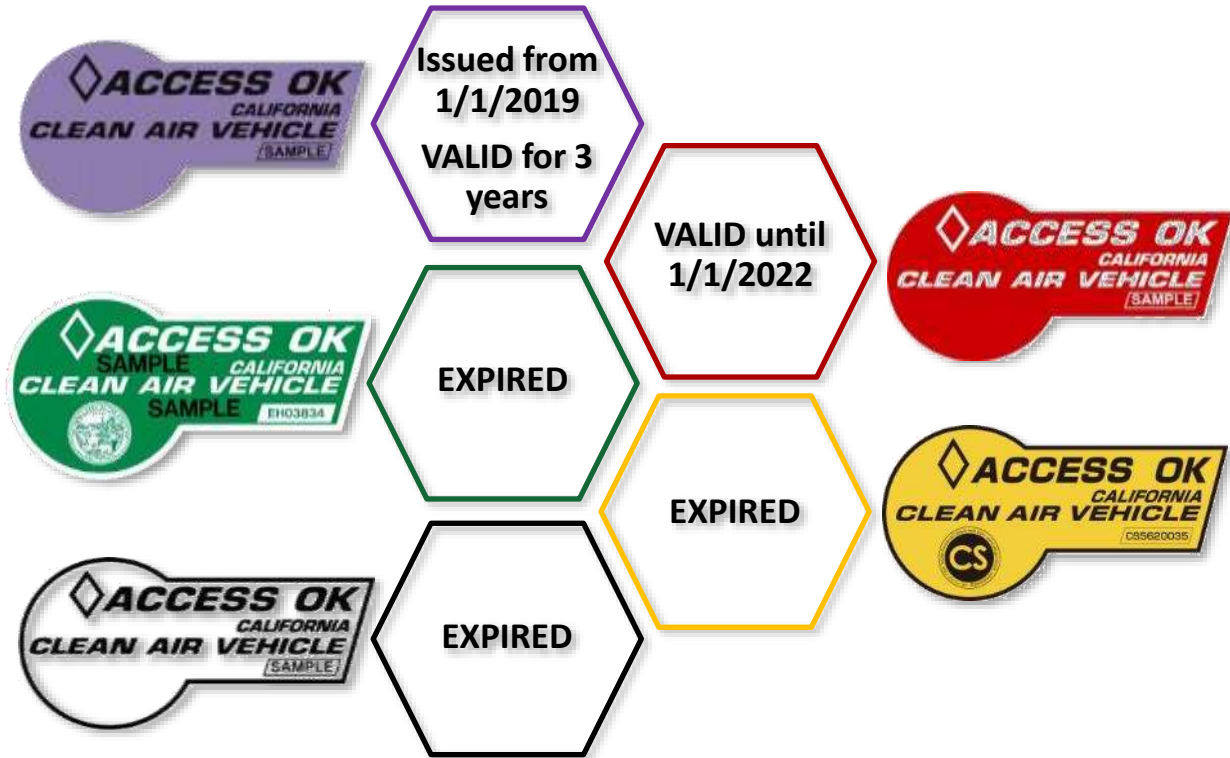
The best time to charge is **while the Sun Shines**

If you don't yet have solar, consider that **AMP power is 100% Clean**

If you will only **charge at night**, consider installing a **Storage Battery**



# Can I still use the Clean Vehicle Lanes?



Head to the DMV website for the application

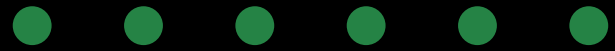
**APPLICATION FOR CLEAN AIR VEHICLE DECALS**

MAIL TO: DEPARTMENT OF MOTOR VEHICLES  
SPECIAL PROCESSING UNIT - MS 3258  
# 0 874 82341 SACRAMENTO, CA 95833-0840

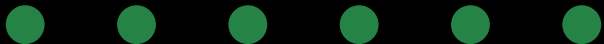
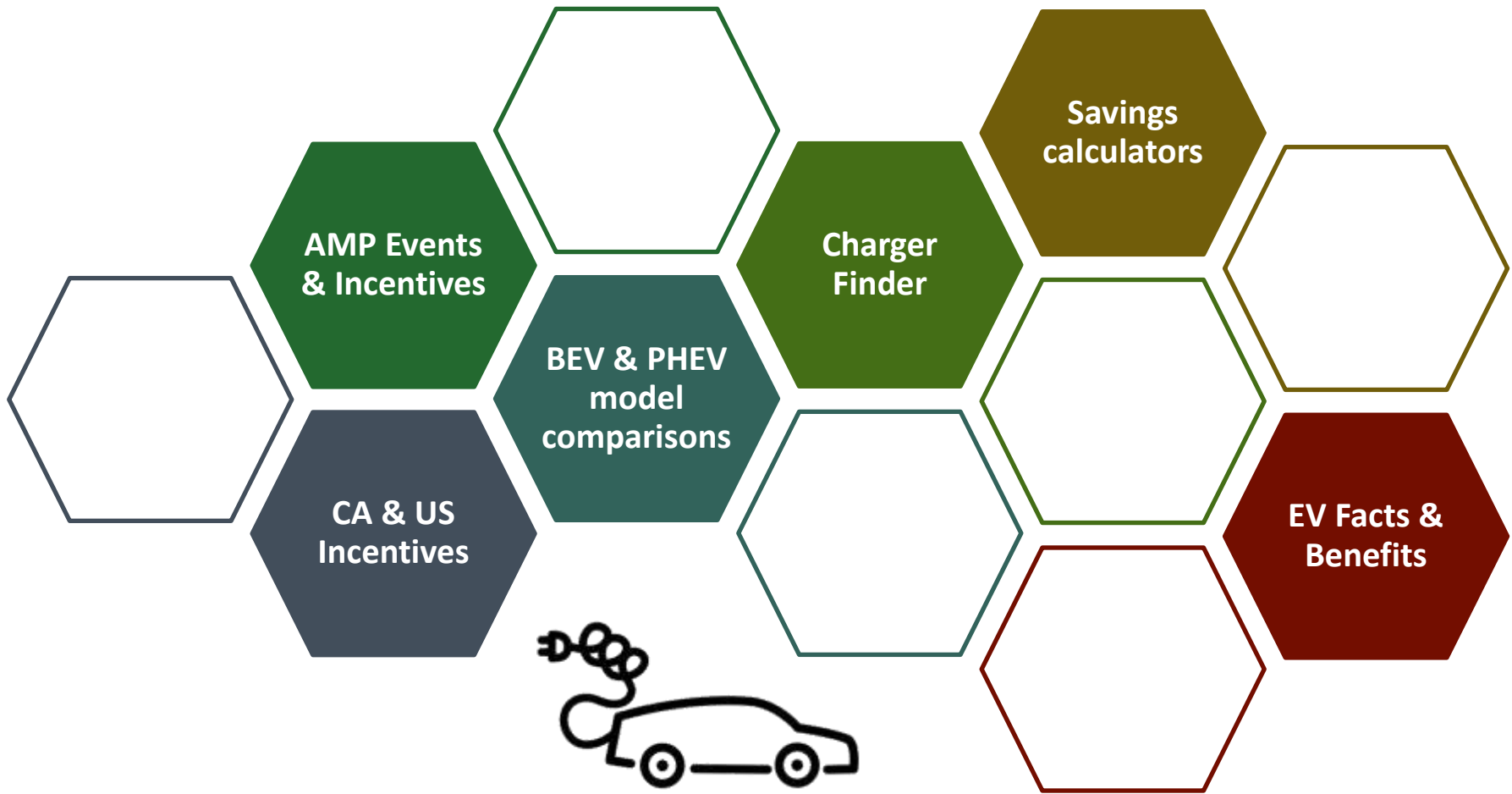
**DMV USE ONLY**

PROCESSOR
ISSUE DATE

Only the registered owner of record may apply. For vehicle eligibility, visit the California Air Resources Board (ARB) website at [www.arb.ca.gov](http://www.arb.ca.gov). Replacement decals are available to vehicles that have been involved in an accident in which body work affected decal placement. To avoid processing delays, check [www.dmv.ca.gov/infocenters](http://www.dmv.ca.gov/infocenters) for information on how to complete this form.



# AMP Website Resources



# Questions

Email: **EV@alamedamp.com**

Website: **[www.alamedamp.com](http://www.alamedamp.com)**

**Check out the Electric Vehicle Tab!**

