

# Charged Up



## ELECTRIC VEHICLE ASSOCIATION OF SAN DIEGO (EVAOSD)

An affiliate of the Electric Auto Association (EAA)

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 Vice President: Lloyd Rose  
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Monthly Meetings: During the 4<sup>th</sup> week of the month, day depends on venue.  
 (No Meeting in December).

### Meeting Location, Date and Time:

**Center for Sustainable Energy**  
**9325 Sky Park Court, Suite 100**  
**San Diego, CA 92123**  
**Wednesday, 23 March 2016, 7:00 P.M.**

Program: News, Project Status, Events

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### Newsletter Topics:

#### EVs Breaking Through



#### Car2Go Going Gas



#### Model 3 Certain Success



## Message from the President

Hi All,

We Failed! Well, I feel like we did, although it wasn't us. Car2Go is replacing their 100% EV fleet with 100% GAS cars! Car2Go was San Diego's flagship location to try an all electric car sharing fleet. They had 400 electric cars running around the city allowing anyone access to an EV and a great car sharing program. Their claim (which is accurate) is that they didn't get the charging infrastructure needed for the program to succeed. Blink went bust before they finished installing the needed 1,000 chargers. So, without the chargers, the ability for the program to support the cars long term died. Car2Go couldn't foot the bill for the chargers themselves, and they shouldn't have to as they were public stations used by anyone, not just their fleet.

In my opinion, this is a major setback to the San Diego EV scene and our progressive forward-looking city. Now, we get to enjoy 300 more gas car's exhaust to breathe downtown. On the upside, there should be a fleet of Smart EVs on the market soon and maybe one can get a crazy good deal on one...or ten.

-Joseph



**Car2Go EV Fleet will be no more**

## The Electric Car Revolution Is Finally Starting

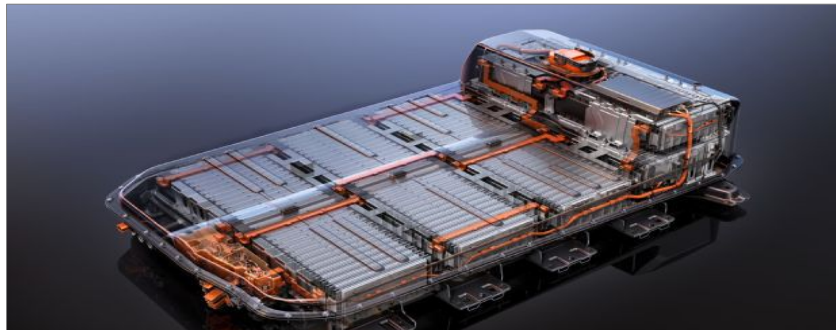
- They were once held back by their pricy, ineffective batteries. That era's over.

By Daniel Gross, [www.slate.com](http://www.slate.com), 26 Feb 2016

First generations of technology are always clunky, kludgy, and way too expensive. TVs were once the size of refrigerators. Personal computers had giant cathode ray tubes and virtually no computing power. And so it went for the first generation of modern electric cars.

For several years, electric cars suffered in comparison with electronic products like mobile phones and computers. Car batteries have been around for a while. But the types of batteries that can pack sufficient energy to drive a car on its own are relatively new; until a decade or so ago, engineers had never given them their full devotion, nor did manufacturers produce them in large volumes. As a result, these batteries and the cars that contained them suffered the unfortunate combination of being both not very good and very expensive. Chevrolet's plug-in hybrid Volt was exceedingly mockable when it debuted in 2010. It cost about \$35,000, and its 400-pound lithium-ion battery pack, with a capacity of 16 kilowatt-hours, could only move a car about 35 miles (under perfect conditions!). The company never shared with Volt owners how much the battery cost, but we know that in 2012, lithium-ion battery packs cost between \$500 and \$600 per kilowatt-hour. So a 16 kWh pack like the Volt's could have easily cost \$8,000.

And that expense inhibited the Volt's success. It's one thing if a battery-powered car doesn't take you that far, since you can run on gas after the battery gives out. It's another when the inclusion of a not-very-effective battery boosts the price of the vehicle so much that no one wants to buy it. So for several years, electric cars suffered in comparison with electronic products like mobile phones and computers, which benefited from Moore's law—the notion that the processing power of computers doubles every two years. That's why we've seen incredible simultaneous improvements in both price and quality for electronic devices like phones and laptops. Every version is both better and cheaper than the previous.



**GM Bolt Battery**

There is no Moore's law for battery storage—the power of batteries doesn't magically double every two years. And yet a funny thing has happened over the past six years. Rather than huge leaps and bounds, there has been slow, incremental improvement in the ability to manufacture lithium-ion batteries that can pack more power in the same space. Companies are doing a better job bargaining for supplies, rationalizing manufacturing processes, improving the chemistry, and generally doing the sorts of things that good engineers do. And so the performance of lithium-ion batteries has been improving by 5 or 8 or 10 percent each year.

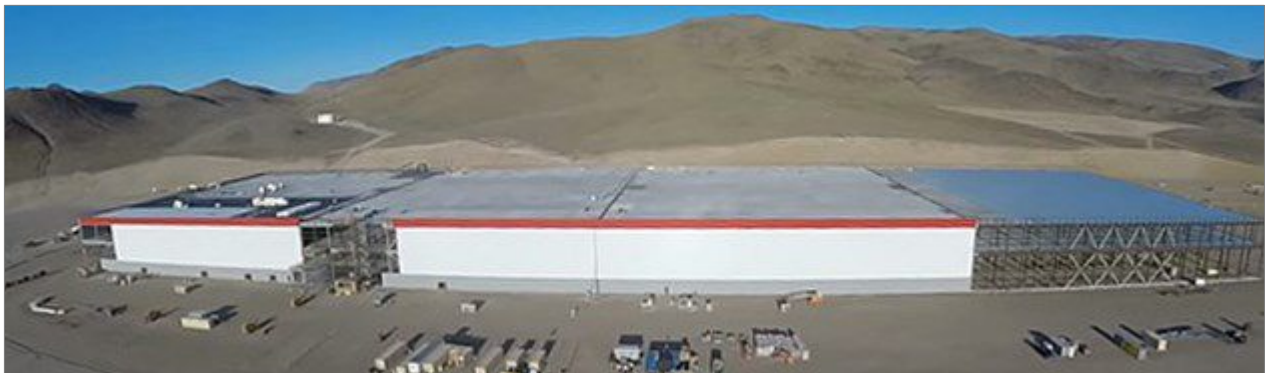
Because of the pace of incremental change, and because product cycles of cars are slower than they are for cellphones, an innovation revolution in electric cars has always felt distant. And yet we're now finally seeing the beginnings of one.

General Motors is preparing to launch the Chevrolet Bolt, and its first letter isn't its only difference from the Volt. Instead of being a plug-in hybrid, it's a real electric car. The Volt had an expensive battery pack and could go only about 30 miles on it. The Bolt has an expensive battery pack but will have a range of 200 miles. Here are the battery's specs: 288 cells weighing 960 pounds. Its capacity will be 60 kilowatt-hours.

But the cost of that battery is another story. Thanks to continuous improvement, General Motors last year said the new lithium-ion packs now cost it about \$145 per kilowatt-hour—about 70 percent cheaper than they did in 2012. Put another way, the battery pack in the 2017 Volt will cost less than 10 percent more than the one in the 2012 Volt. But it will be more than four times more powerful.

And here's the important thing: This isn't the end state. Critics often look at the 1.0 or 2.0 versions of new technologies and make damning predictions. But that's not how innovation works—either in the laboratory or in the consumer marketplace. In the rearview mirror, the early versions will always look big, clunky, and nonfunctional.

In fact, as we speak, batteries are likely getting cheaper. Tesla believes that the Gig factory it's building could drive down the cost of lithium-ion battery cells to \$100 per kilowatt-hour. General Motors, which isn't known for making glassy-eyed pronouncements, believes the cost of the lithium-ion cells it uses can fall to that level by 2022.



**Tesla Giga-Factory for Battery Production**

This doesn't mean we'll all be driving Teslas or Bolts next year, or even in 2020. But the advances in batteries will be seen in other ways. To a degree, more powerful batteries will become standard—in hybrids, in plug-in hybrids, in all-electric cars. We're moving toward a world where more and more cars will either run primarily on gasoline but with an assist from powerful batteries or primarily on powerful batteries but with an assist from gasoline.

This revolution may not be showing up in the sales figures just yet. But a website like [hybridcars.com](http://hybridcars.com) offers daily updates on the leading edge. The Hyundai Ioniq is being introduced in three options: all-electric, plug-in hybrid, and standard hybrid. Daimler, parent of Mercedes-Benz, is forcing executives to drive plug-ins or hybrids. Honda projects that by 2030, hybrids, plug-in hybrids, and electric vehicles will account for more than 60 percent of its sales.

## Car2Go switching electric cars to gas - Leaders call move setback for climate action plan

By David Garrick, SD Union Tribune, March 16, 2016

SAN DIEGO — San Diego's leading car sharing company will soon replace its all-electric vehicle fleet with gas-powered cars due to a lack of charging stations, a symbolic setback for the emission-reduction aspirations of the city's ballyhooed climate action plan.

Electric cars are key to the ambitious plan's requirement to cut carbon emissions in half by 2035, and car sharing plays a major role because it can fill small gaps in commutes that feature mass transit or bicycling.

City and environmental leaders said on Wednesday that the decision by Car2Go should be a call to action. "It's a lesson to all of us that we have to work harder to build the infrastructure necessary to support electric vehicles and other transportation modes," City Councilman Todd Gloria said.

Nicole Capretz, the primary author of the city's climate plan and the executive director of the Climate Action Campaign, said the Car2Go decision is a frustrating step in the wrong direction. "It's disappointing because we as a city are on a pathway to a 100 percent clean energy future and we can't do it without converting our vehicles to electric," she said.

Car2Go has about 400 vehicles, amid hundreds of thousands on San Diego roads. But alternative fuel advocates see the retrenchment as a setback. "This is a step backward, so we have to regroup and figure out some new solutions," Capretz said.



Officials said part of any solution will likely be a plan San Diego Gas & Electric finalized in late January to install 3,500 charging stations across the county over the next three years. That won't happen quickly enough for Car2Go to reconsider the switch, which starts May 1 and should be complete within a month.

The company made San Diego the only North American city with an all-electric fleet when it launched service here five years ago, but company officials say that's no longer sustainable.

A federally subsidized nonprofit called Ecotality had promised to install 1,000 charging stations across the city back then, but only 400 of those stations are in place because the company declared bankruptcy in 2013. "What we expected as far as charging infrastructure versus what we were delivered just hasn't added up," said Car2Go spokeswoman Dacyl Armendariz.

"We're just not able to keep the cars charged, and people aren't able to charge them on their own," she said. "We're still committed to electric vehicles — it works in some of our cities in Europe where they have more robust charging infrastructure. We just don't have the infrastructure we need here to make it work now."

Many of the company's 40,000 San Diego members say they often worry their Car2Go will run out of charge before they finish their trip, Armendariz said. A fully charged Smart Car running on electric can travel a maximum of 65 miles, while a fully fueled Smart Car running on gas can go 342 miles, she said.



### **A disappearing scene – Electric Car2Go**

In San Diego, an average of 20 percent of Car2Go's fleet is unavailable at any given time because the cars are either being charged or because they don't have enough electricity in them to be driven.

Josh Moskowitz, a Car2Go regional manager, said that dynamic will allow the company to replace the electric cars with a smaller number of gas-powered vehicles, although he said the exact number was still being decided. The switch will attract new members, he said, because it will increase confidence they can reach their destination.

"I think we'll attract quite a few people who were on the fence because of 'range anxiety' with the electric vehicles," Moskowitz said. Car2Go also plans to reduce its per-minute usage charges from 41 cents to 19 cents to attract new members, he said.

## Five Reasons Why The Tesla Model 3 Will Be A Smashing Success

March 17, 2016 By Mohammad Omar , Learnbonds.com

Tesla Motors Inc (NASDAQ:TSLA) , widely known for its luxury electric vehicles (EVs) such as the Model S sedan and the Model X CUV/SUV, has confirmed the launch of its much-hyped, affordable Model 3 sedan at its Hawthorne, California facility on March 31. The news was confirmed by the company in a tweet on March 16.

Tesla cars have been on the higher end of the price spectrum, with the starting prices of the Model S and the Model X CUV/SUV pegged at over \$70,000. Thus, the market for these electric vehicles has been restricted to a fairly niche segment. With the release of its first mass market vehicle i.e. the Model 3 sedan, Tesla Motors Inc (NASDAQ:TSLA) is looking to shake up things in the auto industry. Here, we list five main reasons why the new, upcoming model will likely to be a smashing success:

### The Tesla Model 3 Will Cost Less Than The Average Car

The Model 3 will be launched at a target price of \$35,000, but if you consider government tax credits, then the net price is actually going to be lower than the average new car price in 2015 (\$33,560). Electric vehicles are currently eligible for \$7,500 in federal tax credits, which brings the net cost of the Model 3 to around \$27,500 or lower. That is significantly less than what you will be paying to buy a new car. Also, if your state provides additional EV incentives, then that will bring down the prices even more. Of course, things will be different if you decide to opt for a more loaded model, but overall, the incentives in place make the Model 3 a very attractive vehicle to buy



Rendering of Possible Model 3 Design

### A 200-Mile Range From a Full Charge

The Tesla Model 3 will have a real-world range of 200 miles on every charge, putting it among the longest-range EVs on the market. The best thing about this is that you can plug it overnight and voila!- you have a complete charge or a 'full tank' in the morning. Skeptics have raised doubts about the success of the model, given the limited range when compared with petrol and diesel vehicles. However, a study of American driving habits revealed that almost 93% of the time, Americans drive less than 100 miles per day, while 95% of all respondents commute fewer than 40 miles (one side) on a daily basis. Also, the fact that the average car in the US is driven around 11,244 miles per year (less than 220 miles per week) means that you just need to plug your Model 3 a couple of times in a week to get rid of any range anxiety issues. Oh, and you won't need to wait at those smelly gas stations either.

## Superchargers to allow long-distance travel!

A particular topic that EV naysayers bring up (especially in the case of Tesla. It's like some people have an ax to grind with the company) every now and then is that electric cars are practically not feasible for long-distance travel. This argument has been wiped into oblivion by Tesla through the creation of its worldwide network of Superchargers. In just a matter of 30 minutes, you can easily recharge 60% of the range of your Model S and Model X (for free, I may add). Yes, it will take 10-15 minutes more than you would spend at a gas station, but it makes just a minor difference. For the Model 3, we can expect the recharging options to be something on similar lines as the company's previous models. There might be a premium involved, but details are yet to be released.



**Tesla Supercharger Station**

## Beneficial for Environment

It is no secret that electric vehicles have a minimal environmental impact as compared to conventional gas-powered or diesel-powered cars. There are no emissions and neither any exhaust fumes involved in the Model 3. One may argue that generating electricity for powering the car does affect the environment. However, studies have revealed that even in states using a high percentage of coal for electricity generation, net emissions from electric car are lower than the most efficient gas or hybrid models. The figures become more favorable for EVs in states that use renewable sources and natural gas. And if you compare the lifetime environmental impact of EVs compared to gas-powered cars, well, one can safely say that the former blows the latter way out of the park. More details can be studied here in this report by the Union of Concerned Scientists.



## Lower Maintenance Costs, Delayed Obsolescence

The maintenance costs for EVs is substantially lower than gas-powered cars, considering that there is no issue of oil involved and a simpler drivetrain [as compared to an ICE (Internal combustion engine) car] ensures that you don't have to spend a bomb on multiple trips to the service center. Let's see what components does an EV engine have- battery pack, electric motor, linkage between steering wheel, motor and wheel- that's it! Compare this with an ICE car- you have a carburetor, a starter, an exhaust system/catalytic converter, transmission, radiator, pistons, cylinders, spark plugs, as well as hundreds of other components that are used to create an ICE. Tesla cars even have longer lasting brakes, as they use a technique known as 'regenerative braking', which allows capture of energy produced by slowing the car, and converting that to electricity in order to recharge the battery.

Considering software updates, Tesla Motors Inc (NASDAQ:TSLA) rolls out upgrades automatically to its Autopilot navigation system, such as automated parallel parking and 'Summon' feature, through which your Tesla can park itself in the garage or come out to greet you all by itself. These features are expected to get better in the Model 3 sedan.



### Another Rendering of the possible design of the Tesla Model 3

Another issue that you need not be worried about is the replacement of the battery pack. This is because any concerns about replacing the battery after 5 or 10 years are quite misfounded. According to a long-term study of Tesla Model S owners in the Netherlands, an average Tesla battery pack depletes to around 94% of its range after 50,000 miles, and further degrades by 1% every 30,000 miles. This means you will still have about 90% of your range (180 miles for the Model 3) after 15 years of use. With battery technology expected to improve over time (as well as become cheaper), a replacement in the future would certainly be a good decision!



FOR SALE: 1998 VW Golf EV Conversion  
Range: 50-60 miles, driver dependent  
Azure Dynamics Motor/Controller  
97 X CALB 60 AH Cells, 19 Kwhr Batt Pack  
5-Speed Manual Transmission  
Power Brakes, Power Steering  
Displayed at SD Intl Auto Show  
Contact Dave Crow, (619) 846-5358 (cell)  
[deekcrow@yahoo.com](mailto:deekcrow@yahoo.com)  
\$3,900 or OBO



# Electric Auto Association (EAA) Membership Application Form

Fill out this form, attach a check, money order or use PayPal, in US funds only, payable to 'Electric Auto Association'. CE = Current EVents newsletter

e-CE  \$35 USA & other Countries  \$25 Student  \$25 Senior (>65-USA/Canada only) birth year

paper CE  \$45 USA  \$48 Canada  \$52 World  \$29 Student  \$29 Senior (>65-USA/Canada only)

\$120 (supporting level-1)  \$240 (supporting level-2)  \$500 or more (high voltage)\_\_\_\_\_  do not list my name

I support the \_\_\_\_\_EAA Chapter (additional chapters, \$10 each) \_\_\_\_\_

(\$10 each ) Additional Chapters or Special interest group (other than the one that comes with the membership)

You can fold this form as indicated and mail it with your payment enclosed. Use tape to seal the form, **on the sides** , before you mail it or send an e-version of this form, through PayPal using <http://electricauto.org/eamembership.html>

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Mailing City, State & Zip-8  Work phone

Electronic version of Current EVents, paperless only, link sent by email, if your membership was for the e-version, that is what you will receive

Do you own or  Lease an electric vehicle (plug-in)  production  conversion  bicycle  hybrid or  None

please include miles driven and type of vehicle

All information in this application is for the exclusive use of the EAA and not sold or given to any other organization.

**Please identify your primary areas of interest relating to the EAA (check as many as your wish**

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- Environmental/Govt. Regs  Social (Rallies, Shows, Events)  New Technology & Research  Solar & Wind Power
- Promotion & Public Awareness of EVs  Student or General Interest  Electrathon/Bicycle/Scooter/Other

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