

Electric Auto Association



CURRENT EVENTS

May 2018 Promoting the use of electric vehicles since 1967 Vol. 50 No. 5

NISSAN IS FOLLOWING TESLA

Pre-owned
EVSE at a
discount!
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SOLAR POWER & HOME BATTERIES

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The EAA has put most of its issues from 2001 to 2018 on its website.

Please visit

<http://electricauto.org/> and from the home page, click on "Documents" in the top navigation bar.

The resulting page has a listing of years (in a folder), which, when selected, will list the issues for each month. In that folder you will be able to download the pdf that contains the issue you choose.



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Bring on the Ads!



Raejean Fellows

This morning I stopped my morning routine to listen to an advertisement for the BMW line up of electric cars on Spotify. An attractive male voice enticed me to

experience the cars of the tomorrow, today. BMW's message was clearly aligning their "ultimate driving machine" brand with the better technology of EVs that deliver the superior ride.

I was similarly surprised a couple of months ago to see a full page color ad on the back of the NY Times Sunday magazine with a stunning shot of the Mitsubishi SUV Outlander, now available in a plug in hybrid with 25 miles electric and an MSRP starting at \$34,595. We had read about the Mitsubishi Outlander, a Plug-In hybrid SUV, popular in Europe for many years. The ad now sought to attract NY Times readers wanting a larger vehicle with room for the kids, the toys, AWD, towing 1500 lbs and electric driving for around town; all at an affordable price. Thank you Mitsubishi.

Why were these ads so striking? Because until now, there have been barely any ads for any kind of electric car. No billboards, no TV ads, no print ads., no radio ads. Why now? Is this because OEMs realize there is indeed a strong market for EVs? Is it the Tesla challenge? Are they fired up with the competitive spirit, not wanting China to continue their lead as the largest maker of EVs in the world? Do they realize that car buyers really do want a car with better technology than gas cars?

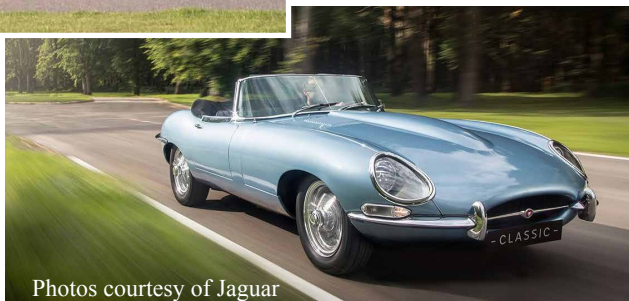
Whether it's the competitive spirit, the marketplace moving beyond early adopter into mainstream, or simply that EVs are the better technology, what a great day. Bring on the ads!

Raejean

The Duke and Duchess of Sussex give homage to a Classic Conversion



On May 19, the Royal Couple drove away from Windsor Castle after their wedding in the Eco-friendly converted classic 1968 Jaguar E-type Concept Zero. *CleanTechnica* reports "The symbolic value of this event for the global shift to electric transportation cannot be underestimated." Renting it for a day made a statement that is reminiscent of an article about the car in the October 2017 issue of *Current EVents* when we reported that this vehicle was originally manufactured in 1968, and was converted to electric power in a factory-guided conversion.



Photos courtesy of Jaguar

Nissan follows Tesla with an all-in-one solar storage package

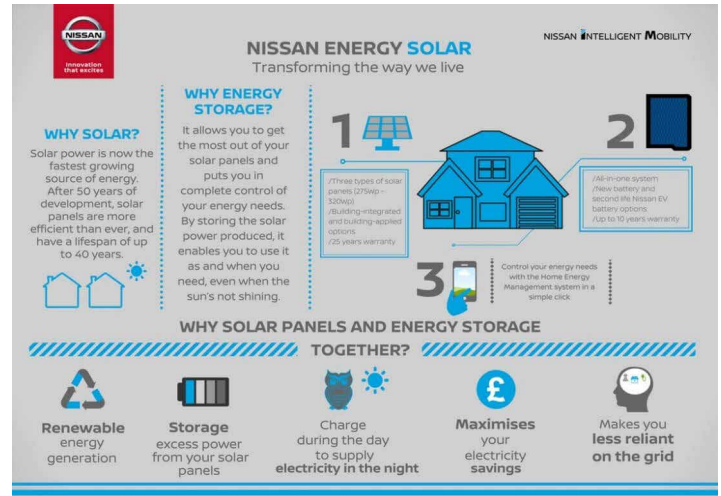
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By K. Filippidis

After making strides in the electric car market, Nissan has set its sights on the home. The company recently debuted its redesigned Leaf electric car and continues to push its xStorage battery, but now it wants to combine its two great loves under one roof. That's what the Nissan Energy Solar scheme — the company's complete home energy solution — is all about.

If that sounds familiar, it's exactly what Tesla is doing in the US with its own all-in-one scheme, which is expected to hit 800 Home Depots around the country. The difference with Nissan's proposed solution is that it's currently only available in the UK, where rain, fog and generally inclement weather are stereotypically common. Nissan says that its panels are designed to operate in bad weather, storing power in recycled Leaf batteries. Stored energy can then be used to power the home and provide an alternate means of fuel for the e-NV200 and Nissan Leaf.

There's a global push for cleaner methods of energy production, and the 13,000 people who pre-ordered Nissan's Leaf EV (check out Engadget's test drive [here](#)) are testament to that. On the home energy front, more than 800,000 homes around the UK are already taking advantage of solar power, so there's definitely room for millions more customers.



Apart from giving consumers some level of independence from national electricity providers, Nissan says its Energy Solar scheme will shave 66 percent off electricity expenses — that's when opting for the six panel system which costs £3,881 (roughly \$5,200). Nissan is also offering customers some degree of flexibility — there's a full package that integrates energy generation, management and storage, but the components are available individually too. At any rate, this seems like an appealing solution for those interested in reducing their carbon footprint and investing in renewable energy.

Nissan Energy Solar enables optimization of energy creation, storage and consumption using solar panels, batteries and a home energy management system.

Photos: Nissan



<https://www.engadget.com/2018/05/17/nissan-energy-solar/>

Del Norte High School Drive Electric Video Contest KICK OFF!

Meagan Ochoa, Del Norte High School Senior and daily Nissan Leaf driver, is the student lead on this exciting project to increase public awareness of electric vehicles. The students, alone or in teams up to 5, will use their creativity to produce 30 second to 3 minute educational and entertaining videos. A contest website helps inform their project: contest@evaosd.org

Winners will choose from iPads, Apple Watches, Helicopter rides, Indoor Sky Diving, ActionCams and more. Lots of learning will take place as students learn about EVs and their impact on combating climate change and cleaning up the air. San Diego is the 6th most polluted city in the U.S. Translating that learning into winning videos will be an exciting journey.

The contest runs from May 15th – September 2nd, with the winners announced at Drive Electric Day in San Diego. The winning video will be placed on EAA's home page, sponsor, Plug in America's newsletter and sponsor, Clipper Creek's home page. The contest was the idea of Elaine Borseth, President of Electric Vehicle Association of San Diego (EVAOSD). A team of four chapter members and two students designed the contest over a period of several weeks.

With all the hard work and groundwork complete, interested EAA chapters will be able to bring this contest into their hometown high schools with ease. There is lots to share about how the Chapter worked with the high school to make this happen.

Stay tuned!



Women Are Accelerating the Switch to Electric Cars



[Note: Women in the late 90's were active too, like Chelsea Sexton star of the movie *Who Killed the Electric Car?*]

By Mary Lunetta

Not long ago, my partner — a man — and I wanted to test drive a plug-in Honda Clarity at a local dealership in San Diego. After informing us they had no electric car available for a test drive (indicative of an industry-wide inventory problem the Sierra Club documents in our *Rev Up EVs* report), our male salesperson would not make eye contact with me. When I asked questions about their models on the lot, he would only answer to my partner, despite my partner not asking any questions because he was too busy

tending to our young toddlers.

Today, up to 85 percent of car purchasing decisions are made by women, and a lot of us are excited about electric cars. Just as gender norms change over time, so too should the stereotype that EVs are a uniquely male interest. It's one myth among many associated with electric cars.

The truth is, women are proving that EVs are not just for men. Numbers show that, though EV buyers are indeed predominantly male, more women are

making the switch to drive EVs. The Center for Sustainable Energy found that in 2012, women represented 21 percent of their voluntary EV consumer survey and in 2015, that number increased to 27 percent.

However, who buys a car doesn't necessarily indicate who will be driving the car. Women are often not the ones closing the deal and signing the paperwork. And who can blame them? Car dealerships still aren't the most welcoming place for women.

continued next page

While we may be starting to close the EV gap between white men and women, we still have an even longer road to pave when it comes to women of color gaining the same access to electric transportation. The CSE survey mentioned earlier found that 64 percent of their 18,661 survey takers were white, and only 2 percent were black.

There are clear demographic gaps when it comes to who has access to the EV market, but this has less to do with intrinsic truth about gender or race and more a result of the social and economic power structures at play within our society.

The good news is, these sexist and racist barriers are being dismantled and transportation justice is accelerating in diverse, multifaceted ways at the state and local levels. As EVs continue to become more affordable and more states adopt rebates, as tax credits are extended, as fights are underway to replace punitive registration fees with fair alternatives, as EV car-sharing geared toward low-income residents expands, as charging infrastructure installation increases (and not just in the white gentrified neighborhoods), and as more transit agencies commit to 100% electric bus fleets, these policies are expanding the benefits of zero emission vehicles by giving more access to women on the margins of EV adoption, including women on low and fixed income, women of color, disabled women and elderly women.

And female leaders are pushing for our collective equitable, swift transition to EVs — from their seats as policy-makers, from the desks of our organizations, from the apps of the small businesses we run, and even from our race cars.

Though women dominate car-buying

decisions, they are strikingly absent from holding positions in industry sales and as executives. One notable woman who has broken this ‘glass sunroof’ is CEO of General Motors, Mary Barra. While we really wish her company would stop lobbying for weaker federal fuel efficiency standards, she is speaking out in favor of expanding the federal EV tax credit, which starts to sunset for automakers that reach 200,000 EV sales.

Another woman who stands out in the auto industry is racecar driver and electric car advocate, Leilani Munter who not only drives a Tesla but is fighting the ban on Tesla’s direct sales models in several states.

Some female entrepreneurs are also thriving in the electric car space, including EV Match — the Airbnb of EV chargers — and Luscious Garage, the all-women owned auto repair shop for EVs.

Many would argue a Super Woman of EV advocacy is Mary Nichols, the Chair of the California Air Resources Board. The agency Nichols chairs sets strong EV policy in the nation’s most populous state and has an impact on the EV industry and our air quality, not only nationwide but worldwide.

Tonia Buell, co-creator of the West Coast Electric Highway is also a founding member of the international group, Women of Electric Vehicles (WEV). One of WEV’s biggest annual meet ups is held during EV Roadmap, the largest annual EV conference in the nation. WEV began in 2013 with a handful of members, growing to 80 women in 2017 and this year, more than 100 women are expected to convene from national advocacy organizations, leaders of charging companies and advisors to elected officials.

“Women popularized EVs in the first place, and are still playing key roles as both EV purchasers and leaders within the movement itself,” says Chelsea Sexton, electric car advisor and one of the co-founders of Plug In America.

Paradoxically to today’s stereotype of being ‘boys’ toys’, electric cars were initially considered the cars for women when they first hit our roads in the early twentieth century. EVs were seen as ‘less masculine’ than their dirty fuel counterparts because they were quieter, slower and easier to operate — a stereotype created and perpetuated by the marketing of the automanufacturers. Even Henry Ford’s wife Clara drove a 1914 Detroit electric car.

As women, we fight for our collective liberation — to simply have the right to speak, to be included and have value. And we continue that fight alongside the fight for a clean transportation future for all, without leaving anyone in the dust.

As women, we are not, for the most part, selling electric cars or leading the industries that manufacture them — but many of us are driving them and advancing transportation justice to ensure that zero emission vehicles are accessible and enjoyed by all. Considering that today, EVs are cleaner and more popular than ever, women should be proud to be leading that charge.

The image on the previous page is by Tonia Buell

Mary Lunetta is the campaign representative for the Sierra Club’s Electric Vehicles Initiative.



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Road Trip Magic – Only in an EV!

Ocean to Mountains in a Chevy Bolt EV

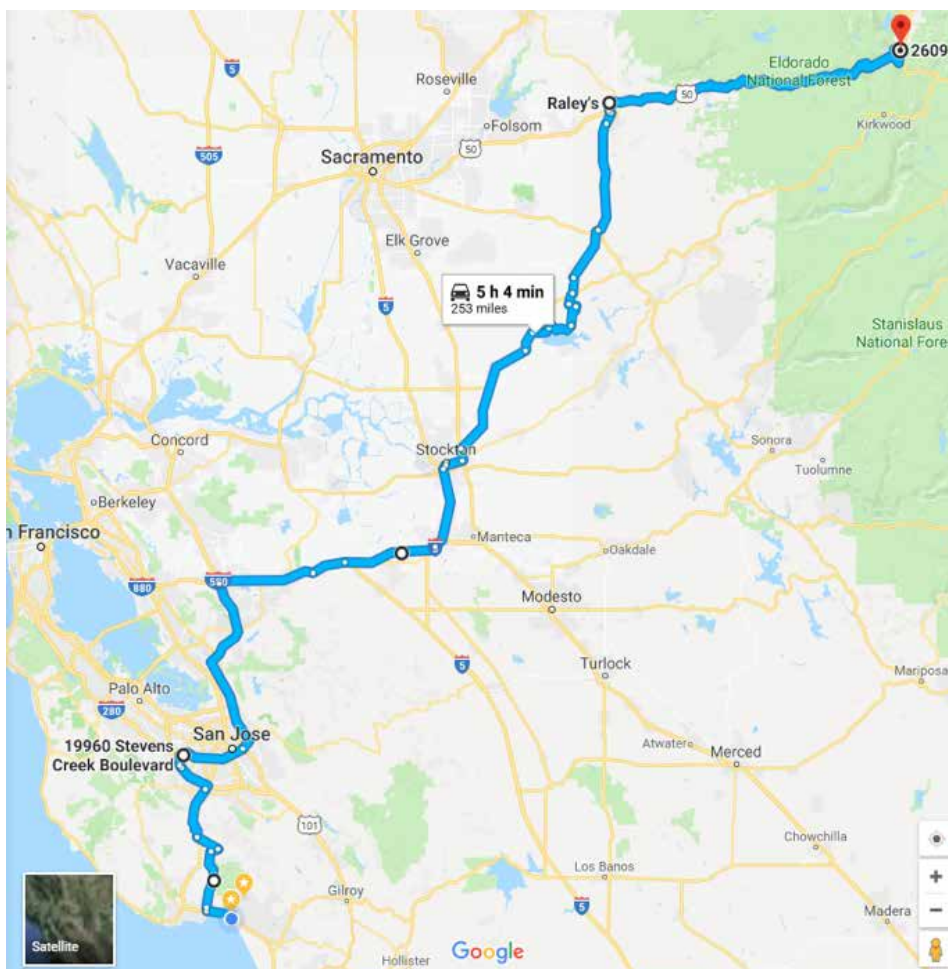
By Will Beckett

Fully charged (100%) in Aptos on Thursday morning, the car fully packed with my charging station — we headed for the Aptos Chamber breakfast at 9 AM. Heck, might as well pick up a big meal and collect all the local news at the same time! So began our road trip from the ocean to the mountains in a modern EV.

The next stop was Cupertino's First Tech Federal Credit Union for a new signature card for our new EAA president, Raejean Fellows. We spent about an hour chatting and giving the agent time to figure out dealing with a business account since it was his first time.

Left about bit after 11AM and headed for Placerville for a planned DC Fast Charge, before heading over the summit on Hwy 50. We wanted to avoid Sacramento, so drove over to Stockton and used Highway 4 to 88, 49 to 50 on the way to Placerville.

Arrived at the Raley's store around 2 PM and plugged into an EVgo, dual port station using CCS. The images below are shots of "before charging" and after arrival at Raley's showing our energy levels and distance travelled.



continued next page

ROAD TRIP



You can see we picked up a few miles of range from the summit down to South Lake Tahoe. I plugged my charging station into the 14-50 outlet that my friends had installed on their house and charging started at around 4 PM. The two shots below are of the area we stayed on the Lower Truckee river. I have a video of the water falls where we stayed coming off the mountain, which is very dramatic.



After the EVgo turned off (31 minutes), the display showed the following:



Only needed to travel another 51 miles (though it was all uphill), so I felt confident we had enough to get to South Lake Tahoe. Got on the road and started the drive. With about eight miles to go, I wondered why we had not reached the summit yet. Finally we went by the Echo Lake turn-off and started down hill with about 20 miles of range to spare. Shown is the detail after reaching our destination.



The picture above is from Echo Lake, looking down at the cabin we stayed in, in Christmas Valley.

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Trip to Tahoe

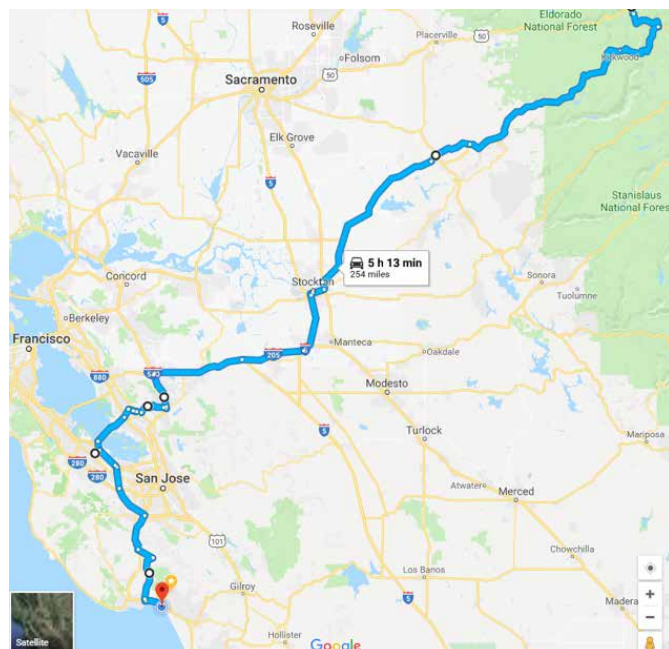
Continued from page 9



The part of this trip that was the most interesting though, was the return on Sunday. Unfortunately, I took no pictures until I arrived home, so I will just need to tell you about what we observed. Our route back was a bit different. I knew we would not need to stop in Placerville, so we decided to use Carson Pass for the return trip to Stockton. Also, it was Mother's day and it would be easy to stop in and see mine in Palo Alto.

What I was most interested to see was what all that downhill travel would do for my range. That's the focus of this entire piece. Downhill not only saves your charge (which is common sense) but it actually *grows your state of charge*. But that can't be done on a gas car — their drivers may save a little but can't FILL THEIR TANK on the fly!

Just as a point of interest for those that know about the BoltEV, I drive with the "L" option (full regen and single peddle control) all the time. By the time we were going through Stockton, my display indicated I was getting about eight miles per kilowatt-hour. It was very clear that I would not need a charge for this leg of the trip. However, we did stop at my mother's place in Palo Alto and I plugged in there.



Spent about two hours with my mom, then completed the trip home to Aptos.

Conclusion: This trip demonstrates what only EVs can do. Increase their travel range by regen'ing from 7,000' ASL back down to sea level.

ClipperCreek Now Offering Factory-Certified Pre-Owned EV Charging Stations



By Blagojce Krivevski

ClipperCreek has launched the sales of factory-certified, pre-owned HCS and LCS series charging stations. The electric vehicle charging stations are factory tested and certified by ClipperCreek and come with a one-year warranty. Pricing starts at just \$300.

Pre-owned LCS charging stations are \$300, a savings of up to 42% off the price of a new LCS. HCS models are available for \$400, a savings of up to 59%.

Factory-certified pre-owned products have been inspected and fully tested to ensure 'Like New' functionality. The products may have visible cosmetic imperfections. The products will be packaged in ClipperCreek packaging, and will come with an installation manual and a new connector holster, as new products do.

"We have had an increasing number of customers asking for a pre-owned charging station option, and quickly realized re-certifying slightly used HCS and LCS products would offer great value to our customers, and also aligns with our own environmental impact and sustainability goals," said Jason France, President and Founder of ClipperCreek.

Amanda Lance, ClipperCreek's Inside Sales Manager, said, "We are happy to offer this option to our customers. The ClipperCreek team developed stringent guidelines as to what products are considered for factory certification, and a process to ensure that all parts that can no longer be utilized are recycled in an environmentally-friendly manner. I

believe our customers will be completely satisfied with their factory certified pre-owned EVSE purchase and we back the products with a one year warranty."

Features of the HCS and LCS stations, including power capabilities, will vary depending on model; all factory-certified, pre-owned ClipperCreek HCS and LCS stations feature the following:

- One-year warranty
- Wall mount SAE-J1772TM connector holster included
- Integrated cable wrap making storing the cable simple and convenient
- Rugged, fully sealed NEMA 4 station enclosure for installation indoors or outdoors
- Support from ClipperCreek's outstanding customer service team
- No assembly required
- Made in America
- UL and/or ETL listed, electrical safety certification



Factory-Certified Pre-Owned LCS Charging Station \$300, various power levels and connections available.

Factory-Certified Pre-Owned HCS Charging Station \$400, various power levels and connections available.

Call Clipper Creek at 877-694-4194 to order your Factory-Certified Pre-Owned Charging Station or email at orders@clippercreek.net

No online web orders



<https://electriccarsreport.com/2018/05/clippercreek-now-offering-factory-certified-pre-owned-ev-charging-stations/>

CA Bill Expands Renters' Right to Charge EVs

Rent controlled residences in California are not currently protected by AB 2565, which requires most landlords to allow installation of EV charging equipment. AB-1796 is an amendment to AB-2565 submitted recently by Assemblyman Muratsuchi to include rent controlled residences. Paul Scott, co-founder of Plug In America and ex-President of the EVASOC, testified recently in Sacramento in favor of the bill. On May 14, the bill passed in the Assembly. Here is Paul's testimony:

"Two years ago, I met and fell in love with a woman who lives in an apartment in Los Angeles. As we got to know each other, I told her about electric vehicles and renewable energy and convinced her that she should switch her apartment's electricity to a clean source through her utility. She did it immediately, and she has powered her home with clean electricity since then.

"I also convinced her to get a used EV, as her parking space was only 50 feet away from her electrical panel, so it would be easy to install a charger. However, when I approached her landlord and explained what we wanted to do, there was no response. I contacted them several times over several months, each time explaining that we wanted to install a charger for an EV.

I knew about AB 2565, but I also knew there was a carve out for rent control apartments, meaning those renters did not have the right to use their own electricity to power their cars. Barbara lives in a rent control apartment, so her landlord could legally deny her the right to use her own clean electricity to power her car. There are no public

chargers in her neighborhood, so she could not get that EV. She continues driving a gas-burning car today.

"When I saw that there was a single 15 word line in AB 2565 disallowing rent control tenants from having the right to use their own clean energy to power their cars, I contacted Assembly Member Muratsuchi and asked if he would write a new law that corrected this problem, and that's how AB 1796 came to be.

"From my research, I've learned that there are over half a million rent control units in California. None of those people can switch from burning gasoline unless they have access to a charger where they work, which the vast majority do not. Thousands of these people would probably switch immediately if they could install a charger at home. This is a classic example of low hanging fruit.

"Using dirty energy, electricity from coal and gas, and oil for transportation, is for most people, the single worst thing they do in their entire lives. With affordable electric cars and low cost renewable energy, most people can now switch to a clean, low impact lifestyle, but they need to be able to access that clean energy with their cars. AB 1796 will do that for over half a million Californians. I urge you to pass this bill."

What can California EAA members do to support this effort to ensure access to electricity for EVs? Contact your local Assembly members and Senators. Keep an eye on the status tab for this bill below.

Is there a similar burning issue that has not yet been addressed in your statehouse, or by your city council? With some thoughtful planning, you too can get the attention of lawmakers and change the status quo. As Margaret Mead famously said: "Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it's the only thing that ever has."

Text of the bill:

https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB1796

Its passage will permit the installation of EV charging stations in rent-controlled housing, effective January 1, 2019.

See the additional article in this issue on page 26 dealing with apartment (rental) charging.

DID YOU KNOW?

A survey of the general population in early 2018 revealed that 89% of the population of Norway knows someone owning a BEV, 66% have been a passenger in a BEV, and 34% have driven a BEV. Only 22% have never been inside a BEV.

The survey also revealed that in the general population the main barriers to sales are range, a lack of sufficient charging infrastructure and uncertainty about battery life.



Department of Energy Announces \$19 Million for Advanced Battery and Electrification Research to Enable Extreme Fast Charging

The U.S. Department of Energy (DOE) has announced \$19 million to support twelve new cost-shared research projects focused on batteries and vehicle electrification technologies to enable extreme fast charging. Selected research projects are focused on developing electric vehicle systems that can recharge rapidly at high power levels, decreasing typical charge times to 15 minutes or less using a connector or wireless fast charging system.

DOE's Vehicle Technologies Office within the Office of Energy Efficiency and Renewable Energy invests in early-stage research to enable private-sector development and commercialization of affordable, energy efficient transportation technologies that can strengthen our energy security, support U.S. economic growth, and offer consumers and businesses additional transportation choices. The projects announced today will help advance DOE's research on batteries and electrification aimed at reducing battery pack cost to under \$100 per kilowatt-hour, increasing range to over 300 miles, and charging in under 15 minutes or less by 2028.

Recharging current EV batteries takes much longer than refueling the average liquid-fueled internal combustion vehicle. Slower charge rates are required to allow the lithium-ions to penetrate to the deepest portions of the active material on the electrode. Charging at too high a rate runs the risk of lithium plating, increased battery temperature, and other detrimental side chemical reactions which decrease life and performance characteristics of the batteries. The nine selected battery projects listed below focus on advanced anodes, electrolytes, and battery cell designs that can be charged rapidly — in less than 10 minutes — while still maintaining performance over the 10 year life goal.

- Regents of the University of California, University of California San Diego (San Diego, CA) – \$650,000
- Pennsylvania State University (University Park, PA) – \$1,000,000

- Regents of the University of Michigan (Ann Arbor, MI) – \$1,500,000
- SLAC National Accelerator Laboratory (Menlo Park, CA) – \$1,500,000
- Oak Ridge National Laboratory (Oak Ridge, TN) – \$900,000
- Microvast Inc. (Orlando, FL) – \$1,500,000
- Research Foundation for the State University of New York – Stony Brook University (Stony Brook, NY) – \$800,000
- University of Tennessee (Knoxville, TN) – \$720,000
- Coulometrics, LLC (Chattanooga, TN) – \$1,000,000

The three selected electrification projects listed below will develop and verify electric drive systems and infrastructure for electric vehicle extreme fast charging, which increases charging power levels from current home charging at 7 kW to power levels up to 400 kW. They will also reduce typical charging times from 8 hours down to 15 minutes or less.

Wireless Advanced Vehicle Electrification Inc. (Salt Lake City, UT) – \$4,300,000

Delta Products Corporation (Fremont, CA) – \$3,500,000

Oak Ridge National Laboratory (Oak Ridge, TN) – \$2,200,000

To learn more about the projects selected today and DOE's work with industry, academia, and other partners on advanced vehicle technologies, please visit the Vehicle Technologies Office website.



<https://www.energy.gov/articles/department-energy-announces-19-million-advanced-battery-and-electrification-research-enable>

670 Horsepower and 0-60 in 2.2 seconds: The Volkswagen I.D. R Pikes Peak

The electric racer finally breaks cover and starts testing ahead of June's race.



This is the Volkswagen I.D. R Pikes Peak, an electric race car designed to set a new record at Pikes Peak in Colorado.

By Jonathan M. Gitlin

They say there's none so zealous as a fresh convert. The fallout from dieselgate saw Volkswagen find religion in electrification, and the automaker sure is embracing it. Last year, now-departed VW Group Chairman Matthias Müller revealed Roadmap E, which commits the company to electrifying its entire lineup by 2030. It is building networks of 350kW DC chargers. In Europe that's happening with other OEMs; here in the US it's doing it alone (revealing on Monday that Target and Sheetz, among others, will join 100 Walmarts in the network). It has locked in \$25 billion of batteries for European- and Chinese-market battery electric vehicles (BEVs), and barely an auto show goes by without the reveal of yet another BEV under the I.D. sub-brand. The first of these will go on sale in 2020, with the microbus that everyone drools over coming in 2022.

But one I.D. electric car will hit the street a little sooner. Well, one particular street—the strip of road that runs up to the top of Pikes Peak in Colorado. Volkswagen will use this year's Pikes Peak International Hill Climb both to stress test its new BEV platform and—if driver Romain Dumas sets a new EV record—to make some headlines. In March we saw a couple of renders of the I.D. R Pikes Peak, but on Sunday at Alès in France, it finally gave us our first look at the real thing.

The technical specs are still few and far between. We don't know what the battery pack is like; VW hasn't commented on that aspect yet. But since the run to the top of the mountain is just 12.4 miles (19.99km), and you only get one attempt, range won't be much of a concern. VW says that even at maximum attack, the run should only use about 20 percent of the pack's energy.

Performance, on the other hand, is very much a priority. So the car's powertrain is being optimized for power output and the battery pack for power density. The I.D. R Pikes Peak is a twin-motor design, with a total of 500kW (670hp) and 650Nm (479ft-lbs) ready to be unleashed. The car's weight has been kept to under 2,425lbs (1,100kg), and VW says it's capable of zero to 62mph (0-100km/h) in just 2.25 seconds, which is faster than either a Formula 1 or Formula E car.

Of course, we should point out that both those series have rather restrictive rule books. The technical regulations at Pikes Peak in the Unlimited class are mainly focused on ensuring the driver cell is able to withstand rolling down several hundred feet of mountainside—something that remains a distinct possibility on this scary course. Consequently, the I.D. R Pikes Peak is one of the more extreme-looking race cars, dominated by a huge front diffuser, enormous rear wing, and floor extensions at either side that all aim to maximize aerodynamic downforce to keep it stuck to the road, particularly when above 14,000 feet (4,267m) in altitude.

The choice of Romain Dumas as the driver is a good one. When he wasn't busy driving Porsche's 919 Hybrid in the World Endurance Championship in 2016, he was engineering his own hillclimb car, and that year he set the overall fastest time at Pikes Peak, just a week after winning Le Mans for his day job. He won it last year as well, but for 2018 Dumas will have the backing of a

continued on next page

PIKES PEAK ENTRY



It's a pretty tightly packed cockpit. Since the race is against the clock, side and rear visibility isn't much of a concern.

full factory effort. Volkswagen says the goal is to set a new record for an EV. That's currently 8:57.118, set by Rhys Millen in 2016 in the Drive eO PP100. (Dumas' 2016 time in the gasoline-powered Norma M20D was even faster at 8:51.455.)

But I have to wonder if the real goal might be Sebastian Loeb's 2013 record of 8:13.878. The I.D. R Pikes Peak is

heavier than Loeb's Peugeot 208 T16 Pikes Peak (1,100kg vs 875kg), and on the face of it the Peugeot made more power with an 875hp (652kW) turbocharged V6. But any internal

(L-R): Sven Smeets, Francois-Xavier Demaison, and Romain Dumas stand with the I.D. R Pikes Peak.

combustion engine will lose power as it ascends in altitude and the air thins, something that doesn't happen to batteries and electric motors.

Following the unveiling, the I.D. R Pikes Peak started a two-week test in Alès. "It was absolutely fantastic to see the completed I.D. R for the first time and to take it out for its first spin," said Dumas. "What Volkswagen has managed to put together from scratch over the past few months has my greatest respect. I had obviously seen initial pictures of the car—but it is even more spectacular in the flesh. We now have a packed schedule of testing ahead of us, and I am looking forward to every metre!"

The team will relocate to Colorado in June, with the race scheduled for June 24. And if it all goes to plan, I'll be on site to see how they get on with one of the hardest challenges in motorsport.



<https://arstechnica.com/cars/2018/04/670-horsepower-and-0-60-in-2-25-seconds-the-volkswagen-i-d-r-pikes-peak/>

EV Review: 2018 Fiat 500e



By Jason Unrau

Introduction

Electric cars tend to lean toward the cutesy style. They're often small cars with and a very distinct EV looks. You know the type: blue accents, oddly-shaped grilles, strange interior materials, and such. It's refreshing when an electric car doesn't bring any more attention to itself than necessary, as is the case with the 2018 Fiat 500e.

What we're talking about is a microcar. It's a subcompact model that's gone from a fuel-sipping two-door hatchback to one that doesn't use any fuel at all. Really, it meets the right clientele as its gas-powered sibling and doesn't seem to be much different at all. That's a great thing at times, but in the Fiat 500e's case, there are a few flaws evident immediately.

This little micro-hatch seems starts its life at a disadvantage compared to the competition. It's priced higher than several other EVs like the Nissan

LEAF and Chevy Bolt, yet it has a much shorter driving range. There has to be something spectacular behind that cute exterior to make customers choose the 2018 Fiat 500e.

Exterior Styling

In the segment, the Fiat 500e looks exactly right. It's a small, two-door hatchback-style vehicle that gives car buyers the feeling of individuality. There's a retro appearance to it, such as round headlights and the throwback

style to the 500 from decades ago. It's very much the same car as the gas-powered Fiat 500 from the looks of it, save for only half the color choices and a different wheel design.

The 2018 Fiat 500e comes standard with a few things the gas version does not, though. Heated outside mirrors are more aerodynamically shaped, and fog lights and a rear spoiler are found on all 500e trims. *continued next page*



Fit and finish interior

There are some good things happening inside the 2018 Fiat 500e. It's a comfy car with tons of legroom, even for taller people in the front seats. Heated, power-and-memory leatherette seating surfaces are standard equipment on the 500e. Automatic temperature control, SiriusXM radio, and an Alpine Premium Audio System with six speakers are standard equipment on all Fiat 500e models.

In fact, there are only a few things that can be changed up on the 2018 Fiat 500e. You have two interior color options, Steam or Nero (aka White or Black), an available power sliding moonroof, and the E-Sport package. The E-Sport Package adds orange-accented wheels, orange mirror caps and side stripes, and black headlight housings.

One of the best interior features for the Fiat 500e is its instrument cluster. It's a 7-inch round full-color display that can be used as your Uconnect Navigation or display trip information, et cetera. It's a highlight especially since the radio is rather nondescript in appearance and the whole dash and console area feel excessively cheap and plasticky.

The 2018 Fiat 500e is a comfortable ride and a well-equipped car, but it falls way short of expectations in the cabin. That goes doubly so when you take the price into consideration.

Driving Experience

Here's where the Fiat 500e had an opportunity to outshine the competition. It has Italian DNA that could have been harnessed to make it an incredible little performer. It was an opportunity squandered.

There's nothing inherently wrong with how the 2018 Fiat 500e operates, but it could be better. The electric motor is just 111hp, although off-the-line torque



continued on page 18

Fiat Reviewed

continued from page 17

is always surprisingly strong in electric cars, and the 500e has 147 lb.-ft.

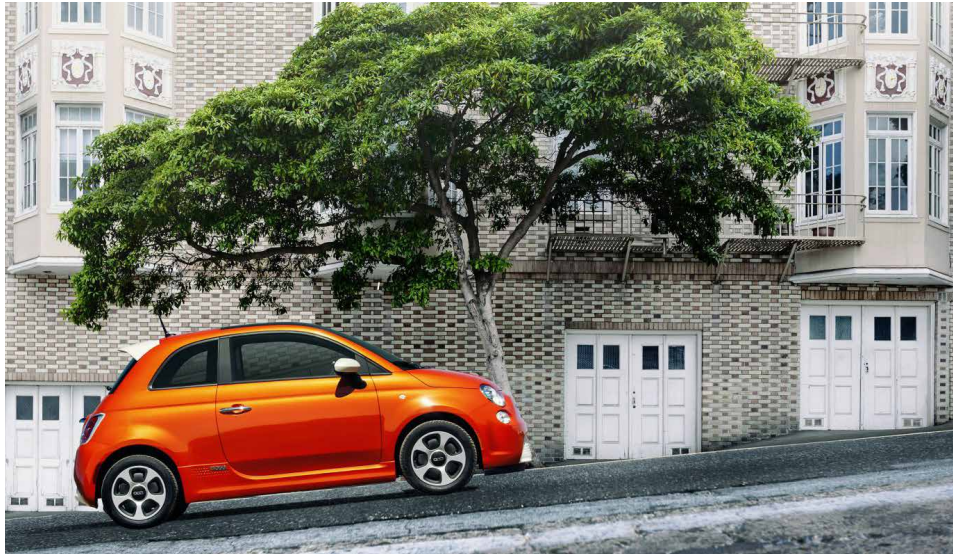
FCA has equipped the 2018 Fiat 500e with fairly standard MacPherson front struts and a rear twist-beam axle with coil springs, as well as an electric power-assisted rack-and-pinion steering system. What that means is the Fiat 500e handles about the same as every subcompact car built in the past 15 years. You aren't slaloming a mountain course or even powering around a highway cloverleaf. It's a run-of-the-mill driving experience.

The only thing with the 2018 Fiat 500e that stands out is the regenerative braking system. Fiat has developed the 500e to feel as much like a normal vehicle when braking while still having the same regenerative braking efficiency as the typical EV. It would just be really nice if the Fiat 500e could go further than 84 miles before it required a 4-hour Level-2 charge.

Conclusion

The 2018 Fiat 500e is a city car, through and through. With a comparatively short-distance range and a seemingly long charge time, you aren't going to be taking the Fiat 500e on road trips. The exterior is good-looking but the interior doesn't meet expectations.

Add to that, the 2018 Fiat 500e is only available from dealers in Oregon and California. There won't be too many people choosing the Fiat 500e over some of the more powerful and longer-range competitors out there, but those who choose it are probably fuel- and eco-conscious millennials and small families.



Features

MSRP	\$32,995 USD
Type	BEV
Electric Range	84 miles / 135 km
Total Range	84 miles / 135 km
Time to Charge	4.0 hours (Level 2)
Electric Motor	83 kW
Battery Capacity	24 kWh
Top Speed	88 mph / 141 km/h
Warranty	4 years/50,000 miles or 80,000 km

Top Competitors

- 2018 BMW i3
- 2018 Kia Soul EV
- 2018 Chevrolet Bolt
- 2018 Nissan LEAF



Jason Unrau is a freelance automotive writer with more than 15 years of experience in the retail automotive environment. He has a passion for automotive technology, is a GM Certified Technology Expert, and loves to drive.

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<https://www.fleetcarma.com/ev-review-fiat-500e/>

SF Motors reveals two electric SUVs with 300 miles of range

By Nicole Lee

While much of the automotive world was focused on the New York Auto Show, a small car startup unveiled its first-ever vehicles on the other side of the country in Santa Clara, California. SF Motors, the US arm of Chinese company Sokon, has just announced two cars — the SF5 and the SF7 — as part of a whole new line of electric vehicles. The SF5 is a medium size crossover SUV, and the SF7 is a full size crossover. The SF5 will be available for pre-order by the end of this year and will ship in 2019.

Both vehicles boast a proprietary powertrain that promises 1,000 horsepower and the ability to accelerate to 60 miles per hour in under 3 seconds. They utilize a LiDAR system for adverse weather, road conditions and more. According to SF Motors, it also developed a “range-extension platform” that helps to extend the driving range of the vehicles thanks to a “high-power onboard generator.”

Interestingly, SF Motors also states that it developed its own proprietary battery cells that apparently has a range of more than 300 miles (500 km) per charge. It incorporates a so-called advanced Battery Management System, liquid-cool thermal management and “unique mechanical structures.” And thanks to the acquisition of InEvi, a battery module startup last year, SF Motors



is also working on a next-gen battery module system that directly integrates into the vehicle chassis.

And once those batteries are spent, they don't need to be tossed away. SF Motors is also proposing a battery recycling solution whereby they can find second use in homes and offices.

Sokon is a well-known maker of vans, trucks and sports utility vehicles in China, but none of them are EVs. A couple of years ago, the company decided to launch a company in the US dedicated to EVs and autonomous vehicles, which is how SF Motors was born. In just two years, SF Motors has made significant strides in creating its first car. It set up its HQ in Santa Clara, California, a research and development center in Ann Arbor, Michigan, and now has seven R&D facilities in the US, China, Germany plus an upcoming one in Japan.

Thanks to the backing of a large company like Sokon, SF Motors is able to make its own investments. As mentioned above, In 2017, it paid \$33 million to acquire InEvi, a battery module startup started by Martin Eberhard, whom you might recognize as one of the original co-founders of Tesla. SF Motor had even hired Eberhard as a consultant prior to the acquisition. Now, he serves as SF Motors' chief innovation officer.

SF Motors also seems well-poised to make a serious run at vehicle production. It purchased the AM General Commercial Assembly Plant in Mishawaka, Indiana last year, which was previously used to make vehicles from the likes of Mercedes-Benz and Hummer. It kept around 400 or so employees from the factory and will apparently be the only EV company to have manufacturing facilities in both the US and China.



<https://finance.yahoo.com/news/sf-motors-reveals-two-electric-030000042.html>

What to consider when buying tires for your EV

By Rikki Gibson

When it comes to buying tires, we all know that the options are endless and that it always pays to shop around. There are already all-season tires, all-terrain tires, low profile tires, mud tires, performance tires, and winter tires, but should there also be EV tires? When it comes to shopping for new car tires, there is already a laundry list of things to consider, but when owning an electric vehicle, there are new items that you will need add to that list.

Requirements of tires for EVs

Anyone who drives an EV knows that they are virtually silent, have instant torque, and range is important. This means that you need your tires to be quiet since the lack of engine noise won't cover up any road noise, they need to be durable enough to stand up to the instant torque and extra weight, and they need to help extend driving range instead of hindering it. Is that asking too much?

According to an article from Wired, Michelin doesn't think so. Michelin currently makes the Michelin Energy E-V tire which is advertised as a tire that was exclusively designed for electric vehicles. The tire is supposed to offer a 20% reduction in rolling resistance, for up to almost four more miles, and 40% less interior noise (these numbers are based on internal tests by Michelin and are compared to none EV tires). Many electric models use high-performance tires if they aren't using EV specific ones. For example, Goodyear recommends various options that all highlight "sport performance" and a quiet ride. In areas that experience cold winters, it is recommended that, for safety and reliability, you have winter tires.



Nissan LEAF at the Goodwood Festival of Speed (<https://inhabitat.com>)

How to increase EV tire longevity

As mentioned, electric vehicles weigh more (about 20-30% more than an ICE counterpart) and that with instant torque, tires will wear out much quicker. Some of the easiest ways to extend the life of your tires are just general good driving habits. You don't want to accelerate quickly when you don't have to, reduce the number of sharp turns you make, and use your regenerative braking to your benefit. It's also important to keep your tires at the right tire pressure and get them aligned regularly. Finally, you'll want to be extra cautious about punctures and rubbing against curbs. This is because of the pressure on the tires caused by the extra weight.

Expect to pay more

Since EVs have specific tire requirements to ensure the best possible driving experience, they may be a bit different than tires you purchased for your ICE vehicle. The tires are likely going to be different (wider, narrower, or larger) in size and made up of different materials so that they offer a quiet ride that helps get the most range possible. This also means that they are probably going to be more expensive. When it comes time to replace your tires your best bet will be to replace them with the same type that

came with the vehicle. That's because those have been selected specifically for your EV. If you opt for less expensive tires, you might end up just having to replace them more often.

Conclusions

As EVs continue to evolve and become more popular, it only makes sense that tires specifically for electric vehicles will become more common and more affordable. The perfect tire will offer a quiet ride, have limited rolling resistance, and offer great handling. When it comes time to purchase new tires, taking some time to research your options will ensure you have a good driving experience and can also help save you money.



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<https://www.fleetcarma.com/consider-buying-tires-ev/>

Why electric vehicles have lower maintenance costs

By Rikki Gibson

The popularity of electric vehicles is increasing as battery technology is developed and a larger number of car manufacturers are investing in new production lines. Up to \$90 billion has been invested by car manufacturers globally. Among the various advantages of electric vehicles, the maintenance costs are considerably lower.

For fleet managers looking to cut costs, switching to a fleet of electric vehicles is a great option, but often comes with many questions because of the new technology. Let's take a look at some of the reasons why electric cars are less expensive to maintain than traditional internal combustion engine (ICE) vehicles.

Regenerative braking

Electric vehicles use regenerative braking to decelerate the car and in the process transfer energy to the battery that can be used to accelerate the car. The traditional braking system wastes a lot of kinetic energy that's transferred to heat and then dissipated into the surrounding environment. Therefore, regenerative braking leads to lower operating costs as battery power is generated while driving.

Regenerative braking has a lower emphasis on the use of the braking pad. You'll mostly be using it when you need to decelerate rapidly or come to a halt. Consequently, your brake pads will last significantly longer.

You may even find that a one pedal system is implemented such as in the Tesla Model 3 and Nissan LEAF.

The electric motor has fewer parts

An electric car motor has significantly

fewer engine parts when compared to ICE vehicles, which means there is a smaller chance of a part breaking and requiring replacement. Once a component of an electric engine does break, it's far easier to replace. Fewer trips to the mechanic means the fleet will have less downtime, and in turn, the consistency of the transportation is improved.

Furthermore, no oil change is required whereas with ICE vehicles an oil change is needed every 3-5,000 miles. For a fleet of vehicles, this is costly as you need to spend \$45 per oil change on average.

It's estimated that the overall maintenance costs per kilometer for an electric car is one cent per kilometer and for ICE vehicles it's three times as much at three cents per kilometer.

Battery degradation (lack of)

The replacement cost of electric vehicle batteries is relatively high, but the rate of battery degradation is slow. For example, the Model S loses 5% of battery power after 50,000 miles, but after 100,000 miles that figure increases to just 8%. Data collected from simulations indicate that after 500,000 miles the battery capacity retention will be at around 80%, which is surprisingly good.

A number of factors affect battery life such as high temperatures, overcharging, deep discharges and high discharges. However, battery management system optimizes the use of the battery to ensure the rate of battery depreciation is reduced.

As battery technology improves you can expect batteries to last for longer

and reduce maximum capacity at a slower rate. After all, this is an emerging technology that's still in its infancy. Many EVs, like the Chevrolet Bolt, come with 8 year/160,000 km warranties on batteries.

Traditional maintenance costs

As a fleet manager, you will still need to consider traditional maintenance costs such as changing tires, ensuring the wiper blades are working, and damage the car sustains while out on the road. However, the overall maintenance bill will be significantly lower, allowing you to run more efficiently. The money saved on maintenance can be used to upgrade or expand your fleet to allow your business to grow.

Conclusion

Since EVs have lower maintenance costs, when extrapolated across the entire fleet, you can drastically reduce fleet operating costs. The vehicles will be on the road for longer with fewer instances where emergency repairs are required due to a faulty engine. For a business longer uptime and lower costs means that switching to electric vehicles is a positive ROI move.

When switching to an EV fleet, it is a great option to start with FleetCarma's Electric Vehicle Suitability Assessment. We collect high-quality vehicle-side data to analyze and run efficiency diagnostics to create a final report. This report lets you forecast the effects of your fleet decisions. It also supports budgetary decisions by accurately forecasting ROI. After conducting hundreds of assessments for thousands of vehicles, we know how to find hidden savings in automotive fleets.



New Tesla Gigafactory 1 flyover shows new section underway, parking lot and solar rooftop array

By Fred Lambert

After a hold on the expansion of the structure over the last year, Tesla has made some moves for an expansion at Gigafactory 1 in 2018.

Now, a new drone flyover of the battery factory shows that Tesla is working on the expansion.

Over the last year, Tesla's focus at Gigafactory 1 has been on building up production capacity in the structure for Model 3 batteries and drive units as well as Powerpacks and Powerwalls.

It resulted in the actual structure remaining virtually unchanged throughout 2017, but Tesla has started making changes in 2018 – finally beginning to install its massive 'world's largest solar rooftop array'.

A few weeks ago, Tesla also started moving ground at Gigafactory 1 in order to build a new parking lot on the north side of the plant.

This is important because the company's current parking lot is located on the west side of the factory – where the structure's expansion is planned and therefore, they need to move the parking lot in order to keep building.

As we previously reported, the current structure has a footprint 1.9 million square-feet. Including several levels, the factory currently has about 4.9 million square feet of operational space. This represents only ~30 percent of the planned completed Gigafactory, according to Tesla.



Now, a new drone flyover by Duncan Sinfield gives us a glimpse at this new parking lot and solar array:



Interestingly, Tesla also appears to be preparing the foundations for a new expansion of the building on the lower part of the west side of the factory:



<https://electrek.co/2018/04/24/tesla-gigafactory-1-drone-flyover/>

Siemens debuts first electrified eHighway in the US



By Greg Beach

Siemens just unveiled the first electrified eHighway in the United States. The one-mile long demonstration site is located in California near the ports of Los Angeles and Long Beach. The eHighway includes an overhead catenary system that charges electric big-rig trucks – similar to the system found above trolley or streetcar lines. Through the eHighway system, select highway lanes could be electrified, allowing electric vehicles to charge as they move and empowering a zero-emissions transportation system on existing port infrastructure.

Siemens, in collaboration with the South Coast Air Quality Management District (SCAQMD), is hoping to address a serious source of air pollution with the new eHighway system. Large trucks, such as those used for shipping goods across country, are the largest contributing source of smog-forming emissions in Southern California. “This project will help us evaluate the feasibility of a zero-emission cargo movement system using overhead catenary wires,” said Wayne Natri, SCAQMD’s executive officer. “This demonstration could lead to the

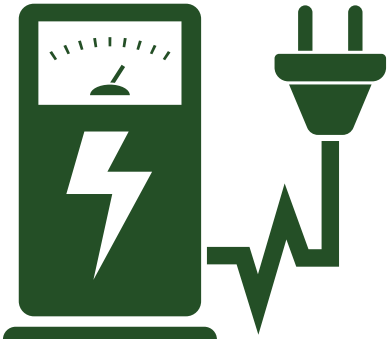
deployment of eHighway systems that will reduce pollution and benefit public health for residents living near the ports.” Currently, a battery-electric truck, a natural gas-hybrid-electric truck, and a diesel hybrid truck are being tested for effectiveness at the demonstration site on South Alameda Street from East Lomita Boulevard to the Dominguez Channel in Carson, California. While this may be the first eHighway site in the United States, the first such system on public roads opened in Sweden in June 2016.

The eHighway system is designed with the future in mind. “Experts expect global CO2 emissions from road freight traffic to more than double by 2050,” said Andreas Thon, head of Turnkey Projects & Electrification, North America. “This electrified truck system, what we call eHighway, can modernize the existing infrastructure using the latest technology to accommodate the growing amount of freight travel, reduce harmful emissions, and keep these ports, one of our country’s major economic drivers, competitive.”



<https://inhabitat.com/siemens-debuts-first-electrified-ehighway-in-the-us/>

CHARGING



NEWS

Electrify America announced recently that it will be installing ultra-fast electric vehicle chargers at more than 100 retail, convenience and refueling locations across the U.S., increasing the convenience for consumers who drive or are considering purchasing an electric vehicle. Each location will offer multiple chargers.

Initial partners include major retail companies Target Corporation, Brixmor Property Group, Kimco Realty Corporation and DDR Corporation. In addition to these are major convenience and refueling partners including Sheetz, Inc., Casey's General Stores Inc., and Global Partners LP's Alltown.

These chargers are part of Electrify America's first \$500 million, Cycle 1 investment, in electric vehicle charging infrastructure, education and access in the U.S. The company plans to complete four investment cycles over the next decade, resulting in a total investment of \$2 billion.

"These partnerships allow for more convenient charging opportunities for EV drivers," said Mark McNabb, President and CEO of Electrify America. "We're purposefully placing our charging stations in locations where people already go, where they are needed, and in places that offer the best customer amenities, such as shopping and food,

Electrify America

Electrify America Announces Partnerships to Install Ultra-Fast Electric Vehicle Chargers at more than 100 Major Retail, Convenience and Refueling Locations in the United States.

Partners include Target Corporation, Brixmor Property Group, Kimco Realty Corporation, Sheetz, Casey's General Stores, DDR Corporation, and Global Partners LP's Alltown.

so that electric vehicle charging is easier and more appealing. We are delighted to partner with these hosts to offer their customers a new on-site service."

Through these relationships and others, Electrify America plans to deploy more than 2,000 DC Fast Chargers at up to 484 stations near retail, dining, parking and other facilities that offer convenience and amenities for EV drivers. All the chargers in this Cycle 1 investment will be installed or under development by the end of the cycle in June 2019.

Electrify America's charging systems will have a range in power from 50kW, the most commonly used fast charging for electric vehicles today, up to 350kW for its highway stations. The Electrify America systems will also offer DC Fast Chargers ranging from 50kW to 150kW for metro locations. An L2 AC charger will also be offered at a majority of metro DC fast charging stations to accommodate plug-in hybrids and non-DC-charge capable EVs.

Electrify America's certified cooled-cable chargers offering 350kW of power can charge a vehicle up to 20 miles per minute, which is seven times faster than today's most commonly used DC 50kW Fast Charger.

The majority of the new, larger battery EVs expected by 2020 from many manufacturers will typically use up to 150kW while at least one manufacturer will offer 320kW charging perfor-

mance. All charging stations will offer a CHAdeMO1 (50kW) connector, plus additional dual-handle dispensers with CCS1 (50 to 350 kW) connectors, ensuring that all fast charging capable cars will be able to use the Electrify America stations, regardless of their charge point locations.

Electrify America to Complete Installation of First DC Fast Charger in Chicopee, MA

As the first partner to sign with Electrify America to host charging locations, Brixmor Property Group's Chicopee Marketplace, in Chicopee, MA, will also be the first location to install an Electrify America charging system with the first-ever certified cooled-cable 350kW charger in the US.

A "First Charging" ceremony was held on April 25. The COO of Electrify America, VP of Operations & Environmental Management of Brixmor Property Group, were joined at the event by Chicopee Mayor and the assistant secretary for Environment, Commonwealth of Massachusetts.

About Electrify America

If you are interested about Electrify America and would like more information about the event and the company as well as who to contact for investment information go to the url below.

<http://www.electrifyamerica.com>



ABB unveils its 350 kW electric vehicle charging tech, claims 200 km of range in 8 minutes

By Fred Lambert

ABB, a major Swedish-Swiss multi-national technology company, is involved in several major electric vehicle charging networks. The company is now unveiling its own full 350 kW electric vehicle charging technology, which it claims can add 200 km of range in 8 minutes.

Range per minute is a weird metric to share since it's highly dependent on the specific electric vehicle, but it's certainly achievable with a 350 kW charging technology.

ABB launched the new system called the Terra HP at Hannover Messe this week with the BMW i8, which ironically can't take anything close to 350 kW.

Frank Muehlon, Head of ABB's Global Business for Electric Vehicle Charging, said about the launch:

"We are committed to supporting the expansion of electric vehicle charging systems across the globe to drive cleaner environments. Creating innovative state-of-the-art and energy efficient solutions which are scalable to expand and flex with our customers' needs is at the heart of ABB's philosophy."

The company claims that it is "the first 350 kW electric vehicle charging system", but Chargepoint already started deploying a 350 kW system and Porsche also started building its new high-power stations.

With this said, ABB has also been working with EVgo to deploy their own 150 to 350 kW system.

ABB says that Terra HP has the capacity to charge "both 400 V and 800 V cars at full power."

At the moment, there are no 800-volt electric cars on the market, but it is expected to change soon — starting



with the Porsche Mission E next year.

ABB has been increasingly involved in electrification especially as a hardware supplier for charging networks. It has plans to deploy a network of fast-charging electric car stations in Iceland, but also through their factory automation division, like their cooperation with Northvolt to build their European battery gigafactory.

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<https://electrek.co/2018/04/24/abb-electric-vehicle-charging-tech/>

Apartment / Condo Dwellers

What to do if you cannot charge at home!



This situation is all too common. The car is parked under a carport, and it's impossible to run an extension cord to use electricity from inside the apartment

By David Herron

While having home charging is the most convenient place to charge, many are not allowed to charge at home and therefore don't even get an electric car. Primarily this applies apartment or condominium dwellers, and anywhere else one has inadequate control over the place they live. The typical house owner can hire an electrician, run permits with the city, etc, and install a charging station at their home. Others must plead with a landlord or home owners association, who are unlikely to agree with the request.

You may be asking how to get an electric car charging station at your apartment complex. Or whether it's safe to run an extension cord from your apartment to your assigned parking space. Or whether it's allowed to charge your electric car using that power outlet in

the wall of your carport. Unfortunately there aren't good answers.

It comes down to "cost" and that the landlord doubts whether investing in charging stations would recoup their cost. Stereotypical apartment dweller move frequently, what guarantee does the landlord have that spending a few thousand dollars on a charging station will pay off? Likewise, why should the tenant pay for equipment only to leave it behind on their next move? What if the tenant suddenly needs to move in a few months?

Whether apartment/condo dwellers can charge at home is tricky. They don't have the freedom a home-owner has to modify their living space. Instead, the landlord calls the shots and has to approve any modifications.

In some areas laws have been passed or are being considered to pave the way towards requiring charging support in multi-unit dwellings. Government planners are trying to solve this problem by making it so more multi-unit dwellings have charging stations. But is that practical given the many difficult issues and costs getting charging installed at apartment buildings? It may be easier, and more useful for us all, to simply have more public fast charging stations.

A large percentage of people live in multi-unit dwellings (apartments, condominiums or townhouses). Each of these people face extra difficulty owning an electric car. In current conditions, an apartment or condominium dweller attempting electric car ownership can seem foolish. This idea is

continued next page

holding back electric car adoption, especially in areas with a high percentage of multi-unit dwelling occupants.

Typical Conditions

Parking at the typical apartment complex was designed with no thought tenants would use electricity in their carport space. That makes getting the tenants electricity service to their assigned parking space prohibitively expensive. While the landlord could install electric service in the carports, that creates the complex problem of getting the tenant to pay for the charging service. As a result, very few apartment or condominium complexes have on-site charging support.

A few apartment complexes have installed a few paid charging stations in a corner of the parking area. While that's better than no charging at all, the apartment dweller is unable to reap the monetary benefit of charging at home because of the fee required to use the charging station.

In actuality, it is far from impossible to own an electric car while living in an apartment building where the landlord forbids charging an electric car at home. Life is more difficult, but it is not impossible. One key is to rely on fast charging infrastructure, but that's getting ahead of ourselves.

What's the practical thing an individual can do?

Carefully examine your situation: Try to understand where the electricity runs, and the expense required to add charging service. It's helpful to understand it from the position of the landlord/HOA.

Very few complexes are set up so an extension cord can easily to their parking place. We discussed using

charging cords elsewhere [<https://greentransportation.info/ev-charging/range-confidence/chap3/3-charge-away-from-home.html>], and need to say again that it's extremely important to use a thick [Ed: heavy gauge] extension cord to reduce electrical fire risk. If you do use an extension cord, your charge rate will be limited to the line cord charger. If the extension cord needs to run across a sidewalk, make sure to mitigate the tripping risk.

Get permission first, before dragging an extension cord across the sidewalk and parking lot to your car. If you've carefully thought through the situation, the conversation will be easier. The landlord is likely to want to know

- whether it will cost money,
- whether it puts anybody (or the building) at risk.

Educate yourself on government policies: The government may be ahead of you, and may have passed laws designed to help apartment dwellers get charging. California has a couple laws on the books.

Look for complexes with charging service: Some landlords have seen the light and have installed charging service. Usually this will incur an extra fee similar to using a public station. This seems to be limited to the higher priced complexes, unfortunately.

Talk with the landlord or HOA: These people need to know that their customer base is interested in charging at home. The more people ask, the more landlords are aware of the need, the more likely they'll see this as a cost of doing business rather than a government mandate. The landlord receives a powerful message when a potential renter walks away because they don't offer charging. Some landlords are open to supporting charging, while others are closed to it.

Public Charging

Suppose you're stubborn enough to want an electric car even though you live in an apartment or condominium complex. An inability to work out an arrangement to charge at home, doesn't mean you're screwed. It means you must rely on public charging stations, and you don't get to enjoy the various luxuries of charging at home.

Fast Charging Stations

The charging rate at a fast charging station is enough that the half hour or so to recharge is not overly burdensome. It suggests an electric car ownership model similar to what gasoline car owners do. They can't recharge at home either, and therefore must take time from their lives to find gasoline stations offering a fast refueling experience.

An electric car owner could rely on public fast charging stations just like gasoline car owners rely on gas stations.

CONSIDERATION: The recharge time at a fast charging station (30 minutes to an hour) is still longer than refilling a gas tank.

CONSIDERATION: Fast charging sessions are pricey compared to charging at home. You'll lose the economic benefit of electric cars.

CONSIDERATION: There's a worry that frequent fast charging will hasten battery pack degradation. While that was true for the early model Nissan Leaf's, it's not clear this is true for all electric car models.

Personal Experience

These recommendations aren't just theory — it's the story I lived for two years. I'm on my second electric car, and lived for two years in a complex (see the picture above) where the landlord did not allow me to charge at home.

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Apartment/Condos

Continued from page 27

I've examined the situation every way I can. Most affordable apartment complexes are simply not set up to easily bring electricity to the parking stalls. While it's not difficult to get electricity to the parking stall, the cost would be prohibitive.

Over the past couple years I've examined dozens of apartment complexes, and have talked with many landlords about charging at home. Most said "no" but it was clear they knew of the problem, and home charging was on their mind. Some were supportive, but the electrical infrastructure worked against us. Others were accommodating, willing to allow an extension cord across the sidewalk, or willing to allow use of a power outlet in the parking garage.

Extension Cords at Apartment Complexes

Many people in this situation want to just drag an extension cord to their parking space. Unfortunately the typical parking spot is far from the apartment, making an extension cord a

hazardous choice. An extension cord running across a sidewalk is a tripping hazard, and the landlord would rightfully get upset.

Maybe you're lucky and there's a safe route that doesn't create a tripping hazard. Hopefully you read the recommendation to use an extension cord with heavy-duty 10 gauge wiring, and know how to do it safely.

<https://greentransportation.info/ev-charging/range-confidence/chap8-tech/electric-car-extension-cords.html>

If you do it guerrilla style — run the extension cord so it doesn't create a tripping hazard — use a heavy duty extension cord — ensure it has GFCI protection — don't just plug into the landlord's power outlet without permission. All those steps will show seriousness and sensibility, and if the landlord does discover your guerrilla charging setup they may appreciate that you took measures to do so safely.

My personal solution? I'm now paying a bit more to rent a house. The 120 volt outdoors power outlet is way better than having no charging at home, and

is sufficient to cover my needs. The extra cost is a hard burden to bear, unfortunately.

Using the Landlord's Electricity ("house power")

But, wait, what about that power outlet in the parking area? It's electricity and it's right there, and you might think it's free, but you'd be "stealing" electricity from the landlord who will rightfully get upset.

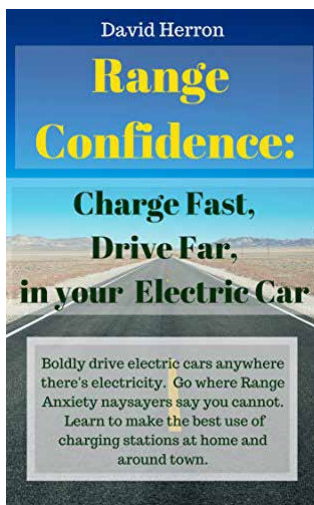
It's possible to talk with the landlord and discuss the situation. It helps to do so with confidence, and to knowledgeably express how it can be done safely.

Summary

The fact is that electric car sales are increasing rapidly. Sooner or later the landlords will begin to commonly see tenants asking for charging at home, even if that's not occurring today. But expect the landlord to be resistant to allowing you to charge at home.

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<https://greentransportation.info/ev-charging/range-confidence/chap6-home-charging/apartment-dwellers.html>



Range Confidence: Charge Fast, Drive Far, in your Electric Car

David Herron is a writer, journalist, blogger, living in Silicon Valley. His focus is to inform people about clean energy systems, clean transportation, and the urgent need to switch from the old stone-age energy paradigm to a new one centered on electricity. When not writing he indulges in software projects and is sometimes employed as a software engineer. David has written for sites like *PlugInCars* and *TorqueNews*, and worked for companies like Sun Microsystems, Yahoo and Recargo.

Learn **Range Confidence** and freely drive your electric car where you wish, rather than stay trapped by the Range Anxiety that would keep us wedded to gasoline. Read this complete guide to electric car charging best practices.

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<https://greentransportation.info/ev-charging/about.html>

Available at: <https://www.amazon.com/Range-Confidence-Charge-Drive-Electric-ebook/dp/B072FRZNPD>

ChargePoint Reveals New Concept Design for High-Powered Charging of Electric Aircraft and Semi-Trucks

ChargePoint, the world's leading and most open electric vehicle (EV) charging network, today revealed a first-ever concept design for two megawatt, high-powered charging of electric aircraft and semi-trucks, including electric vertical takeoff and landing (VTOL) aircraft. As the charging partner for Uber Elevate, ChargePoint made the announcement at the second annual Elevate Summit, which took place May 8-9 in Los Angeles.

The concept design provides a proposal for high-powered charging applications while generating a conversation around a common industry connector as the transition to electrified trucking fleets and the introduction of electric aircraft ramps up in the years to come. Uber plans to roll out to its first Elevate markets (Los Angeles, Dallas and Dubai) as early as 2020. Analysts predict that at least 15 percent of global truck sales will be electric by 2030, with the cost of electric trucks expected to reach cost parity with their diesel counterparts by 2025(1). Aircraft manufacturers are already exploring electric propulsion for a number of use cases which could save the industries hundreds of billions of dollars annually.

“The drivetrain debate has ended and electrification has won out as the propulsion method of choice across transportation categories, as evidenced by the growing interest in electrifying semi-trucks, aircraft and beyond,” said Pasquale Romano, President and CEO, ChargePoint, Inc. “Revealing a new concept design for high-powered charging at the second Elevate Summit is appropriate as the Uber team prepares to get Elevate off the ground in a few short years. The new design not only provides a first look at a common industry connector that can provide benefits to the manufacturers and operators of electric semi-trucks and aircraft, but is a catalyst for an important conversation in the industry.”

Many of the charging requirements are similar across heavy vehicle transportation categories. Electric semi-truck and aircraft have the same power requirements and both require high-powered, fast charging. The shared requirements create an opportunity for a common connector, and the benefits are clear: a shared connector will help reduce complexity for manufacturers, drivers and pilots; bring down costs; and create greater economies of scale.



Two Megawatt Connector Marks the First Such Concept for Electric Truck and Aviation Applications

“Uber is proud to work alongside the ChargePoint team, an industry leader in designing charging solutions suitable for eVTOL charging,” said Celina Mikolajczak, Director of Engineering, Energy Storage Systems at Uber. “ChargePoint brings unparalleled experience in safety, reliability and understanding human factors, resulting in robust connector and charger designs. A proven track record in developing and deploying automotive EV charging systems at scale gives us confidence that ChargePoint can develop and deploy world-class aircraft charging systems, which will one day operate on skyports.”

The ChargePoint engineering team focused on several key elements in developing the new design. To meet performance requirements, up to four BMS interfaces and four 500-amp delivery circuits are needed. Each delivery circuit will have a voltage range from 200 to 1000 volts. To facilitate autonomous data and vehicle performance payload offload, a provision for high speed data transfer was also included. Designed to be used in heavy vehicle applications, the connector must be rugged and able to withstand the rigors of frequent use, while also being easy to insert and remove. A motorized system aids in the insertion process, while rugged construction protects against drops and rough maneuvers common in heavy-duty fueling. The connector also supports optional auxiliary liquid cooling to the aircraft or semi-truck while it's being charged and is designed to be operated either manually or robotically.

Since 2017, ChargePoint has been the charging partner for Uber's Elevate initiative, as the two companies explore innovations to help support the launch of a fleet of electric VTOL aircraft within five years. Leveraging Express Plus, ChargePoint's ultra-fast charge platform, the company continues to develop designs specifically for use at skyports where VTOL aircraft will park and fuel as part of their day-to-day activities.

<https://www.chargepoint.com/about/news/chargepoint-reveals-new-concept-design-high-powered-charging-electric-aircraft-and-semi/>

DIY Li-ion battery building kit opens door for homemade ebikes, powerwalls and even EVs

By Micah Toll

For DIY enthusiasts in the green energy community, homemade lithium-ion battery packs have long been a holy grail. For everything from home solar energy storage to garage-built electric bicycles, go-karts and full-size EVs, lithium-ion batteries were once one of the most limiting factors for hobbyist and makers.

However, the last few years have seen an impressive upswing in availability of parts, tools and knowledge in the DIY lithium-ion battery pack space. This has led to increasing opportunities for creative DIYers to shuck the bonds of traditional suppliers of expensive Li-ion battery packs and instead develop their own custom batteries for a variety of projects and applications.

I've personally been building my own battery packs since 2011, when I realized that the limited options available to tinkerers like me simply weren't enough to fit the needs of my solar and EV projects. Back then, battery cells were limited to a few commercially available options. If you wanted something special, like high power or high-capacity battery cells, you had to tear apart power tool battery packs to harvest the specialty cells.

Today though, well-known companies such as Samsung, Panasonic, LG, Sanyo and Sony are producing dozens – if not hundreds – of different types of high quality battery cells that hobbyists are using to build battery packs for countless green energy projects. In addition, sophisticated tools needed for battery pack building, such as spot welders that used to be \$1,000+ specialty machines, have come down



in price and size to the point where hobbyists can use them in their homes and garages.

Large communities have sprung up all over the internet, showcasing the homemade battery projects that creative individuals have produced around the world. One of the first and largest of these communities revolved around electric bicycles. Ebikes were some of the first consumer products to require large Li-ion batteries with dozens of individual battery cells.

Combining the high cost of these batteries with the DIY nature of many in the early ebike communities, DIY batteries were an inevitable result. Custom ebike makers that wanted more options for batteries began buying up the newly available consumer spot welders to create their own custom battery configurations. A DIY battery renaissance was born.

Shortly thereafter, DIY powerwalls, or home energy storage battery banks

often constructed from salvaged laptop battery cells, starting becoming much more popular. Even before Tesla unveiled its eponymous Powerwall in 2015, DIY enthusiasts were already trying to create their own home energy storage batteries. After Tesla entered the market and turned the Powerwall into a household name, DIY versions became even more popular.

Because they are used to power entire homes, DIY powerwalls often require many thousands of individual battery cells. At \$3-6 per cell though, builders had to get creative. The community discovered that old laptop batteries destined for recycling centers often contained perfectly good battery cells, largely as a consequence of computers dying long before the batteries had served their useful lives.

Scrupulous DIYers could harvest the cells from these laptop batteries, sometimes even finding them for free at computer repair shops and retailers

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that are often required by law to take back old Li-ion batteries. This had a fascinating effect on the battery recycling economy. In a matter of months, old laptop batteries went from being annoying e-waste that most retailers and collection centers had trouble dealing with to a commodity that was being sold off by the pound.

Unlike most DIY electric bicycle batteries that are spot welded together like professionally produced battery packs, DIY powerwall builders needed a way to economically join thousands of cells quickly, cheaply and in a way that would allow them to remove cells that went bad over time. Thus, the DIY powerwall community adopted the sometimes controversial method of soldering battery cells together into their massive battery packs. This soldering process had the benefit of allowing builders to add in cell-level fuses like Tesla includes in their packs, but the jury remains out on exactly how large of an effect the heat of a soldering iron can have on the longevity of Li-ion battery cells.

As battery pack building started becoming more accessible, I began committing to paper all of the knowledge and experience in DIY lithium-ion battery pack building I had collected over the years. This effort to create a single source of high quality educational content on DIY batteries eventually turned into the Amazon bestselling book *DIY Lithium Batteries*.

Between writing the book and running a YouTube channel that teaches people the art of battery building, I've interacted with countless makers and hobbyists that wanted to join the DIY lithium battery craze. One of the most common desires I saw was for a modular battery pack building system. Instead of using welding and soldering to create permanent battery packs, DIYers wanted to be able to swap out



lithium batteries the same way you swap out AA's in your TV remote. Nothing like this existed on a scale and power level appropriate for powering large energy storage installations or electric vehicles. So I got to work with a team of bright, enthusiastic young engineers and designers and we created a solution.

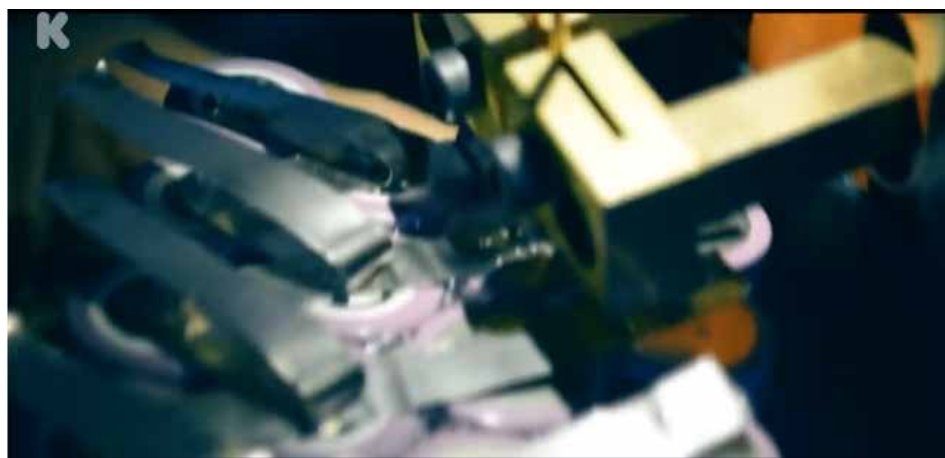
Last summer we debuted the first version of our idea, called the Vruzend battery building kit. It incorporated press-fit battery caps that fit on the end of common lithium-ion battery cells, using spring-loaded terminals and threaded terminal posts. The caps lock together, allowing the battery builder to

create exact size, shape, voltage and capacity of battery needed for any project.

Our latest version just announced today on Kickstarter is designed for higher power applications, such as high power electric skateboards, ebikes, racing karts and e-motorcycles or high power energy storage banks.

I believe the future of DIY lithium battery building is incredibly bright for hobbyists and makers in the green energy field. Whether you're building a solar-powered toy or an electric race car, a growing DIY battery building industry is waiting at your fingertips.

—



You can see this complete video in the url below.
<https://electrek.co/2018/04/17/diy-li-ion-battery/>

Lidar Tech Today, Lidar Vendors Tomorrow

By Junko Yoshida

Two factors have turned lidars into a fair-haired technology in the investment community and automotive industry.

One is the yet-to-be-settled technology landscape for lidars. Alexis Debray, a technology and market analyst at Yole Développement, considers lidars “not [yet] mature.” He said, “We are at the beginning of big changes” coming to lidar.

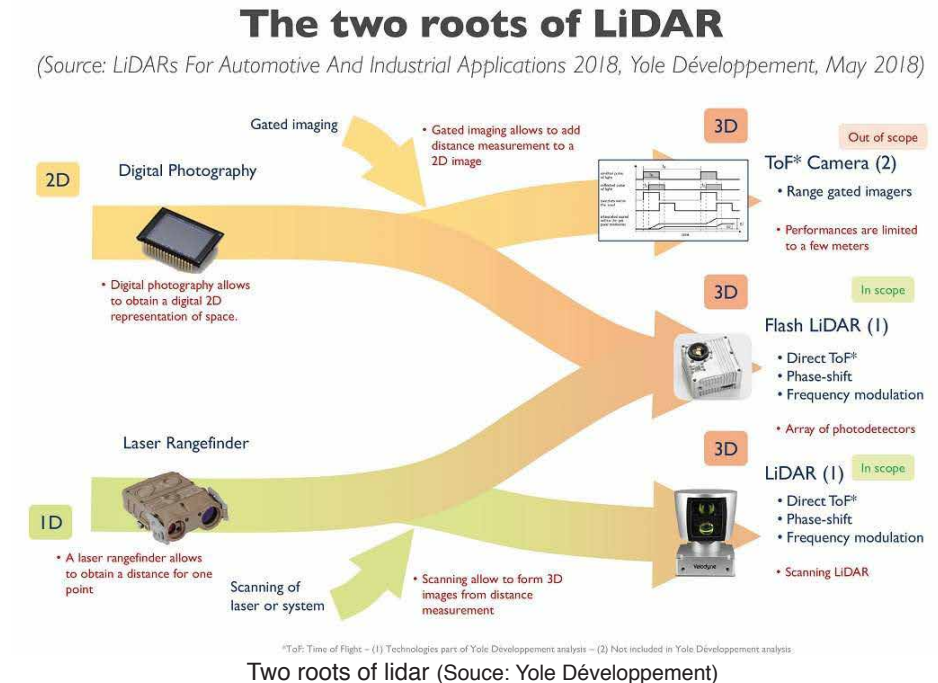
Another is a broadly accepted notion that the lidar is a must-have technology for robo-taxis. Yole pointed out that companies like Waymo, Uber, Lyft, Baidu and Mercedes-Benz are integrating “an average of \$200,000 worth of sensors [including lidars] into hundreds of conventional cars,” to transform them into fully autonomous vehicles able to operate on city streets.

A lot of ink has been spent in the media on spot news about lidar design wins. But such coverage doesn’t typically break down the variety of technologies folded into different types of lidars. EE Times got help from Yole to review the pros and cons of different lidar technologies, their marketability, and the lay of the land for lidar companies emerging as hot investment targets.

Key players

In Yole’s view, lidar technologies have two roots — one coming from digital photography, another derived from laser-based range finders. The complexity and diversity in lidars is partly explained by “the mix of these technologies” going into products, Debray noted.

Broadly speaking, two types of lidars exist in the automotive field.



“Industrial-grade” lidars are used for robo-taxis. The other, which Debray calls “automotive-grade” lidars, will be deployed in mass-market consumer autonomous cars. The industrial grade lidar is defined as “durable enough for 24-hours usage, good sensitivity and performance.” Since they are used for industrial/commercial applications, the cost of lidars, for now, is not a primary concern. They are expensive.

In contrast, when it comes to automotive-grade lidars anticipated in mass-market cars, OEMs worry about everything from price and size to cosmetic look-and-feel.

Citing the different approaches to scanning technology, Yole divides lidars into five categories: multi-channel macro-mechanical scanning (represented by Velodyne, Valeo and others); other mechanical scanning (Luminar, Panasonic and others); MEMS lidars (Leddar Tech, Innoviz, Pioneer and others); optical-phased

array lidars (Quanergy, Robosense); and flash lidars (Argo, Sense Photonics, Continental and others).

Among the various lidars, macro-mechanical scanning is the most heavily used technology today. These lidars are already available and designed into autonomous cars — currently used for testing, readied for the commercial robo-taxi business. But they do come with cons. Debray said, “They are still very expensive — costing several tens of thousand dollars, and they are [physically] very big.”

MEMS lidars are believed to be the next best hope. The Yole analyst explained that they are as good as micro-mechanical lidars and have potential to become smaller and cheaper as they use fewer parts. Earlier this week, BMW announced its plan to use Innoviz lidars for its autonomous cars.

Yole sees lidars using optical-phased

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Automotive LiDAR players

(Source: LiDARs For Automotive And Industrial Applications 2018, Yole Développement, May 2018)



Except when noted, wavelength is between 830 nm and 940 nm.
CW: Continuous Wave
FMCW: Frequency Modulated Continuous Wave

(Source: Yole Développement)

arrays, such as those proposed by Quanergy, as “the next step after MEMS scanners.” With no moving parts, they can be even cheaper and smaller.

Flash lidars have been proposed by companies such as Continental and Xenomatix, in which a whole scene is illuminated simultaneously with no moving parts. Flash lidars may be simpler to make but their range is less than that of MEMS lidars, Debray observed.

Yole listed other players proposing different solutions, such as Cepton and Luminar using mechanical scanning technologies. Neptec employs prisms. However, due to the lack of details about these technologies, they’re hard to assess, said Debray.

https://www.eetimes.com/document.asp?doc_id=1333254&_mc=RSS_EET_EDT

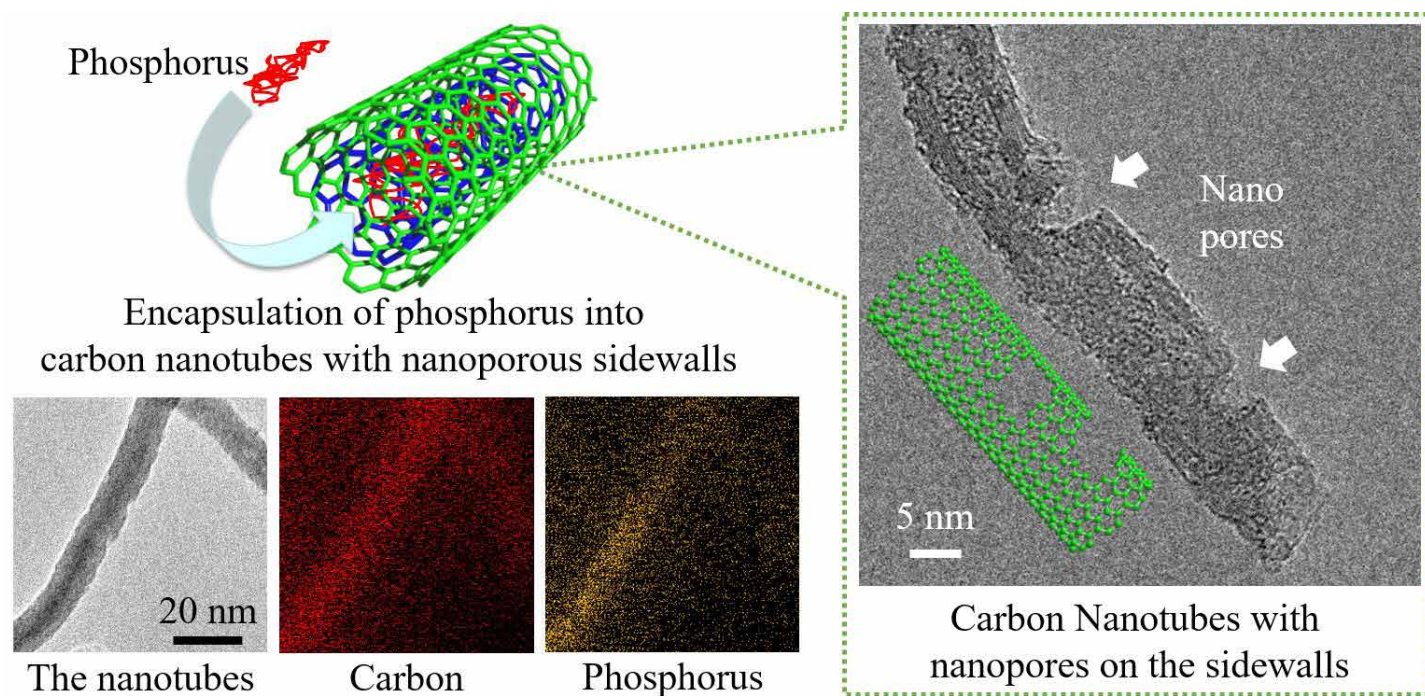
Zero Motorcycles is building the powertrain for an electric T-Rex



The next type of vehicle to get electrified will be a three-wheeler, it seems. Campagna motors announced that it will unveil a 100 percent electric version of its T-Rex three-wheeler using a powertrain from Zero Motorcycles. With that, Zero is continuing to expand its side business supplying parts for other electric vehicle builders. It’s also working with Curtiss Motorcycles on the all-electric Hercules cruiser bike, and had been working on an electric jet-ski until recently. Shown at the Montreal Electric Vehicle Show!

<https://www.engadget.com/2018/04/11/zero-motorcycles-campagna-electric-t-rex/>

Wrap an electrode material for Li-ion battery into the inner spacing of carbon nanotube



(left) Elemental mapping images for phosphorus-encapsulated carbon nanotubes with nanopores on the sidewalls. (right) Transmission electron image of carbon nanotube with nanopores on the sidewalls. Credit: Toyohashi University of Technology

Researchers at the Toyohashi University of Technology have demonstrated the electrochemical performance of lithium ion batteries (LIBs) using phosphorus-encapsulated carbon nanotube electrodes, in which red phosphorus with high capacity is introduced into the inner spacing of carbon nanotubes (CNTs). The electrodes indicated an improvement in the electrochemical reactivity of red phosphorus when accessible pathways of lithium ions, i.e., nanopores, were formed onto the sidewalls of the CNTs where the red phosphorus was encapsulated. Furthermore, the charge-discharge profiles and structural analysis revealed reversible electrochemical reactions and the relatively high structural stability of red phosphorus in the nanotubes even after the 50th charge-discharge cycle. The charge-discharge capacities show a value two times or higher than that of graphite used in commercial LIBs.

Therefore, a new electrode material for LIBs with high capacity is proposed.

Red phosphorus has attracted attention as a higher capacitive electrode material for LIBs because it can deliver a theoretical capacity approximately seven times higher than that of graphite used as a commercial electrode material for LIBs. The large difference in the capacity is thought to be due to an acceptable amount of lithium ions in the structures of graphite for LiC_6 or phosphorus for Li_3P . However, red phosphorus suffers enormous volumetric changes, pulverization, and peeling off during lithium ion insertion and extraction processes, resulting in rapid capacity fading due to the decrement in the amount of electrochemically reactive red phosphorus. Additionally, while electrons move onto the electrode during lithium ion insertion/extraction, red phosphorus has a disadvantage in terms of energy loss be-

cause of its low electronic conductivity.

As shown in Fig. 1 (Above left), Tomohiro Tojo and his colleagues at the Department of Electrical and Electronic Information Engineering, Toyohashi University of Technology, have synthesized unique structures in which red phosphorus is encapsulated into the inner spacing of CNTs to prevent its peeling off from the electrode and improve its electronic conductivity. For improving the electrochemical reactivity of red phosphorus through accessible pathways of lithium ions, nanopores (<5 nm) were also formed onto the sidewalls of the phosphorus-encapsulated CNTs as shown in Fig. 1 (above right). After phosphorus encapsulation, Fig. 1 (Above left) shows that the phosphorus atoms were distributed inside the nanotubes, con-

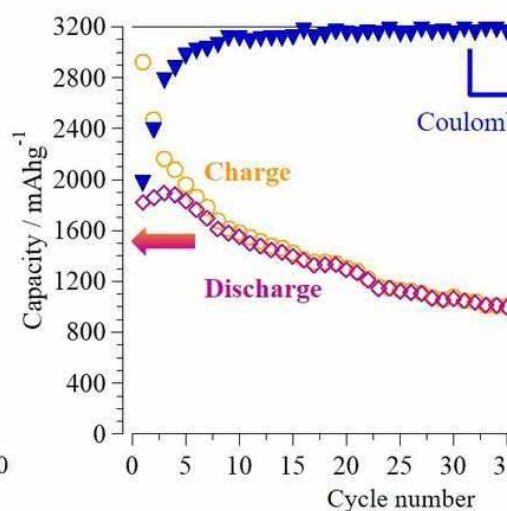
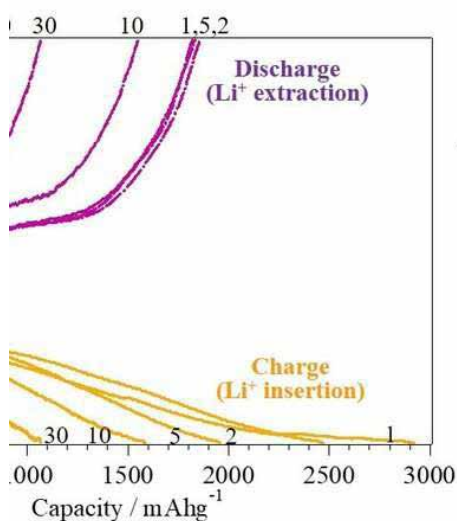
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firming the structural stability of red phosphorus.

Using phosphorus-encapsulated CNT electrodes, a reversible capacity showed approximately 850 mAh/g at the fiftieth charge-discharge cycle, as depicted in Fig. 2 (left). This was a value at least two times higher than that of graphite electrodes. Figure 2 (right) shows the estimated ratio of charge and discharge capacities (Coulombic efficiencies) of >99% after the tenth cycle and the subsequent cycles, which indicates a high reversibility of charge-discharge reactions on red phosphorus. However, the charge-discharge capacities gradually decreased with increasing cycle number because of the dissociation of some P-P bonds and other side reactions on the surface of phosphorus and the CNTs.

Interestingly, the phosphorus-encapsulated CNT with nanopores facilitated the significant improvement in electrochemical performance compared with the phosphorus-encapsulated CNT



(left) These are the charge-discharge curves for phosphorus-encapsulated carbon nanotubes with nanopores on the sidewalls. (right) Charge and discharge capacities with a ratio of charge and discharge capacities at each cycle (Coulombic efficiencies).

Credit: Toyohashi University of Technology

without nanopores. This is suggested to be due to the high reactivity of red phosphorus with lithium ions through the nanopores on the sidewalls. After the charge-discharge cycles, red phosphorus was observed to be inside the nanotubes, as is the case shown in Fig. 1 (left).

We have proposed phosphorus-encapsulated CNTs as an electrode material for LIBs with high capacity, even though additional improvements in the structures are required to achieve long-term cycling without capacity fading. Further studies will be performed on the utilization of such electrodes.

https://phys.org/news/2018-05-electrode-material-li-ion-battery-spacing.html?utm_source=nwletter&utm_medium=email&utm_campaign=daily-nwletter

What Happens When You Put A Tesla Motor In An Old Honda?



Many EAA members who have loitered around the EV community know some of the pioneers which woke up the world. Some notable names are still active in the art... so here comes a newcomer with his first outrageous conversion. This is something that many Americans love to do — tinker with something exciting in the garage. In the past decade conversions have changed little. But the components that one can purchase have improved significantly. Fewer will opt for a conversion when the cost of doing one nears the entry price of a modern OEM produced vehicle. Now we just have to spread the fever, the excitement and show others what can happen. Long distance, high performance or ultra-economy: pick any two, but not all three. https://www.youtube.com/watch?v=0KSt_Y4gZgM/

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AEC
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<https://sepapower.org/event-complex/grid-evolution-summit-national-town-meeting/>



Don't Miss These...

From time to time there are articles and videos we would like to bring to your attention but are not able to reproduce in this newsletter. The Electric Vehicle is continuing to be newsworthy on many different levels so when we find interesting items we will share them with you.

Videos & Articles of Interest

Tesla in 2018



<https://youtu.be/azUbCdcAeFM>

Tesla just released a new video that appears to exist for no other reason than to recap Tesla. There are coupes and SUVs going fast, batteries and a gigafactory, a couple of semis, "The machine that makes the machine," and lots of shots of active, intense factory workers. There's also, at the 0:15-second mark, a tease of some new Tesla half built and half hidden under a sheet. We will assume this is the Model Y. And at the 1:05 mark we get a few seconds of the coming Roadster cockpit looking like it came from 20 years in the future. From *Jonathan Ramsey the Associate Editor at Autoblog*. <https://www.autoblog.com/2018/05/10/tesla-video-model-y-roadster/>

Tesla's Battery Tech Explained: Part 1 - The Cell



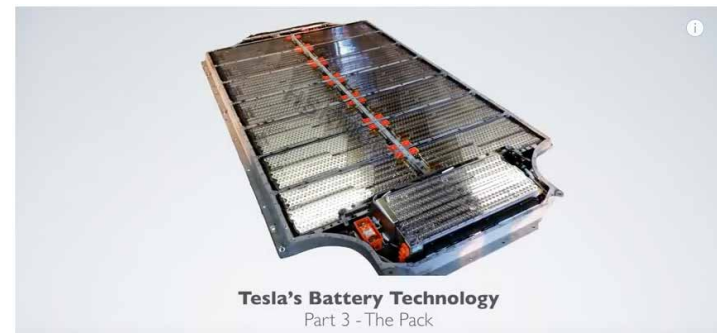
This is the first of a three part video series which will explain Tesla's battery technology in depth, with this video focusing on the cell technology. <https://www.youtube.com/watch?v=P7GR5fERXNY>

Tesla's Battery Tech Explained: Part 2 - The Module



The 9 minute Part 2 discusses manufacturability of each module with the many cells and some design tradeoffs. This is the second of a three part video series which will explain Tesla's battery technology in depth, with this video focusing on the module. <https://www.youtube.com/watch?v=bNd-yJtRPhk>

Tesla Battery Tech Explained: Part 3 - The Pack



This thirteen and a half minute long explanation reveals the electrical and mechanical details of the 100 kWh pack which Tesla now includes in the top of the line Model S and X. With 8,256 individual cells, it's maximum capacity, internal resistance and other items such as current delivered are discussed, and its specifications are derived. Listening carefully to this will address most all of anyone's questions on how Tesla is leading the drive with excellence in engineering today. <https://www.youtube.com/watch?v=izUI28YtQbE>

More Videos of Interest (cont.)

Zero Motorcycles 2018 Launch Video



Imagine the wind on your face without the engine in your ears. Quietly gliding into the horizon, breathing in the world around you. This is riding in its purest form. At 86 wH per mile - that's very economical travel!

<https://youtu.be/FXuqQHPxggA>



Clean Transportation Show, Custer, WI June 15-17, 2018

Learn all about energy-efficient travel options at The Clean Transportation Show!

The Show features alternative and fuel efficient vehicles from around the Midwest. From homebrew cars that run on moonshine, to DIY electric bikes, to the latest offerings from Tesla Motors, the Clean Transportation Show holds a multitude of lean-clean-green driving machines.

<https://www.theenergyfair.org/clean-transportation-show/>

SPEED VENTURES

REFUEL Clean Power Performance Driving Event and Time Trial

The 10th Annual REFUEL Clean Power Motorsports Event welcomes Electric Cars and Motorcycles to world famous MAZDA Raceway Laguna Seca to celebrate the evolution of EV technology in a motorsports setting.

Sunday, July 1, 2018
All experience levels welcome to
MAZDA Raceway Laguna Seca (Salinas, CA)

Full Course CCW on Sunday
AMB Timing & Transponders are available.
See the url below for all details.

2018 REFUEL Clean Power Motorsports Event at Mazda Raceway Laguna Seca.

<http://www.speedventures.com/events/eventdetail.aspx?id=680>



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The Electric Auto Association is a non-profit, 501(c)(3) for the promotion of electric vehicles. Your donations are tax deductible and with your membership you will receive the EAA publication, "**Current EVents**". All information and statistics in this application are for the exclusive use of the EAA and is not sold or given to any other organization or company. Your membership dues include a percentage goes to the EAA Chapter you support for public Electric Vehicle promotion EVents like rallies, shows and EV rides.

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Harley-Davidson Confirms LiveWire on Schedule for 2019 Release



Photo: Harley-Davidson

Harley reports its debut electric model is on schedule for a release next year, but will the MoCo's foray into ebikes right the ship?

At this point it's common knowledge that things in recent years have been pretty rocky for Harley-Davidson Motorcycles. An aging primary demographic is forcing the American manufacturer to shift its current marketing and branding strategies in an effort to stay relevant, and profitable. A pivotal element of this lies in new offerings that veer away from the company's traditional, heavy-weight, high-dollar cruisers with models like the (relatively) nimble, sub-\$10K Street Rod. No model better encompasses this change in direction than the upcoming, fully-electric LiveWire—which Harley just confirmed is still poised for a debut sometime around the Summer of 2019.

"Our future must be more about the software. Not digital code software, but people," stated Harley-Davidson CEO,

Matt Levatich in a recent interview with TheStreet. "And how they think, and why they ride, and in fact, maybe why they don't ride. The numbers are clear and they do not support the status quo. Overall ridership needs to grow in order for our industry to remain vital. It's plain and simple."

While the outfit's introduction of an electric bike obviously doesn't mean the end of its gas-powered range, the company clearly sees the LiveWire as an opportunity to remove many of the common complaints or barriers that currently prevent people from buying Harleys. Interestingly this comes down to a few key areas; the first is that a lot of millennials are, let's say, less-than-mechanically inclined so the low-maintenance LiveWire is more appealing to a younger demo. The lack of a clutch and gears also removes an element that, for whatever reason, many seem to find intimidating.

"We continue to see electric vehicles

as a tremendous opportunity. These motorcycles are easier to ride than bicycles, they lend themselves to urban environments where our product is maybe less targeted or less suited. They are suited to a generation of people that don't have the mechanical depth of experience that maybe boomers had with manual transmissions and clutches," explains Levatich.

Another major factor is that the LiveWire is arguably the most utilitarian machine the company has made in decades. With roughly half the planet's population currently residing in major metropolitan areas—a trend that's steadily rising—the increasing availability of urban charging stations is making the prospect of electric ownership a lot more compelling to a younger audience. If Harley can get millennials to see the economic and utilitarian benefits of commuting on two-wheelers—instead of an overpriced luxury item to cosplay with—sales should inevitably increase. While the LiveWire may not be the most efficient commuter, it does boast a certain sexy-factor that electric scooters can't come close to rivaling.

How loyal Harley customers will feel about the upcoming electric model, and how those feelings will affect Harley's bottom-line, both have yet to be seen. Action needs to be taken, and Harley is doing just that. Whether or not this push will be enough will only become clear sometime around the summer of 2019, but the wheels are in motion.

"We are progressing to that plan and we are excited about that product (i.e. the LiveWire). We continue to see electric vehicles as a tremendous opportunity," stated Levatich.

<https://rideapart.com/articles/harley-davidson-livewire-confirmed-2019>

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continued on next page

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Tesla batteries will live longer than expected, survey finds

The packs are on track to last over 500,000 miles



Chesnot via Getty Images

Tesla batteries retain over 90 percent of their charging power after 160,000 miles, according to data gathered by a Dutch-Belgium Tesla owners group. According to its survey of over 350 owners, the EVs dropped about five percent of their capacity after 50,000

miles, but lose it at a much slower rate after that. If the trend holds, most Tesla vehicles will still have 90 percent capacity after around 300,000 km (185,000 miles), and 80 percent capacity after a whopping 800,000 km (500,000 miles).

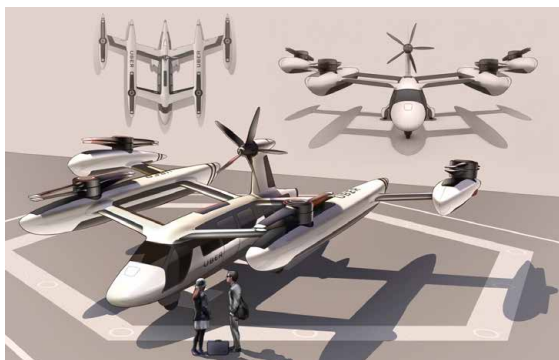
Tesla has no battery degradation warranty on its Model S and X luxury EVs, but guarantees that the Model 3 will retain 70 percent battery capacity after 120,000 miles (long-range battery) and 100,000 miles (shorter-range battery). That's a bit more generous than Nissan offers on the Leaf (66 percent over 100,000 miles) for instance. According to the survey data, Tesla will easily be able to meet this mark.

Lost battery capacity over time is one of the biggest concerns for EV buyers, so this new data, based on real-world usage, should be reassuring. There are some outlier EVs that lost capacity more quickly than others, for reasons that aren't clear, though. As such, while the data looks promising, it might be best to reserve judgement pending larger scale surveys with higher-mileage EVs.



<https://www.engadget.com/2018/04/16/tesla-battery-packs-live-longer/>

This is the first look at Uber's air taxi concept



Uber sees a future where users can request a flying Uber. And it's what, as CEO Dara Khosrowshahi calls it, a big, bold bet. He says in an interview with CBS This Morning that big bold bets are what built Uber.

"We want to create the network around those vehicles so regular people can take these taxis in the air for longer distances when they want to avoid traffic at affordable prices," said Khosrowshahi.

The company plans to launch trials as early as 2020.



<https://techcrunch.com/2018/05/08/this-is-the-first-look-at-ubers-air-taxi-concept/>

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