

Electric Cars 101

Everything you need to know
about owning an electric car



Introduce yourself and other speakers

Today we're going to talk about Electric Vehicles and everything you need to know about owning an electric car.

- why EVs are important
- what's happening in the market.
- the cars, costs, incentives, how to charge,
- leave you with recommendations on how to choose the right car for you.

(Also, housekeeping, i.e., restrooms, emergency exits, if appropriate).

How many EV owners are here?

Why Electric Cars?



Before we talk about personal cars, let's talk about emissions and why reducing them is important.

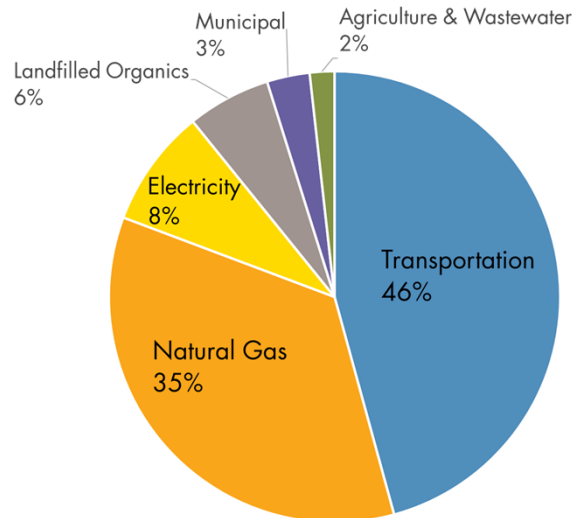
As it stands, in 2014, 21% of high school students in San Francisco were diagnosed with asthma, well above the national average of 10%.

In the Central Valley, childhood asthma rates are around 26%, and as high as 52%. What we put into our air becomes their air.

That's without major forest fires.

Mitigating Climate Change

2017 San Francisco Greenhouse Gas (GHG) Emissions by Sector



- Transportation accounts for 46% of GHG emissions in San Francisco
- 91% of transportation emissions are from privately owned vehicles
- If we want to meet our climate goals and clean our air, we need to get more people out of their cars and onto public transit, bikes and sidewalks, and simultaneously shift all the vehicles that remain on our roads away from fossil fuels and onto renewable energy.
- Trend in US is that transportation is highest emitter.

You Can Drive GHG-Free TODAY



This is the take home message: Electric cars and renewable energy allow individuals and business—the people in this room--to be 100% GHG-free RIGHT NOW

People in the Bay Area can purchase 100% renewable, GHG-free electricity RIGHT NOW.

- CCAs are providing more renewable energy to most Bay Area residents

Utilities are Supplying 100% Renewable Energy



East Bay Community Energy is now serving Berkeley and most of Alameda County businesses and residences. You have a choice of three electricity products.

- All customers automatically enrolled in Bright Choice, which is slightly cleaner and less expensive than PG&E.
- For the same price as PG&E, you can Opt Up to 100% carbon free electricity with EBCE's Brilliant 100, or
- For a penny more per kilowatt hour (about \$4 for the average home per month), Opt Up to 100% renewable (CA wind and solar) with EBCE's Renewable 100

Opt Up by phone, online, or fill out a postcard and I will drop it in the mail. (Pass out the opt up postcard.)

<https://ebce.org/opt-up/>

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The Investor-owned utility also offers a "green energy" option.

For presenter: Depending upon where the talk is given, one can substitute the logo of Marin Clean Energy for Marin and parts of the EB, Peninsula Clean Energy on the Peninsula, Clean Power SF, in San Francisco and other CCA's in the Bay Area.

Governments are Banning Petroleum Vehicles

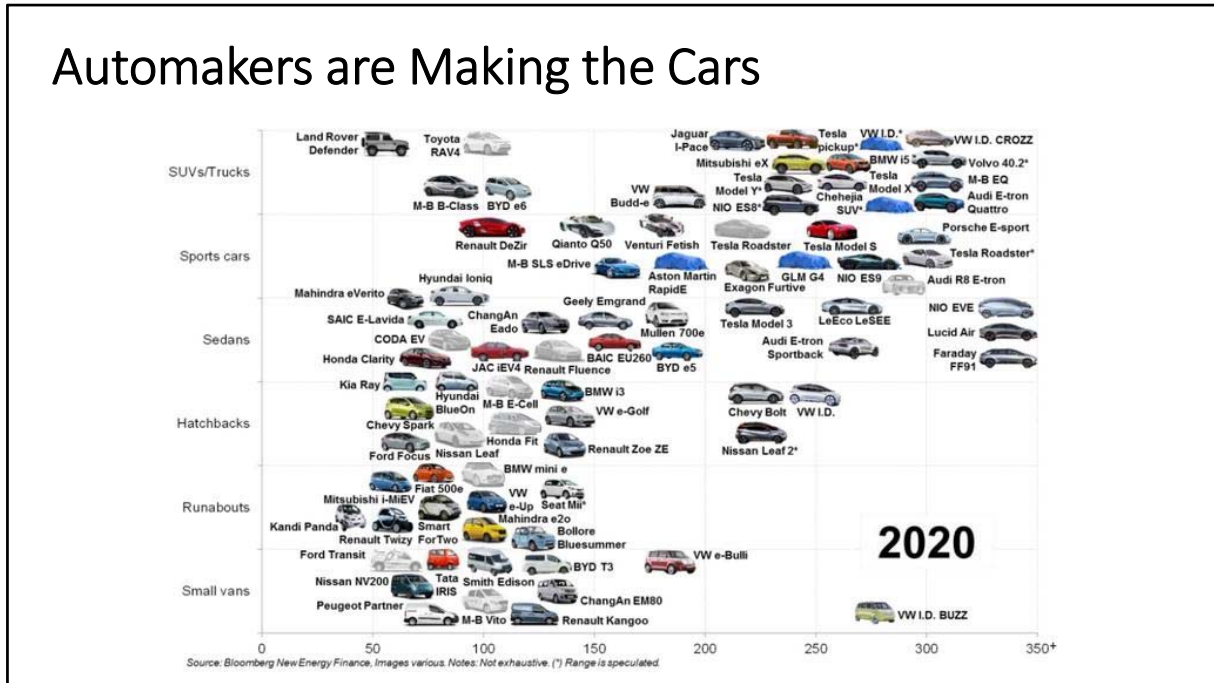


Countries and across the world have been announcing plans to ban gas and diesel powered vehicles—in response to local demand for clean air. The countries listed in black type have announced plans to ban the sale of these vehicles; those in red are considering banning these vehicles at a future date. (Data as of October 2018.)

- Norway: 2025
- Netherlands and India: 2030
- Scotland: 2032
- France and UK: 2040
- China (largest car market): TBD
- California had legislation for a 2040 ban pulled back, but we expect it to return in a modified form

Story: In January 2017, Oslo, Norway experienced an “inversion layer” similar to what happens in the LA Basin or the Central Valley. These regions are in geographic bowls where weather conditions can trap smog, and make air unhealthy. Oslo doesn’t issue “spare the air” warnings; they did not allow diesel vehicles into the city for two days.

Automakers are Making the Cars



More and more automakers are announcing ambitious EV goals

- Volvo will be all electric or hybrid by 2019
- Mercedes-Benz will have 10 electric models by 2025
- VW will be all electric by 2030
- Ford will have 40 electric or hybrid by 2022
(16 BEV; 24 P/HEV)
- GM will have 20 EV models by 2023
- Honda: two-thirds of cars will ZE or electrified by 2030

The public is responding also: about two million electric cars have been sold around the world (2017).

Types of Electric Cars

Zero Emissions



**Battery Electric
(BEV)**



**Fuel Cell Electric
Vehicle (FCEV)**



**Plug In Hybrid
(PHEV)**

Variable Emissions

When we talk about electric cars, we generally mean battery electric vehicles (BEVs). But there are three types of electric vehicle: pure battery electric, hydrogen fuel cell electric, and the plug in hybrid electric, which also uses gasoline. Currently, there are 44 models available in California (as of Oct. 2018). Only BEVs and FCEVs are zero emission. In this talk we generally are referring to BEVs.

Electric Cars are Cheaper to Own

Operating Cost Comparison

Vehicle Type	Operating Cost	Annual Mileage	Annual Cost
Gasoline	15¢ per mile	10,000	\$1,500
Electric (with PG&E)	7¢ per mile	10,000	\$700
Electric (with solar)	2¢ per mile	10,000	\$200

- Assumptions:
 - Average PG&E EV electricity rate: \$0.24486/kWh
 - Average electricity rate with solar: \$0.08/kWh
 - Average EV efficiency: 3.5 mi/kWh (59-62% of energy goes to powering the wheels)
 - Average gas car efficiency: 26 mpg (17-21% of energy goes to powering the wheels)
 - Average gas price in SF-Oak-Hayward area: \$3.80/gal (June, 2018 – US Dept. of Labor, Bureau of Labor Statistics)

Electric Cars are Cheaper to Own



Battery Electric Vehicle (BEV)
"Engine"



Internal Combustion Engine (ICE)

- EVs have far fewer parts, far fewer moving parts, less fluids, no oil.
- Fuel and maintenance is about 1/3 the cost of a gas car.
 - No oil changes
 - No timing belt replacement
 - Significant savings on maintenance costs

Electric Cars are Cheaper to Own



You never have to worry about the fluctuating cost of gasoline again! And you will know you are not buying a product that is creating and continuing to add to global warming.

And Easier to Own



When you get to your destination, just plug in your car like you plug in your phone

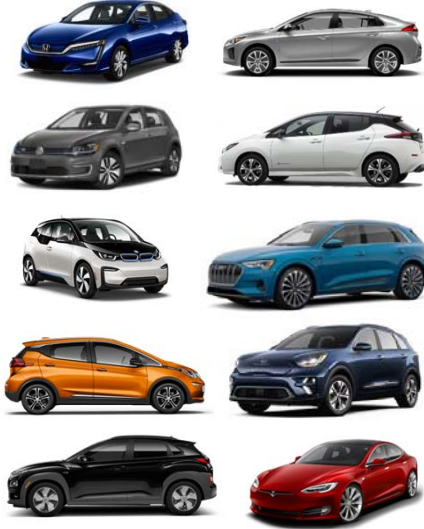
Did We Mention Fun?



When we think of sustainability, we're taught to think of something being taken away. If you've ever driven a Prius, you know that for that 50 mpg, you give up speed and "performance." Not the same with EVs.

The Cars

	Model	Range (miles)	Price After CVRP	Lease
Short Range	Fiat 500e	84	\$30,495	\$180
	Honda Clarity	89	N/A	\$199
Medium Range	Hyundai Ioniq	124	\$27,300	N/A
	Volkswagen e-Golf	125	\$29,395	\$237
	Nissan LEAF	150 – 226	\$27,490 – 36,010	\$219
	BMW i3	153	\$41,950	\$399
	Audi E-tron	204	\$72,300	\$751
Long Range	Jaguar I-PACE	234	\$67,000	N/A
	Chevy Bolt	238	\$36,620	\$435
	Kia Niro	239	\$36,000	N/A
	Tesla Model 3	240 – 310	\$36,490 – 52,490	N/A
	Hyundai Kona	258	\$36,950	\$318
	Tesla Model X	305 – 325	\$82,490 – 102,490	\$992
	Tesla Model S	345-370	\$77,490 – 97,490	\$899



These shorter range vehicles will cover day-to-day driving and most Bay Area commutes. The longer range vehicles can match the range of a gasoline engine.

- You'll notice that price and range are not necessary correlated.

These are the medium range vehicles: the Leaf, i3, that will get you 100-150 miles. The majority are under \$30,000 before incentives.

These longer range vehicles will get you to Sacramento and back on a single charge, and there are models that can fall below \$30,000 after incentives.

Car Incentives

Federal, State, Local

As you've seen, that cars aren't that expensive and they cost less to operate. But they do cost more up front. Incentives can help with that.

Federal Tax Credit

Up to \$7,500



A federal tax credit of up to \$7,500 is available for most cars. The thing to know is that these tax credits were assigned to the first 200,000 electric cars made by each automaker and decreases after the first 200,000. Teslas delivered after Dec. 31, 2018 will not be eligible for the full \$7,500. General Motors will hit the 200,000 threshold soon, but the other brands will take some time to catch up.

If you're leasing a car, the dealership receives this tax credit and should pass the savings to you in a lower monthly lease cost.

Clean Vehicle Rebate



Up to \$2,500

- Significant program changes as of December 3, 2019: EV Rebates reduced to \$2,000.
- Vehicles must be no more than \$60,000 MSRP with minimum of 35 miles electric range to qualify.

The California Clean Vehicle Rebate Project will send you rebate check for up to \$2,500 for your lease or purchase of a new electric car. Some income restrictions apply (to limit high earners) and lower income households may qualify for an additional \$2,000 rebate.

CVRP.org

Other Incentives

- **PG&E Clean Fuel Rebate = \$800**
- **Clean Cars for All: up to \$9,500**
- **Special electricity rates for EVs**
- **Carpool Sticker**

- PG&E's Clean Fuel Rebate is available to all electric car owners, even CleanPowerSF customers
- Clean Cars for All: retire your 2004 or older vehicle, get up to \$9,500 for new EV (baaqmd.gov/cleancarsforall)
- PG&E and CleanPowerSF also have special "time of use" rates for EV owners.
- Carpool Sticker: drive in the HOV lane even if driving alone (expires Jan. 1, 2022 for new drivers; Jan. 1, 2019 for pre-2017 drivers)
- Website for lease info: ev-vin.blogspot.com
- Leases do qualify for CVRP and PG&E, but not federal tax credit (credit goes to dealer and should be factored into lease price)
- Used EVs do not qualify for CVRP or tax credit, might qualify for PG&E rebate

Group Buy Discounts



<https://drivecleanmarin.org/group-discount>



<https://www.bayareasunshares.org/>

- Drive Clean Bay Area, in partnership with Cartelligent, who is currently negotiating the deals
- Program will run from Nov 1-Dec 31
- Sign up without obligation and save on a purchasing or leasing an EV
- SunShares registration closes Nov. 15 (don't need to make purchase by then, just sign up)
- Discount on 2019 Nissan Leaf (Boardwalk Nissan – Redwood City, Hanlees Hilltop Nissan – Richmond)

Car Charging



**Level 1 and Level 2
(At Home or Work)**

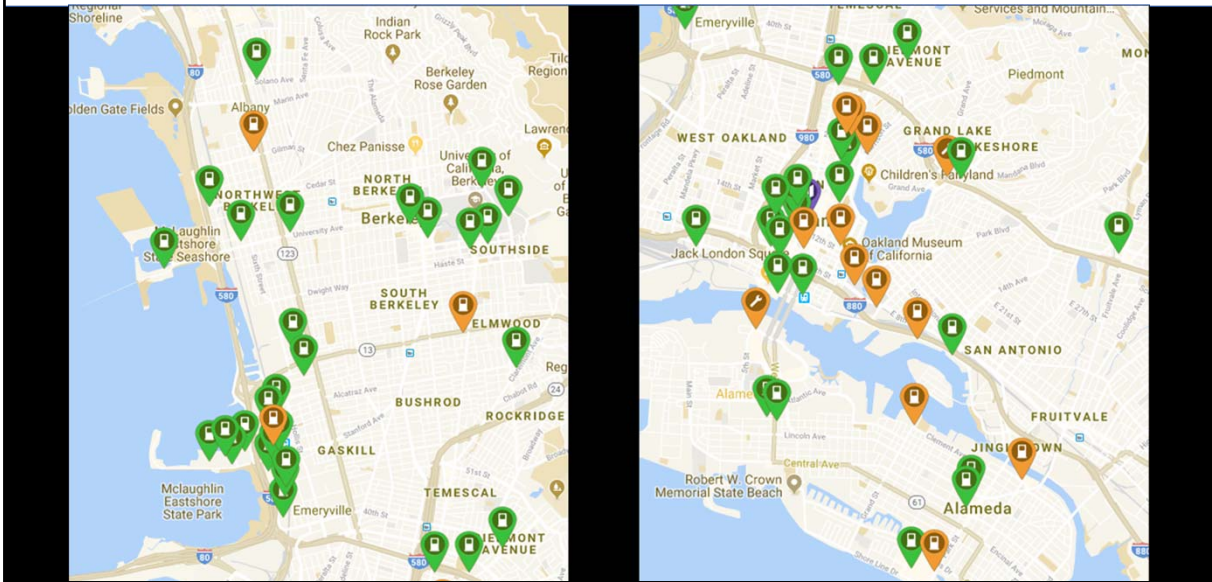
**DC Fast
(In Public Areas)**



Now let's talk about fueling your electric car. There are three basic types of chargers: Level 1, Level 2, and DC Fast.

- Level 1: ~5 miles of range per hour on 120v outlet (should be on a dedicated circuit)
- Level 2: 12-25 miles of range per hour on 240v outlet, which requires minor electrical work by a qualified electrician
 - Both good for charging at home if you have a garage/driveway and at work if your employer provides stations
- DC Fast Charger: fully charge 250 mile range EV in 20-60 minutes on 480v commercial unit. Not for home use.
 - Supermarkets, shopping centers, restaurants, etc.
- Pro tip: buy a level 2 charger with a US EPA Energy Star rating.

Public Charging



- There are about 750 publicly available charging ports in San Francisco. Most electric cars come with navigation systems that help locate chargers.
- There are two great sources for charging locations: Plugshare.com and the Department of Energy's Alternative Fuel Data Center (AFDC). Both have trip planners to help you find the right charging route.
- More public charging is coming to California: our goal is 250,000 chargers by 2025. California state agencies will continue to co-fund chargers and approve public utility plans to expand charging.
- The VW diesel settlement will bring hundreds of millions of dollars in charging station investment, including significant investments in the San Francisco metro area

Consumer References

Resources for EV Shoppers

<https://pluginamerica.org/plugstar>



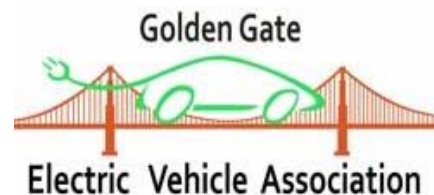
State Rebate Program

www.cleanvehiclerebate.org/eng



EV Owner Advocacy Group

www.ggeva.org



Plug in America is a great resource for electric car information and includes PlugStar, which connects you to qualified electric car dealers—not all dealerships understand electric cars. Also features a “get equipped” page with detailed information on home chargers.

The Clean Vehicle Rebate Project website has lots of information about cars and explains the different rebates for different car and income types.

Golden Gate Electric Vehicle Association is an owner advocacy group that has a monthly meeting in San Francisco.

PlugStar
by Plug In America

Shopping Assistant Cars Incentives Dealers Chargers Login

Everything you need to know to drive electric.

Select Make Select Model Find Vehicle

Need help? Our Shopping Assistant makes it easy. [Get Started!](#)

Consumer References <https://plugstar.zappyride.com/>

<https://plugstar.zappyride.com/>

Consumer References



<https://ev.pge.com/vehicles>

Electric Vehicles

With all the EVs on the market today, how do you choose? Start by answering a few questions on the left to get your EV Match Score. Then review your best matches to the right. Click on each EV for more details, including average cost of ownership compared to a similar gas vehicle.

Sort By Match Score

Refine Match Score

ROUNDTrip COMMUTE

30 Miles

BUDGET AFTER INCENTIVES

\$40,000

Personalize Incentives

MINIMUM SEATS

Audi A3 e-tron	BMW i3 REX	Chevrolet Bolt EV
Electric Range Total Range	16 miles 400 miles	126 miles 200 miles
	Electric Range Total Range	238 miles

<https://ev.pge.com/vehicles>

Consumer References

<http://ev-vin.blogspot.com/2016/07/current-lease-offers-for-selected-evs.html>



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How to Pick the Right Car

My Green Car is a free app that will monitor your driving and use that data to recommend cleaner cars that fit your needs.



California and the US Department of Energy each have online calculators that can help you choose a car.

Plug Star connects shoppers to vetted dealers experienced with EVs

My Green Car is a free app that will monitor your driving for a period of time and use that data to recommend cleaner cars that fit your needs. Download it wherever you get your apps.

You Can Drive GHG-Free TODAY



And again, the take home message. What we really want you to remember is that you can drive GHG-free today.

Thank You!

SF Clean Cities Coalition

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