

Electric Auto Association



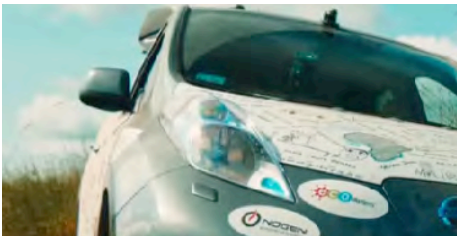
Current **EV** Events

March 2019 Promoting the use of electric vehicles since 1967 Vol. 51 No. 3

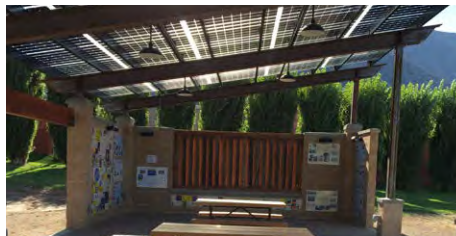
THE FIRST IMAGE!



(Photo Polestar). See page 6



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Current Events Back Issues

The EAA has put most of its issues from 2001 to 2019 on its website.

Please visit

<http://electricauto.org/> and from the home page, click on "Documents" in the top navigation bar. You will see the document library. Click on that to reveal 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.

Greeting Members!

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 - o School-based Events
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- **Read Older copies of Current Events** in the Document Library.
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- **Best of All:** Got a question? Support is offered to ALL EAA members; email: support@clubexpress.com.

Stay tuned . . . your Board of Directors is working on a “refresh” for the website look and feel. You can help by sending us your great photos of people and EVs.

Email: jack.b.brown@gmail.com

Thank you for all you do for electric vehicles.
Raejean



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EV Driver Associations Agree to Create Global Network

This past week, 14 EV driver associations from around the world met in Norway on the sidelines of the Nordic EV Summit. This is the second year that the organizations have met at the time of the annual summit. But this time, the groups agreed to create a global network to share information and help promote the growth of more EV driver associations around the world. Joel Levin of Plug In America was invited to be the interim chair of the Coordinating Committee for the nascent network. For the immediate term, the associations agreed to focus on information sharing, but collaboration may expand into policy work or other areas in the future.

The Nordic EV Summit, hosted by the Norwegian EV Association, along with a number of other Norwegian EV organizations, has become the leading European gathering for the EV community, reflecting the explosive growth of EV sales in Norway. The conference had over 1,000 attendees and dozens of exhibitors from a bewildering variety of EVSE equipment, software and network firms.

Sales of plug-in cars in Norway exceeded a 50% market

share for 2018. During the first two months of 2019, with the arrival of thousands of Tesla Model 3s, the overall EV market share exceeded 75% for Oslo. Wow. This makes Norway an interesting case study for what things look like when the EV market goes from early adopters deep into the mainstream.

Most of the attending EV associations were led by volunteer activists, and were structured not unlike EAA. Associations present were disproportionately European (Norway, Sweden, Denmark, Netherlands, Belgium, Scotland, Austrian, Slovenia, and Romania), but also included the Americas (Chile, Costa Rica and the United States), Middle East (Israel), and Oceania (New Zealand). They are also actively looking for additional member associations in other countries.



Joel Levin
Executive Director
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- For Conversions so that they can use Public J1772 EVSE's



- Remote and regular
- 30A - 50A versions

EVE 40A Cord

- Orange Jacket, UL Certified 105 deg C
- Use as EVSE cord or J1772 Extension
- 2 legs of the 12AWG are connected for 40A like the Tesla UMC 40A EVSE

EVE 30A Cord

- Black Jacket, UL Certified 105 deg C
- Use as EVSE cord or J1772 Extension
- 10AWG Power and Ground

Quantity discounts available, for more information and pricing:

www.TucsonEV.com or EV@TucsonEV.com

The Polestar 2 is More Than Just a Pretty Face

It's Got Silicon Valley Tech and Backing of Parent Company Volvo

By Roberto Baldwin

The Polestar 2 was unveiled ahead of the Geneva motor show via a livestream from Sweden. The automaker wanted more time to chat about the electric vehicle than the typical 15 to 20 minutes allotted at auto shows while also sticking to its environmental ethics and not flying journalists from all over the world to an event.

This meant we had to wait until we hit the ground in Geneva to check out the first electric vehicle from (parent brand) Volvo. What we encountered was a vehicle that's nearly on par design-wise with the breathtaking (yet hybrid) Polestar 1.

This shouldn't be too surprising considering that a focus on design is part of Polestar's DNA. CEO Thomas Ingenlath started his career in the auto industry as a designer. That experience gives him a unique outlook.

"As a designer, you're on your own taking a decision about what design you propose and stuff and that kind of mixture of having very rational aspects in it. But at the same time, acknowledging that certain things are driven by emotions and the gut feeling and being brave enough to make a decision where you have not one hundred percent certainty -- I think that is indeed a very good preparation for the job that I have to do now," Ingenlath told Engadget.

That experience helped shape the look of the company and the Polestar 2. It's not as sleek as the Polestar 1, but it does carry the design language of the brand with a bit of Volvo's visual heritage



Images by Roberto Baldwin / Engadget



thrown in for good measure.

The front of the vehicle hits you with Volvo's Hammer of Thor headlight. But Polestar is a bit more reserved when it comes to its own logo which is the same color as the vehicle. Meanwhile,

the car itself has a beefier stance than its predecessor both in the front and back.

The Polestar 2 looks like someone grabbed the Polestar 1 and squeezed
continued next page

the two ends of the vehicle together resulting in a taller, stockier car. The only design aspect that seems to have suffered is the rear three-quarter view of the car. It still looks good, but it's lost some of the magic seen in the automaker's first vehicle.

The interior, with its large vertically-mounted touchscreen in the dash, seems like its mimicking Tesla, but other than fewer knobs and buttons than what you would find on a Volvo, it's minimalistic design doesn't feel nearly as sparse as the EV out of Fremont. The steering wheel and volume knob are borrowed directly from Volvo which is a good thing, plus, (thankfully) the gear selector is a lever instead of a series of buttons.

Wherever you look, the advantage of Polestar having Volvo as a parent company becomes clear -- Volvo's influence is everywhere. From the headlights to the interior, it's clear how closely the sub-brand relies on its automotive parent -- but it's more than just stylized headlamps and steering wheels that help Polestar.

The automaker has the advantage of the financial backing of an established automaker behind it with access to factories, capital, and technology that Volvo has been working on for decades. "It's super beneficial. And they will enable us to be successful with the new enterprise," Ingenlath said. "But of course, it comes with something else, we have other problems. We have to be really careful at monitoring that balance between an agile, fast-moving startup spirit and being linked to that industrial system that helps us to develop the whole thing."

Even with all Volvo resources at its disposal, Polestar is happy to work with other partners. Even those that aren't

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Experience Sustainable Design AT THE BARN GALLERY SAN JUAN ISLANDS



Complimentary charging for your EV when you stay at the Barn Gallery waterfront guest house!

Enjoy hiking, biking, kayaking, and watching the eagles play, and in your spare time learn about sustainable design. Ask about our Design Consultation if you are curious or planning to build a sustainable home. Your sustainable takeaways will be invaluable, and it's included when you book a getaway.



The rain harvesting system with cedar-clad 9500 gallon storage tank is showcased at the front of the house. Strong pre-filtration ensures that the water arriving in the storage tank is exceptionally clean. Learning about the Barn Gallery rainwater system is a highlight for our guests.



The Sanden heat pump & Sanco2 water heater supplies the radiant floors and domestic hot water. Keeping your toes warm in the Barn Gallery for just pennies a day!



Whole-house LED lighting, with innovative centralized driver panel. Farm to table cooking in the Ferrari-red kitchen; or enjoy the outdoor kitchen on magical summer evenings. 2 luxurious guest suites; a great place to relax after all the outdoor activities you experience in the islands.

Book your memorable vacation experience at
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And remember to mention that you read about the Barn Gallery in the EAA Current Events Newsletter to qualify for any available EV-owner discounts!

Polestar

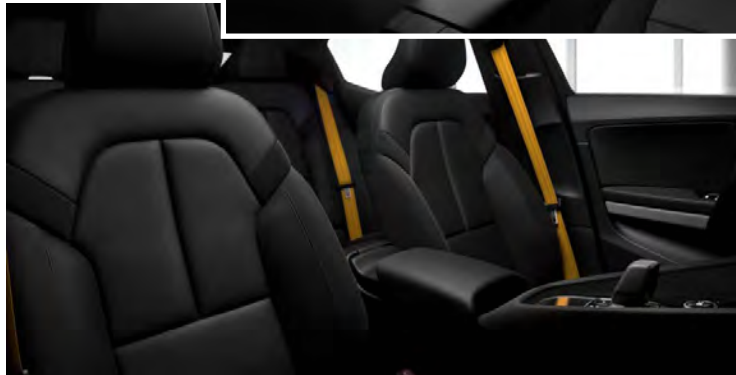
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traditionally in the automotive world.

The Polestar 2 is the first production vehicle to use Google's Android platform for its infotainment system. Unlike Android Auto (which requires a smartphone), the Android platform in the car is a native system. It brings with it immediate access to Google's suite of services and something that Ingenlath recognizes is becoming more important in the automotive world: voice control. The CEO said the feature will result in less distraction while behind the wheel. "It's us recognizing where are our borders. Of course, we will never compete with the Google machinery having so many people feeding the system. Its learning and getting better every day. Of course, we should benefit from that kind of pace and put it into our car."

So, the Polestar 2 is full of tech, has an impressive expected range of 275 miles, uses dual motors that output 408 horsepower and 487-foot-pounds of torque, and can go from zero to 60 in about 4.7 seconds. That pits it directly against the Model 3. The Polestar's \$40,000 price tag helps cement that comparison. But Tesla still has the advantage: Its affordablsh EV is available now, while we'll have to wait for the Polestar 2.

Production is supposed to start in early 2020 and even when that spins up, for the first 12 months, the "launch edition" will cost \$63,000. A lot can happen in the nearly two years it'll take for the \$40,000 version of the Polestar 2 to hit the road. The EV market is heating up with more and more options appearing all the time.



But none of the EVs at this price range look quite as nice as the Polestar 2. Turns out hiring a designer to run the company has its advantages. More importantly, having a CEO that's willing to make strategic partnerships could mean the difference between a failed automaker with beautiful cars and a

successful brand ready to take on the number one EV maker in the world.

Here is a video featuring Jonny Smith of the Fully Charged Youtube show with the Polestar2 in Geneva. https://www.youtube.com/watch?v=UhzZXgiE_OY

<https://www.engadget.com/2019/03/17/polestar-2-first-look/?yptr=yahoo#/>



Volvo's Polestar Unveils Competitor to Tesla's Model 3

By Peter Valdes-Dapena

Polestar, a plug-in performance car brand that was spun off from Volvo, has revealed its first all-electric car. The Polestar 2 will be a direct competitor to the Tesla Model 3.

The base price for the Polestar 2 will be around 40,000 euros, the equivalent of about \$45,000. That's roughly the starting price of a Tesla Model 3 today. Like Tesla, though, Polestar will produce more expensive versions of its car first. The Launch Edition of the Polestar 2, which will be made during the first 12 months of production, will cost about 60,000 euros, the equivalent of about \$68,000.

Production will begin in early 2020 in China, home of Geely Holding Group, Volvo's parent company and Polestar's co-owner.

The four-door all-wheel-drive car will have two electric motors with an expected driving range of 500 kilometers on a full battery based on European and Chinese standard driving tests or 275 miles based on US EPA driving tests. The company promises zero to 60 acceleration in under five seconds. An optional Performance Pack will give the car performance-tuned shock absorbers, brakes and tires for better handling.

Like Tesla's cars, the Polestar has "vegan" interior materials, rather than leather. Drivers will be able to use their smart phones like a remote key fob, another feature found on Tesla cars. An optional Pilot Package will give the car automated driving assistance features, such as Lane Keeping Assistance —



which keeps the car in its lane — and the ability to park itself without a driver in the car, a Polestar spokesman said.

While the car is available for purchase, the company will heavily market a subscription plan under which drivers will pay a monthly fee that includes insurance costs as well as the cost of the car itself in a single monthly payment. The rates for the subscription service have not been decided upon, a Polestar spokesman said. The cars will also be available for sale, though, for customers who would rather simply buy one. The Polestar 2 will only be sold online through Polestar.com. The company is planning to have some physical locations, though, similar to Tesla Galleries.

"In the major cities around the globe, we will have what we call the Polestar

Space downtown in the city, a place where you can go experience the brand, see the car, touch it, test drive it," Polestar CEO Thomas Ingenlath said.

The Polestar 1, the brand's first car, is a high-performance plug-in hybrid that is being produced in limited numbers. The Polestar 3, which has not yet been unveiled, will be a fully electric SUV, the company has said.

Polestar was originally the name of a Swedish company, Polestar Performance, that created racing versions of Volvo cars. Volvo bought that company in 2015 and added its name to performance-tuned versions of its own cars. The Polestar name will still be used on hybrid and electric performance-tuned Volvo cars in addition to being its own separate car brand.



<https://www.cnn.com/2019/02/27/business/volvo-polestar-2-revealed/index.html>

EV-Ready Building Codes are the Best Ways for Cities and States to Encourage Switch to EVs

By Matt Frommer – Transportation Program Senior Associate at the Southwest Energy Efficiency Project (SWEET)

Imagine that you just bought a new condo and, since you care about saving the planet while saving yourself money, you're also thinking about buying a new EV. You check your new parking lot for an electrical outlet, only to find that there isn't one. With persistence, you ask the property owner about installing an EV charging station in the parking lot for communal use, but after reviewing the building plans together, you discover that the property does not have the electrical capacity and pre-wiring infrastructure (such as conduit) to support an easy and low-cost installation. You're concerned that without access to home charging, you won't have a place to charge your new EV, and so you surrender and buy another gas-powered car. This scenario is one of the major challenges for many consumers thinking about buying an EV, but it is solvable, and has been overcome by several communities across the Southwest with EV-ready building codes.

What are EV-ready building codes?

EV-ready building codes are one of the most effective and low-cost strategies for states and local governments to encourage consumers to buy or lease electric vehicles. At their most basic, the codes establish EV infrastructure requirements for new construction projects, including the electrical capacity and pre-wiring to make possible the future installation of EV charging stations. States and municipalities around the country have



developed their own EV-ready building codes to accommodate local EV market trends and to meet community-specific climate goals.

Why do we need EV-ready building codes?

The US plug-in vehicle market is accelerating rapidly – it has had 52 straight months of year-over-year sales growth. Over the first nine months of 2018, the EV market grew 70 percent compared to the same period in 2017. Encouraged by these trends, Colorado Governor John Hickenlooper announced plans to encourage growth in the state's already booming EV market [<https://www.denverpost.com/2018/01/24/colorado-electric-vehicle-plan/>], and some estimate the state could have nearly a million EVs on the road by 2030. Every governor in the Southwest has signed the REV West MOU, which commits the state to a number of actions includ-

For a parking lot with 10 total spaces and two charging stations, the estimated EV infrastructure costs amount to \$920 per charger during new construction, versus \$3,710 per charger for a retrofit.

ing “identify[ing] and develop[ing] opportunities to incorporate EV charging station infrastructure into planning and development processes, such as building codes, metering policies, and renewable energy generation projects.”

To support the monumental transition from gas-powered to electric vehicles, communities across the Southwest will have to install millions of charging stations in both the private and public domains.

continued next page

Approximately half of all vehicles in the US belong to residents of single-family or duplex homes with access to dedicated off-street parking spaces, such as a garage or driveway, which could be used for overnight charging. These new homes are built to last for decades, so they should be ready to accommodate emerging technologies, including the capacity to charge EVs.

The other half of vehicles today do not have reliable access to a dedicated off-street parking space at an owned residence, so the EV market needs to move beyond single-family detached homes and expand charging access to multi-family dwellings, workplaces and commercial properties. EV-ready building codes support this expansion, and can save consumers thousands in installation costs.

Studies have shown
[<http://evchargingpros.com/wp-content/uploads/2017/04/City-of-SF-PEV-Infrastructure-Cost-Effectiveness-Report-2016.pdf>]

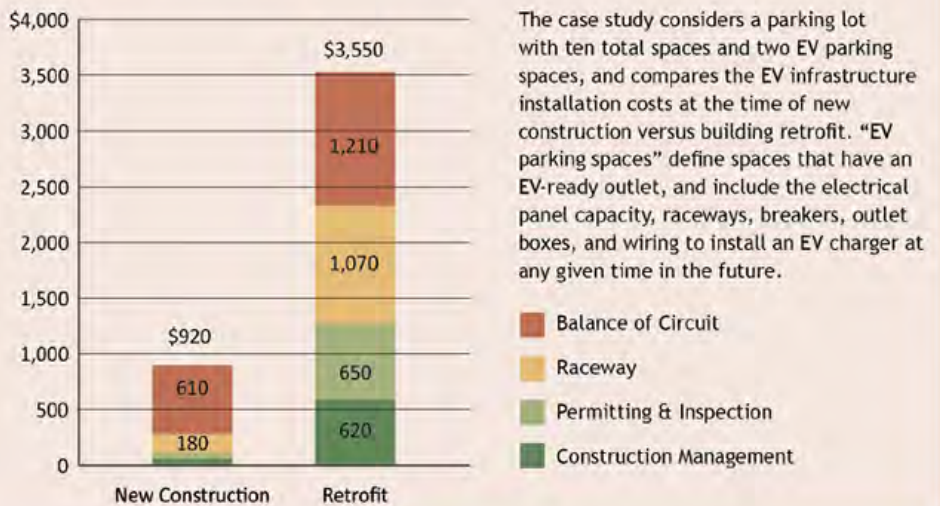
that charging infrastructure is significantly less expensive to install during new construction than it is to retrofit to an existing building. For a parking lot with 10 total spaces and two charging stations, the estimated EV infrastructure costs amount to \$920 per charger during new construction, versus \$3,710 per charger for a retrofit, largely because of trenching, demolition, and additional permitting costs.

What are the EV-ready code options?

State and local governments around the country have led the way on EV-ready building codes, with requirements that have been adapted to best fit the needs of each community. Three basic options for EV infrastructure requirements are detailed below.

Cost per EV Parking Space: New Construction vs Retrofit

Case Study prepared for the City and County of San Francisco (2016)



For one- and two-family dwellings with dedicated off-street parking, EV-capable or EVSE-ready outlet provisions are required for at least one parking space per residence. For multi-family dwellings and commercial properties,

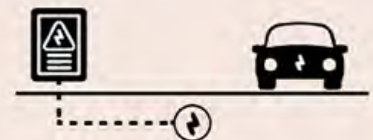
EV infrastructure requirements are applied as a percentage of total parking spaces (e.g. five percent of total parking spaces are to be EV-capable for parking lots with over 10 parking spaces).

1. EV-Capable

Install electrical panel capacity with a dedicated branch circuit and a continuous raceway from the panel to the future EV parking spot.

[Aspen, CO: 3% of parking is EV-Capable \(IBC\)](#)

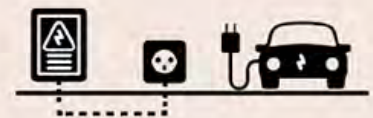
[Atlanta, GA: 20% is EV-Capable \(Ordinance\)](#)



2. EVSE-Ready Outlet

Install electrical panel capacity and raceway with conduit to terminate in a junction box or 240-volt charging outlet (typical clothing dryer outlet).

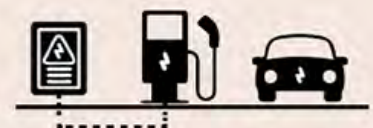
[Boulder, CO: 10% of parking is EV-Ready Outlet](#)



3. EVSE-Installed

Install a minimum number of Level 2 EV charging stations.

[Palo Alto, CA: 5-10% of parking is EV-Installed](#)



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EV-Ready Codes

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Where do EV-ready measures belong in the building code?

EV-ready code language is often introduced as a part of the municipal building code amendment process, which typically takes place every three to six years. The International Residential Code (IRC) [http://www.swenergy.org/data/sites/1/media/documents/publications/documents/Sample%20IRC_EV%20Building%20Code%20Proposal.pdf] applies to new one- and two-family residential projects with access to an off-street parking space in a garage or driveway. The majority of IRC EV-ready building code amendments call for EV-capable infrastructure, but some jurisdictions, such as Boulder County, CO, have chosen to require an EVSE-ready outlet.

New multi-family residential and commercial construction projects must comply with the most current version of the International Building Code (IBC) [http://www.swenergy.org/data/sites/1/media/documents/publications/documents/Sample%20IBC_EV%20Building%20Code%20Proposal.pdf]. These code requirements typically apply an EV-capable percentage to the total number of parking spaces. The more progressive IBC amendments, such as the one in Palo Alto, CA, require five percent of new parking spaces to have an installed Level 2 EV charging station.

An alternative to the building code amendment process is to pass an ordinance, which can be proposed at any time and considered for approval by a city council or county commissioners. Whereas building codes define the technical details for new construction projects, ordinances govern the use of property by land use and occupancy type. With an EV-ready ordinance, municipalities can vary the percentage of EV-charging spaces by type of occupancy (business, hotel, hospital, golf course, etc).

States, municipalities, and community improvement districts across the country with EV-ready building codes for new construction

Municipality	State	Year	Location	One or two-family dwellings	Multi-family unit dwellings	Commercial
Boulder County	CO	2015	IBC / IRC	EVSE-Ready Outlet	EVSE-Ready Outlet: 2% of parking	
City of Boulder	CO	2017	IBC / IRC	EVSE-Ready Outlet	EVSE-Ready Outlet: 10% of parking (25+ spaces)	
Atlanta	GA	2017	Ordinance	EV-Capable	EV-Capable: 20% of parking	
California	CA	2010	IBC / IRC	EV-Capable	EV-Capable: 3% of parking (17+ spaces)	EV-Capable: 5% of parking (10+ spaces)
Aspen	CO	2017	IBC / IRC	EV-Capable	EV-Capable: 3% of parking	
Lakewood (proposed)	CO	2018	Zoning Ordinance		For new development with 10+ spaces: 5% EVCS installed + 10-15% EVSE infrastructure	
City and County of Denver	CO	2017	IBC / IRC	EV-CAPABLE		
Fort Collins	CO		IRC	EV-Capable		
San Francisco	CA	2017	Ordinance	EV-Capable	EV-Capable: 100% of parking	EV-Capable or Outlet: 10% of parking
Palo Alto	CA	2017	IBC / IRC	EV-Capable, Outlet, or installed	EVSE-Ready Outlet or installed: 100% of parking	EV-Capable: 25% of parking, EVSE-installed: 5% of parking
Salt Lake City	UT	2017	IBC / IRC + Zoning Ordinance		EVSE installed - 1 for every 25 spaces	
Washington	WA	2015	IBC / IRC		EV-Capable for 5%, Panel capacity for future EVCS at 20%	
New York City	NY	2013	IBC / IRC		EV-Capable: 20% of parking	
Vancouver	BC	2009	IBC / IRC	EV-Capable	EV-Capable: 20% of parking	
Los Angeles	CA	2014	IBC	EV-Capable or EVSE-Ready Outlet	EV-Capable: 5% of parking	
Hawaii	HI	2012	IBC / IRC		EV-Capable: 1% of parking	
Oakland	CA	2017	Ordinance		EVSE-Ready Outlet: 10% of parking, Panel Capacity: 20% of parking, EV-Capable: 90% of parking	
Oregon	OR	2017	IBC	EV-Capable	EV-Capable: 5% of parking (50+ spaces)	
Montgomery County	MD	2014	Ordinance		EVSE-Installed: 2% of parking (50+ spaces)	

List of municipalities and states with EV-ready building codes

A number of states, municipalities, and community improvement districts in the Southwest and across the country have introduced EV-ready building codes for new construction over the last decade, including Denver, Boulder, Boulder County, and Aspen in Colorado.

To help make sense of existing codes and simplify the options for your community, SWEEP has created a short EV-Ready Building Code Primer, covering residential and commercial building codes, samples of residential and commercial municipal ordinances and cost-effectiveness comparisons.



<https://chargedevs.com/features/ev-ready-building-codes-are-the-best-ways-for-cities-and-states-to-encourage-switch-to-evs/>

EV Educational Resources

for Individuals, Groups and Organizations

Electric Car
INSIDER



EV Buyers Guide

Compare electric cars with comprehensive full page profiles



Discount Pricing Guide App

Save thousands of dollars on EV purchases and leases



Educational Exhibits

Large scale interactive exhibits for indoor and outdoor events



Electric Car Guest Drive

Test drive the latest EVs and learn from EV owners



EV Navigator

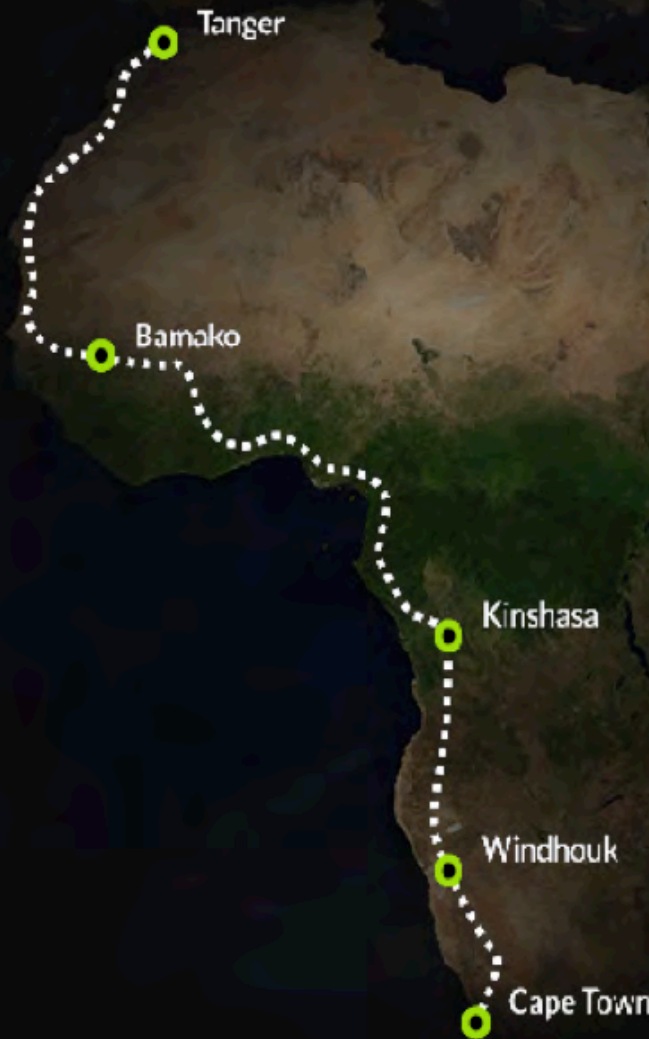
Activity framework to guide prospective EV drivers on the path to EV ownership and advocacy

ECI creates educational resources to promote EV adoption from awareness to advocacy. Email or call us for a complete catalog of products and current pricing.

sales@electric-car-insider.com

619-337-4589

Are You Ready for a REAL Adventure?



[Ed. What's it like to venture into the unknown? True EV pioneering in uncharted territory requires Patience, Perseverance and a Plan (P^3). The author comes from a legacy of intrepid explorers, as his grandfather stands as a giant in Poland today, his writings are the basis for teaching there today. *The article on the next page is published with Arkady's permission*

See https://en.wikipedia.org/wiki/Arkady_Fiedler

His home is located half way between Berlin and Warsaw, in a major urban area, with plentiful charging opportunities for small or large pack EVs to tap into. As the title implies, some of the challenges in 3rd world countries are not just finding power, but *finding a capable outlet*. Much like driving a

Tesla and charging on 120 Volts in the hinterlands of the US, it works, but it's just very slow. Reference the triple P's above!)

EVs in the early days lacked the advantage of modern metering of the energy reserves (SoC) – so that tantalizing uncertainty and then the ultimate triumph of arriving, is still fun to recall. Never mind the potential damage done to the traction batteries by pushing the limits, in those early days, the pack would likely soon be replaced anyway... but today, with ultra-expensive lithium traction batteries, such recklessness would be intolerable, unless your uncle is named Bill Gates! We hope you enjoy this 'tale from the trenches' along with the video he released.]

continued next page

A Journey From Socket To Socket. First Ever Trip Across Africa In An Electric Car

ROSSLYN, South Africa – The Electric Explorer African Challenge 2018, the first-ever electric vehicle expedition across Africa, has begun. Behind the wheel of a previous-generation Nissan LEAF is famous Polish traveler Arkady Pawel Fiedler, accompanied by photographer Albert Wójtowicz. The LEAF is not modified in any way – it is exactly the same as the car that was recently available in showrooms. (The new Nissan LEAF is on sale now across the world.)

“Traveling across Africa is probably the hardest test for any vehicle, not only an EV,” said Fiedler. “Poor roads, limited charging infrastructure and dramatically diverse weather conditions – from equatorial storms to the scorching heat of the Sahara – these are just a few challenges that we’ll have to face during the expedition. We’re optimistic. As part of the tests, I’ve already travelled over 4,000 kilometers in Poland in a Nissan LEAF, and I’m positively surprised by the driving range offered.” Taken from Nissan Motors Press Release. Please see reference at the end of the article.

By Arkady Pawel Fiedler

Let me start from the beginning. Traveling has always been in my blood and it took a while for me to find the courage to leave behind the conventional work / life routine that is so ingrained in us all, and step out into the world and travel unencumbered. My grandfather (my name sake) was a Polish traveler and writer, and I grew up around this legend of a man, reading his many books that became part of the school curriculum in Poland. His memory lives on in his home-turned-museum, a place I have fond memories of. I guess you could say I inherited my love of traveling and exploration from him.

It was while I was living and working in London that I became fed up with the mundanity of things... but it was also where I found the courage to move back to Poland so I could realize my dreams of travelling. And I did move back to Poland, where I put into action my plans.

My African LEAF clocked just over 10,000 km [here in Poland]. The machine works fine, the battery is holding up and there are no signs of any degradation. In total, I charged the car 39 times with a fast DC charger and much more often from AC chargers, or directly from a household power socket. I often had been charging from zero to full, and as charging a battery with fast DC chargers it never helps to prolong a battery’s lifespan but I was more than



Another trip across Africa (my second to date) but what makes mine so different? I became the first person to cross African continent in a [modern all] electric car.



Arkady digging out from a hole with a frying pan!

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EV Africa Trip

Continued from page 15

pleased to note that the LEAF's battery performed 'like new.' :)

So these initial 10,000 km gave me the chance to get to know the car, what to anticipate on the road, to gain confidence, to learn (in a sense) how to drive in order to reach my destination/charging point; all essential for next year's trip through Africa.

[Ed: Arkady used a LEAF-SPY or equivalent to monitor his battery during the trip.]

Cut to 2018, from Cape Town, South Africa to Poland, in a first-generation Nissan Leaf, 100% electric, unmodified car with 30 kWh battery and a [stated] range of around 200 km (120 miles) on a single charge. A trip that lasted 97 days (the African part of the trip), for which I had been preparing for well over a year. In this day and age of economic living and awareness, we have recently seen the rise of electric cars. But this change in many parts of the world remains slow, and awareness of the advantages of EVs is still overshadowed by a general distrust of anything new.

With this in mind, as well as a strong desire to challenge myself on unexplored grounds, I wanted to put to the test a standard electric car, and put it through its paces, specifically in Africa. **The challenge was to find out whether or not it would be possible to drive such a car across this great continent.**

I hired a photographer, Albert Wójtowicz, who accompanied me for most of the trip and who had also previously traveled and worked with me during my first trip across Africa



Damage to the undercarriage, incurred along the way (now held together with three chained zip ties)!



Arkady asking students in a Nigerian school to help design the next gen EV!



Visiting the Nissan dealer in Nigeria and getting a boost!

continued next page

in 2014, and across Asia in 2016. His role was to photographically document this journey. [Ed: The photographer was the only passenger, unlike on those previous trips where the crew was in the “sag wagon” which followed his little Fiat ICE.]

I had anticipated many obstacles, for which I needed to have in place a well thought out plan and strategy. With its limited car range, often long (sometimes vast and empty) distances to drive through and with no infrastructure necessary to recharge on the way, it was important to learn how to drive economically in order to preserve energy and extend the car’s range.

On a few occasions, I had no choice but to test the car to its absolute limit, fighting for every last kilometer of range to reach my next location. On many occasions I managed to drive over 260 km (161.2 miles) on one charge, with my record of reaching 278 km (172.3 miles) on a single charge with some energy still left in the battery. Leaving the battery with a small amount of energy and range at the end of my day was a deliberate part of my strategy.

With the constant uncertainty that there would not be any sufficient sockets or electricity at my day’s destination, I had to allow some sort of margin to remain, in the eventuality that I would need to find an *alternative* socket. Leaving some charge in the car’s battery also allowed me to charge the car overnight by reducing the time I needed to reach 100% full capacity. That meant that even if I had a shorter distance to travel than the maximum range of the car, with the possibility of being able to drive faster at times, I wouldn’t and still drove as economically as I could.

Despite these issues and considerations, the time required to charge the car often delayed the start of my day. About 80%



After a downpour in rural Gabon!

of the electrical sockets available to me were 5 amps, requiring well over 20 hours of charging to full capacity. [Ed: While typically it was 220-230 Volts AC, much like the US Level 1 power hookups in all fourteen of the countries he visited. The Europlug (known as the Type C), probably the single most widely used international plug. This two-wire plug is ungrounded and has two round prongs. No DC-FC and very few 3 phase power sources were encountered. See Reference from <https://www.worldstandards.eu/electricity/plug-voltage-by-country/>]

All of these concerns required a huge amount of patience from me, sticking to the plan of (slowly) moving from one socket to the next socket, literally.

Staying on the main roads was how I had initially planned this trip, in the hopes that along the way I would have easy access to a town or city with some sort of electrical infrastructure. Most

of the roads were tarmac (asphalt) but more often than not, I encountered gravel and mud which slowed me down significantly, occasionally even stopping me in my tracks.

One stretch of road between Congo and Gabon, of about 280 km (174 miles), took me four days to pass due to the rain, mud and water and lack of electrical grid. This particular road would be challenging even for the 4x4’s, and as locals had told me, would be impossible to pass with a car like mine.

With all uncertainty, these struggles, and at times wanting to resign and give up, my encounters with the people I met on the roads during this trip pushed me through. I felt genuine hospitality and kindness from these strangers, and without the help of the Africans, I definitely would not have been able to continue on through the hardest parts of this trip.

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EV Africa Trip

continued from page 17

At the end of the day, these people were willing to open up their hearts – and sockets – and help me, a man travelling through their country. Of course, I always offered compensation for any electricity used and consumed at any socket.

For the majority of the time, I travelled through French speaking Africa, where no knowledge of any French was a detriment, with no way to communicate and explain my needs. It was with difficulty that I managed to explain what I needed, what the electric car was, how long it would take to charge, how much it would cost etc., but I managed to get by. [Ed. Other recent EAA “world travelers” have learned that using simple sketched pictures of power hookups helped transcend language barriers and conveyed their needs very nicely.

We reference the 2016 80eDays.com trip made by Alan Soule (North Bay EAA) and Don Christian, (Si Valley EAA) as documented in *Current Events* Sept. 2016, Vol 48, No. 9.]

Travelling overland through Africa, especially at a slow pace allows you to experience the beauty of the African landscape, which has to be one of the best things about this trip. You cannot deny its beauty, how varying it can be, drastically changing from one country to the next, with lush green trees one moment and dusty red sand whipping around you the next. When traveling, you experience everything much more intensely through all your senses, including your mind; the heat, dust, rain, the smell of rain and thunderstorms, bread and tea, not forgetting the feeling of joy, exhilaration and at times frustration. To see this world with your own eyes and not through the glass of any screen is the best reward.

In total, I crossed through 14 countries in 97 days, covering 15,176 km [9,410 miles] in Africa. The countries, in order, were South Africa, Namibia, Angola, Democratic Republic of Congo, Congo, Gabon, Cameroon, Nigeria, Benin, Burkina Faso, Mali, Senegal, Mauretania, and Morocco. I charged the car exactly 100 times, using 1,425 kWh of electricity on average 9.5 kWh per 100 km. [Ed. That is well over six miles per kilowatt-hours of energy, and averaging 97 miles per day!] I paid in

total for electricity usage around \$230 USD. The maximum distance covered on one charge was 278.6 km [172 miles]. Often, the car’s computer was showing a range of over 300 km, [180 miles] after charging to full capacity.

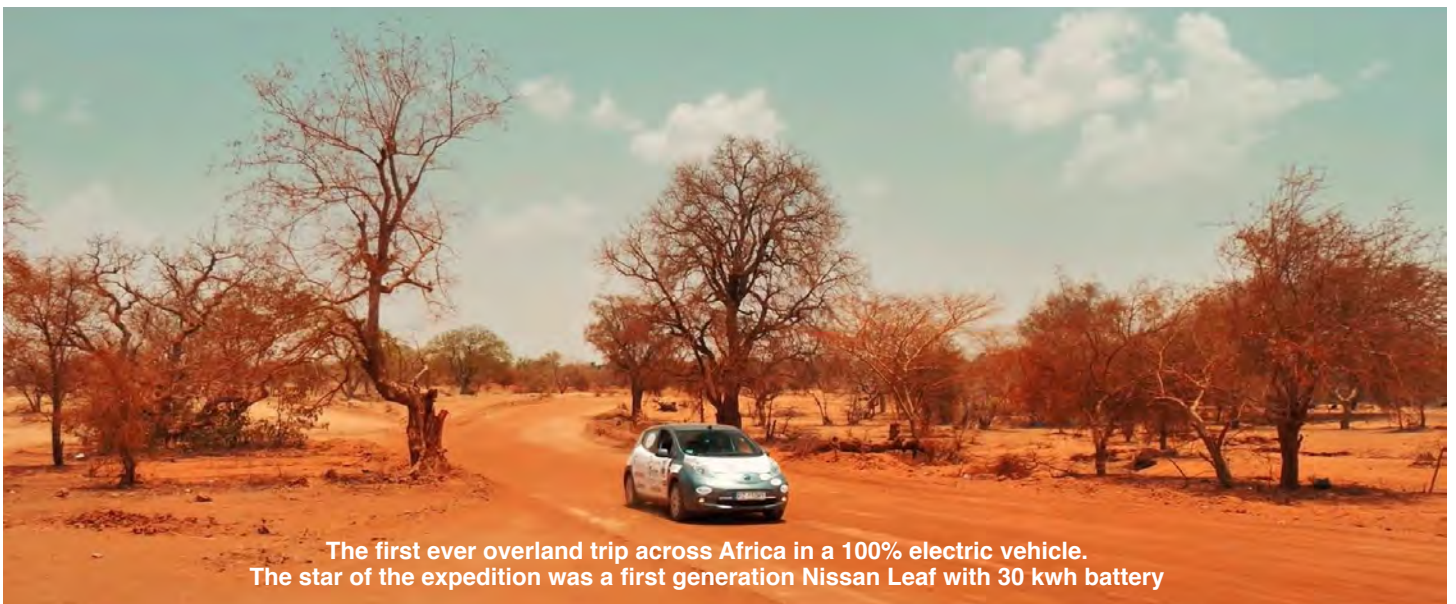
Additionally, [when arriving back on the continent of] Europe I covered [another] 2,100 km [1,300 miles] as I traveled back through Spain, France, Germany and Poland. Throughout the whole trip I only relied on local sources of electricity and I did not carry a power generator. [Ed: This was primarily a weight consideration as doing so would have been considered “cheating”, in the author’s eyes.]

I can now confidently say that it is possible to cross Africa with an electric vehicle. The car made it back to Poland in one piece... and so did I, ready for the next trip, stay tuned.

Currently I am working on a book where I will describe the whole journey in more detail. You can find a short (five minute) video on my YouTube channel documenting my trip.

<https://youtu.be/caAksZ-enDs>

continued next page



The first ever overland trip across Africa in a 100% electric vehicle.
The star of the expedition was a first generation Nissan Leaf with 30 kwh battery

Epilog

Filled with wonderful color images of his encounters along the way, this video depicts his encounters across the vast expanse. Upon closer examination using Google maps, there are many smaller towns where he was able to stop and get a boost. This truly exemplifies EV pioneering at its best!

Readers will find the youtube channel called “Now You Know” (with Zach and Jesse) featured an interview with Arkady in February 2018 just before he left on this trip. This 28 minute English interview was conducted by Jesse via Skype. <https://www.youtube.com/watch?v=UztmE4Xzige>

The author uses a method of teaching by example, with his powerful testament of “if I can cross the African continent, then this same car can certainly take you to your suburban destinations!” He has indeed proven what most thought was simply impossible and he and Nissan take the trophy! As he stated in the nine months prior to embarking on this journey, he put 10,000 km (6,000 miles) on it and practiced getting maximum distances per charge (hypermiling, a science unto itself: <https://en.wikipedia.org/wiki/Hypermiling>) and was been able



to achieve some incredible efficiency numbers – 174 watt-hours per mile on one of his trips!

The African trip website is: <http://www.electric-explorer.com>
The Nissan Press Release is below::



<https://newsroom.nissan-global.com/releases/release-fb0c7bf8bb480413626614af4104c136-electric-explorer-african-challenge-the-first-ev-expedition-across-africa>

Volkswagen Threatens to Leave Germany's Car Lobby VDA in Spat Over e-cars

VW is serious, about their huge commitment to their MEB platform promising 20+ models and investing 22 Billion over the next decade. They now threaten that unless the others collectively do more to embrace electrification efforts, they will step away from it. Forget about hydrogen, forget about “cleaner greener solutions” - they should all step up their game in the electric direction. Read all about it!



<https://www.cleanenergywire.org/news/volkswagen-threatens-leave-germanys-car-lobby-vda-spat-over-e-cars>

Chapter Highlight



This new monthly report will feature short activity summaries from our various chapters to foster knowledge transfer. Such sharing can be powerful for planning new startup activities, special meetings, or just reinvigorating established groups as we grow into our second 50 years of pioneering e-mobility.

Dayton's Group of Electric Vehicle Enthusiasts



Figure 1. DEO at the 2019 Dayton Auto Show. L-R: Tim, Inder, Don & Lois

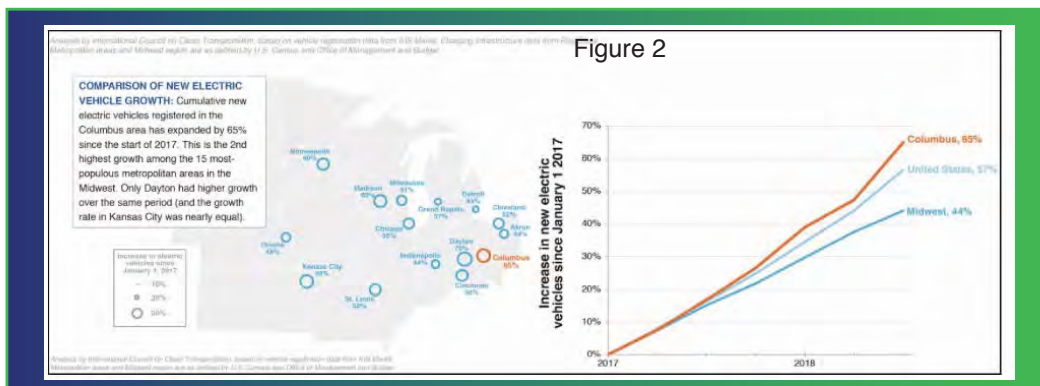
By Tim Benford, Drive Electric Dayton

Every day there are more articles in the media about electric vehicles and how the days of fossil fuel vehicles are numbered. Well, there's a burgeoning group of electric vehicle enthusiasts called Drive Electric Dayton (DED), a chapter of the Electric Auto Association (EAA), led by Dayton, Ohio resident, Tim Benford (an EV Ambassador of Drive Electric Ohio [<https://www.cleanelectricohio.org/drive-electric-ohio>]), which has grown from 0 members in April 2017 to 334 members since their first meetup in November 2017. The group actively works to accelerate the advent of sustainable transport and energy in Dayton, and the surrounding area, by promoting electric and hybrid

vehicles. Sixteen of these members have joined EAA since June 2018 with many more to come. DED can be reached via the Facebook group 'Drive Electric Dayton' and soon via an EAA website (a new Dayton EAA member is working on it).

The group is passionate about helping Daytonians learn about and experience EVs by arranging Ride & Drive events in local suburbs and townships where attendees can ride along in, or drive, EVs provided by group members and participating local auto dealers—with no sales pressure. Three Ride & Drives are planned for Dayton this Earth Day week.

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The group's members own 168 EVs of all types. There are 88 Teslas, including one rare Roadster, 29 Model S, 8 Model X, and 51 Model 3. One hundred and ninety three members are not EV owners yet, but look forward to getting one. DED held 23 events in 2018: 7 Ride and Drives, 3 Parades, 4 planning meetings, 3 auto shows, 2 Cars & Coffee, one Farmer's Market, 2 Cruise-ins, and a Concours d'Elegance.

For the second year running, in February the group had a booth at the Dayton Auto Show in February and helped explain to attendees the benefits of EVs (See Fig 1). Thirty-five new members were signed up because DED volunteers explained that electric vehicles are fun to drive. They are smooth and quiet, and their high torque, even at low speeds, provides instant accelerator response, and also better performance in snow. EVs are easier and cheaper to fuel.

Electricity for EVs is about five times cheaper than gasoline. And it is much more convenient to simply plug in when you arrive home and charge overnight than to stop by a gas station to fill your gas tank.

Further, auto show guests learned that maintenance for EVs costs much less than for gasoline vehicles. EVs require no oil changes and have 10 times fewer moving parts than a gasoline-powered car. There's no engine, transmission, spark plugs, valves, fuel tank, tailpipe, distributor, starter, clutch, muffler, or catalytic converter.

Interestingly, in 2018, the International Council on Clean Transportation reported that in 2017, Dayton cumulative EV registrations expanded by 70%, more than any other city in Ohio or in the surrounding states (See Fig 2). A member of the Electrification Coalition told Benford that this expansion most likely occurred because of DED's EV advocacy work.

In February, President of EAA, Raejean Fellows, joined 32 of DED's members at a dinner in Dayton to give a presentation on EAA and to meet Tim and his team of enthusiasts (see Figures 3 and 4).



Figure 3. Raejean and Tim at the Troll Pub meetup on Feb 28th



Figure 4. DEO members socializing after the meetup dinner



Outstanding Member Achievements Recognized with National Awards

Introduction

2018 was a very special year. Not only did EV sales hit the 1,000,000 mark, but our members and chapters reached new levels of excellence. The impact on consumers was felt throughout the country, with educational messages combating myths and misperceptions and EV owners'

enthusiasm spreading the news of EVs as simply a better technology. We got hundreds of thousands behind the wheel to experience electric drive first hand. While many members contributed to National Drive Electric Week and many other events, a few dedicated members were real standouts. We are proud to present the award winners of 2018.



Janelle London, Co-Executive Director of Coltura.org receiving 2018 Best Music Video Award for "Gasoline, Gasoline The World's Aflame"

<http://www.youtube.com/watch?v=09txc4YaT3M>

with Matthew Metz, Executive Producer

The 2018 Roadrunner Award goes to Bruce Nyden and Ryan Palmateer for the Fastest Growing New Chapter, the San Juan Islands EVA <https://youtu.be/aYn-mh94vmM>

Elaine Borseth, President of EVAoSD received the EAA's 2018 Ambassador Road Tripper Award for her 16,000

mile five months US and Canadian travel odyssey.

Matt Ferrell receives the 2018 EAA Outstanding Educational Video for his "Electric Cars, Myths vs Facts" which at this writing, has been viewed 121,000+ times!

See it at <https://www.youtube.com/watch?v=kk7ZTn9g7bY>

There were three MVP awards given for the East, Mid-west and West regions, each for outstanding leadership, market impact and creativity. Each received embroidered travel blankets.

continued next page



As a result of his winning the MVP National Electric Auto Award for the MIDWEST, the mayor of Dayton OH, declared February 28th, 2019 Tim Benford EV Day [See Clean Fuels Ohio newsletter clip featured on page 38](#)



EAST: Stuart Unger from EVOLVEKY in Kentucky



WEST: Dale Miller from Golden Gate EVA, for leading the GGEVA in the past decade with numerous events, meetings, including over two dozen NDEW events in the greater San Francisco area.



A 2018 Lifetime Achievement Award was given to Will Beckett of Central Coast California EAA for his role on our board as membership chair and the multitude of other tasks he has performed in the past nearly three decades of service.



The 2018 Entrepreneur of the Year Award for the biggest market impact by a business or organization in the EV community was given to Chris Allen, President of Electric Car Insider – Guest Drives.

A 2018 Lifetime Achievement Award was given to Ron Freund, Chairman Emeritus of the EAA for his seventeen years of service and his continuing role as “Current Events” editor.



Lee Vining, CA a New Solar Pavilion Equips it with EVSE



This museum shot comes from Google maps

Lee Vining's Pioneer Pavilion Small Step for a Big Idea — Solar EV Charging at the Eastern Gateway to Yosemite

Community activists have raised a solar pavilion in the small town of Lee Vining that they plan to use for charging electric vehicles (EVs). Dubbed the Pioneer Pavilion, the project is part of an ambitious effort by a local Climate Action Group to make the town on the east side of the Sierra Nevada more 'climate friendly.' Lee Vining is the eastern gateway to Yosemite National Park and Tuolumne Meadows at the head of the dramatic Tioga Pass Road (CA-120).

The pavilion in Lee Vining's Hess Park will feed electricity from the solar panels to the nearby Mono County Historical Society building. The pavilion, the Historical Society, and popular tourist attraction of the 'Upside Down House' are all within easy walking distance of the shops and restaurants in Lee Vining. Led by retired park ranger Janet Carle, the

community group plans to offer public Wi-Fi in the pavilion and a J1772 Level 2 EV charging station at the parking lot.

There are no public non-Tesla EV charging stations on US 395 from Mojave, CA to Gardnerville, NV – a distance of more than 300 miles. But stop the press – this just in! Bridgeport is getting two DC-FC with CCS connections to help make US395 possible with suitably quipped EVs! Equipment is on the ground, just not installed yet. Springtime should expedite that effort!

Carle, and other volunteers in the community, have worked the past three years to bring the \$80,000 project to life. The effort began, says Carle, when the regional planning commission suggested that the climate activists do something concrete to show the community what can be done. From there, the idea just took off. Carle says the community's endorsement and

support of the project is 'like a fairy tale.' It was the year of people saying 'yes' rather than 'no.' Don Condon of the Eastern Sierra Chapter of the Electric Auto Association characterized this project as an 'old-fashioned barn raising' where everyone pitched in with what they could. That included solar contractor Sierra Solar who donated their time on the project, as did other vendors, including a local mason.

The pavilion uses translucent solar panels that provide a pleasing dappled light beneath the canopy says Carle. While the size of the solar pavilion is small in a state the size of California where many solar projects are gargantuan, completing the project was no small feat in a town of only 400 people!

The Lumos Solar panels lack a backing so the sun partially shines through. The panels are designed for use in car ports, pavilions, picnic areas, walkways,

and EV charging spaces where the see-through panels make a statement about the use of solar energy while also providing shade.

This was an effect that the community group desired. They wanted people to know that they were beneath solar panels and not just roofing material. Carle

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envisions integrating the solar pavilion with the local schools as an outdoor classroom. The space is designed to hold 80 people. In a textbook example of community participation, the project gained momentum when organizers solicited locally-made tiles painted by people in the community.

The project's Facebook page shows a busy community hall as residents painted their tiles for use in the pavilion. Also popular was the decision to feature nine pioneer families of the Mono Basin in the pavilion. Story boards describe the families' role in settling the area. The 'stars aligned' says Carle and the pavilion was connected to the grid on 18 October 2018.

[Ed: Update from Carle on 19 March 2019, another hurdle has been crossed when all five of the local Mono County Supervisors approved the EV charging station and were positive and enthusiastic. However, there needs to be a CEQA determination and a draft MoU before they can officially approve, which means another delay and another meeting. Target installation will probably happen in late May.]



THE YEAR OF SAYING YES: THE STORY OF THE PIONEER SOLAR PAVILION at Hess Park in Lee Vining, 2018

Excerpted from the local newspaper last fall after the Pavilion was completed.

By Janet Carle

'Once upon a time, in a little mountain town on the edge of a big blue lake, a small group of people wanted to do something. They noticed that winter snows were less deep, and summer days were drier and hotter with forest fire smoke in the air. The group wanted to protect their beautiful lake, which depended on the snow to stay healthy.

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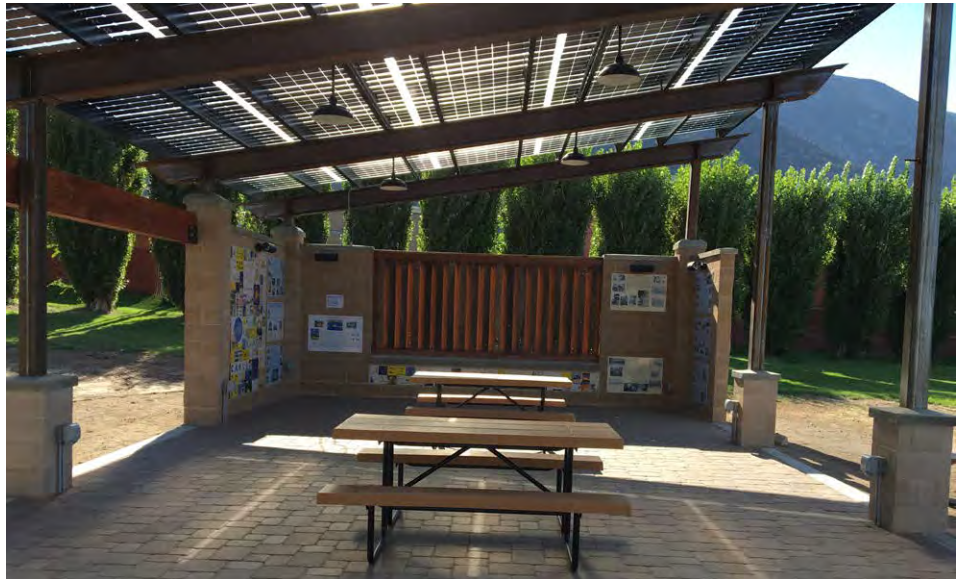
New EVSE

continued from page 25

So they went to their local council and said, ‘we want to become friendly to the climate and set an example for all the visitors that come to see our lake, what should we do?’ The council suggested, ‘Do something real, that people can see and touch, that is useful and beautiful and we will support you.’ None of this touchy feely abstract stuff.

So the group decided to build a beautiful pavilion with a roof of solar panels, based on an idea from a town across the sea, to showcase how it is possible to have clean energy. It would be in the park in the middle of the town, near where the children play. It would be a shady spot to sit and the solar panels would provide energy for the travelers to use. It was a wonderful plan, but there was no money or knowledge to build something so grand.’

This is the beginning of the story of the Pioneer Solar Pavilion that was dedicated on Saturday Aug. 25 at Hess Park in Lee Vining. The rest of the story is this: a community worked together and helped each other to create something useful, beautiful and inspirational. The Park, located at the gateway to Yosemite and the heart of the Eastern Sierra is celebrating its pioneer heritage and making a statement about clean energy. Hopefully, international visitors from around the world will be inspired by what our small town did with cooperation, volunteerism, hundreds of small donations, and leadership from 350 MONO Climate Action, the Mono Basin Historical Society, the Lee Vining



When the new EVSE installation is completed, visiting EV drivers can join in at events like this! *These two photos from Janet Carle.*

Chamber of Commerce and Mono County.

The Pavilion has a stunning roof made of solar panels, providing shade and generating clean energy, powering electric outlets for cell phone charging, the needs of the
continued next page

SOLAR PAVILION – LEE VINING, CA

Schoolhouse Museum and the adjoining public restroom. The Pavilion has Wi-Fi and has been wired for an electric car charger at the curb. The walls of the Pavilion are a work of art of colorful tiles painted by the children and artists of the Mono Basin and June Lake, honoring all the donors that financed the construction. Many local pioneer families made generous donations in return for a place to honor their family history on the Pavilion walls. These panels will be available for viewing year-round, and will enhance the mission of the adjacent Mono Basin Museum.

Another important feature is an exhibit on solar power and the impetus for building the Pavilion as a showcase for renewable energy. Visitors will be able to see how the solar generation is working in real time via a computer monitor.

The Pavilion was made possible by the generosity of many too numerous to include here, but all together they have given the community a gift of lasting beauty.

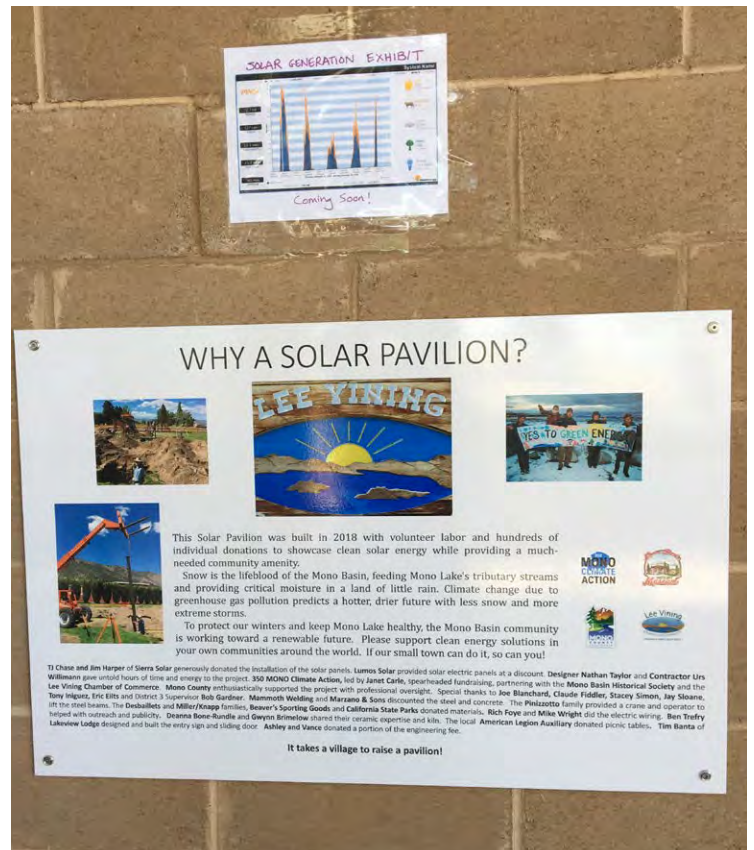
The volunteer construction crew, the businesses and families that donated food and materials, and the tile painters all made invaluable contributions. All of our major suppliers were generous in understanding the shoe string nature of the finances, and responding with discounts and donations.

The newest nearby chapter of the EAA (Eastern Sierra EVA) as well as EAA Board members were involved in the planning of their final EVSE and energy monitoring facility selection. Through the Adopt-a-Charger program, Lisa Rosen (in honor of William Korthof, one of our early EV pioneers) donated a Clipper Creek charger and \$1,500 in cash for electricity costs. Adopt-a-Charger donated funds to pay for any deviations in projected power expenses

Of historical note – that ribbon was cut at the Grand Opening by Augie Hess, the son of Gus Hess, one of the founders of town of Lee Vining and the namesake of the park that holds the Pavilion. We were so honored that Augie, at 103 years old, was able to participate.

As this project nears completion, here is an update in the local newspaper, The Sheet News on p 11:

http://thesheetnews.com/wp-content/uploads/2019/03/The_Sheet_03.23.2019.pdf



The final ribbon cutting and EVSE unveiling is planned for June 13, 2019 at 5pm at the park. It will follow a Climate Seminar earlier in the afternoon. There will be an EV Display.

The Mono Basin community would like to invite everyone to come and see the beautiful Pavilion in the park, to think about clean energy and learn about local history and sit in the shade under the solar roof and watch the children play.

New EV Fees Popping Up Nationwide

Before 2019, 20 states had already enacted annual registration fees on electric vehicles. New developments in 2019, outlined in the table above, have the potential to add 11 states to that list. For context, only 2 new states passed fees in 2018.

EVs are being targeted to fill transportation funding gaps resulting from declining motor fuel taxes. According to David Greene at the University of Tennessee, this decline stems primarily from inflation and increased fleet fuel economy. Annual registration fees for EVs are seen as one option to recover a portion of this lost revenue that funds vital transportation projects. Despite the active debates like the one playing out in Alabama concerning the effectiveness of these fees at combating funding problems, the momentum in state legislatures is undeniable.

Annual fees are seen as a way for EV drivers to pay their fair share towards funding the road network. Calculating the loss in motor fuel tax revenues from driving an EV is straightforward and reveals that fees already in place and under consideration often far exceed what can be considered “fair.” A Georgian driving an efficient Toyota Prius for 10,000 miles per year, for example, would pay less than \$75 in gas taxes per year. An EV driver in the state would pay \$214 regardless of how far they traveled.

Punitive fees like those in Georgia could discourage EV adoption, though the effects are still murky. Once among the fastest growing EV markets in the country, Georgia experienced a 90% drop in EV sales after ending its \$5,000 tax credit and enacting the sizeable annual fee for all-electrics. A University of California Davis report published early this year found that a proposed annual fee of \$100 for EV drivers in California could decrease EV purchases by a considerable amount (up to 24 percent) in the near term. The study found that these effects decrease over time as awareness of the fees becomes widespread.

The existing road network is funded through a variety of mechanisms, including general fund appropriations, motor fuel taxes, tolls, property taxes, and other measures. EV drivers already contribute to road funding through all of these means except motor fuel taxes, which account for only 35 percent of total revenue raised for roads according to the Federal Highway Administration. The transportation funding community is actively exploring solutions to the sizeable funding gaps and are best positioned to address the issue.

For EVs, the increased activity in state legislatures around fees looks to be more about hampering EV adoption than about sustain-



State	Max Annual Fee (Plug-in Hybrids)	Max Annual Fee (All-Electrics)	Link
Alabama	\$150	\$200	HB 2
Arkansas	\$100	\$200	SB 336
Arizona	\$80	\$198	HB 2536
Iowa	\$65	\$130	SSB 1208
Kansas	\$75	\$150	SB 189
Minnesota	\$125	\$250	SF 1409
Missouri	\$210	\$210	SB 201
Nebraska	\$125	\$125	LB 366
Nevada	\$100	\$100	SB 114
New Hampshire	\$111	\$111	HB 478
New Mexico	\$15	\$25	HB 185
North Dakota	\$50	\$110	SB 2061
Ohio	\$100	\$200	HB 62
Oklahoma	\$60	\$150	HB 1950
Texas	\$100	\$200	HB 2513
Vermont	/kWh	/kWh	HB 471
Wisconsin	\$75	\$100	SB 59
Washington	\$200	\$350	SB 5971
Wyoming	\$200	\$200	HB 0166

*Table shows emerging legislations and trends for 2019 only.
Compiled by Atlas Public Policy.*

ably funding the road network. We're actively working on new dashboards to help you make sense of our how roads are funded today and to make it easier to track legislation related to EVs. Stay tuned as we pull these data together and make it more accessible to our users.

Earth Day Goes Electric



The EEvent registration count for the first annual Drive Electric Earth Day (DEED) has broken 100 events across the country, from Juno Alaska to Waterville, Maine. The excitement of connecting Earth Day events with EV showcases is even appearing up in Canada and beyond the continent in Jamaica, Hawaii, and New Zealand.

Members of Plug In America, the Sierra Club and Electric Auto Association will give environmentally focused communities the opportunity to connect their Earth Day events with zero emission vehicles demonstrating how clean vehicles can help fight climate change and clean the air. Community organizations, businesses, utilities and government entities can incorporate EV showcases, test drives, and speakers to expand their events with actions individuals can take today for clean air.

EV owners across the country are teaming Earth Day event organizers to show electric vehicles are where green meets fun, clean air saves money and quiet brings performance.

Want to help with an event? Go to our DEED events page [<https://driveelectricearthday.org/events.php>] to see if there's one near you, then go to the volunteer

page [<https://driveelectricearthday.org/volunteer.php>] to offer your assistance.

If there aren't any events registered nearby, it's easy to team up with any local community group, business, workplace, utility or government entity that is planning an Earth Day event some time in April. These can be very simple displays with one or two EVs, or scaled up to 30 EV's with a Ride and Drive activity.

Not only are Earth Day event hosts generally excited to include EVs, but DEED will provide the tools to help make a showcase successful and fun to do. EV owners can get started by checking on the short webinar "Drive Electric Earth Day - How to Participate" [<https://www.youtube.com/watch?v=ol5TLahTbWY&feature=youtu.be>] and the EAA EEvent Coordination Webinar. [<https://zoom.us/recording/play/2cHUSggLxABMaT-fQx1BaFimyY67heBG2vyiZVZAYINKd4YzPgr8-HahurZ9Fct8?continueMode=true>]

Once you register as an Event Captain you'll be a member in a community of Drive Electric Earth Day volunteers sharing ideas and answering questions. As an EAA member you you can download the Event Coordinator's Handbook in the Document library under the Chapter Toolkit folder.



New Tesla Offerings

By CE Staff

Model 3 Standard Range – RELEASED

The long awaited and oft touted \$35,000 Tesla Model 3 has been released, and dubbed the ‘Standard Range’ version. There are numerous changes and shuffling of features such as “auto pilot” options and interior features.

Vehicles belonging to early adopters (surely there have been at least 150,000 of those sold to date, dubbed the Long Range RWD version) will thrill about their original 310 miles of range now getting a firmware upgrade to give it 325 miles of range! Plus, all Model 3 cars (including ones already shipped) will get a 5% increase in peak power output, meaning faster acceleration!

There also was a realignment of “Auto Pilot” features which makes sense, to distinguish between Enhanced Auto Pilot feature and what was a Full Self-Driving Capability feature. The current driver assistance is considered Level 2 autonomy. Now all of the “Full Self-Driving” (FSD) capability features as listed below, are currently in Enhanced Autopilot, except for those “coming later this year” features. This would possibly be considered Level 3 (or higher) autonomy.

For an explanation of these definitions, see: <https://www.techopedia.com/driverless-cars-levels-of-autonomy/2/33449>

Here’s how it breaks down now:

Auto Pilot (admittedly a poor name choice because “it’s simply not that!”)

- Enables your car to steer, accelerate and brake automatically for other vehicles and pedestrians within its lane. These are advanced safety and convenience features designed to assist you with the most burdensome parts of driving.

Full Self-Driving Capability

- Navigate on Auto Pilot: automatic driving from highway on-ramp to off-ramp including interchanges and overtaking slower cars
- Auto park: both parallel and perpendicular spaces
- Summon: your parked car will come find you anywhere in a parking lot. Really.

Coming later this year:

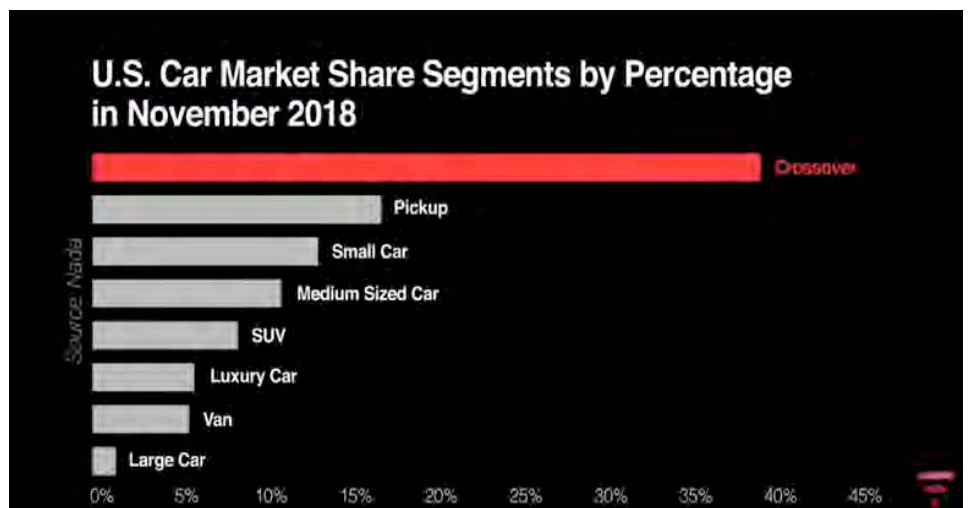
- Recognize and respond to traffic lights and stop signs
- Automatic driving on city streets.

Tesla seems to be responding to the fact that traffic-aware cruise control and some form of autosteer is becoming more common with their ICE and EV competition. They are therefore lowering the price for that part. They are then raising the price on what the competition doesn’t have. If you paid more for something you haven’t yet received, that has yet to be resolved or decided.

In summary, there are three ranges: Standard, Mid-Range, Long Range with 220, 240 and 325 miles respectively, under ideal conditions (steady driving at 60 mph, on flat roads, no wind, moderate temperatures). Who can maintain that in a Tesla? (In other words, YMMV!)

MODEL Y

The next vehicle slated for release is a smaller SUV, without falcon wing doors. Dubbed the Model Y, this has a slightly larger (~10%) body, higher ride height and is considered a cross-over SUV. It is based on much of the Model 3 internals, except it now offers the possibility of a 3rd row of seats in the very back, and has a power lift gate (option) on its rear hatch. This is the largest selling segment of vehicles in the US today, so will satisfy those who don’t want a sedan. This graphic, courtesy of Ben Sullins’ Telsanomics shows that crossovers are even more



popular than pickup trucks!

continued next page

UPDATE SUMMARY

It too, will be offered with Standard Range and Long Range battery sizes, and can seat either five or seven passengers with their optional 3rd row seating. The AWD and Performance versions will cost more and perform better. The new model includes highly efficient Switched Reluctance motor in the rear, and an induction motor in the front, if ordered as AWD. Their website has all price break downs. Availability will be in the Fall of 2020 except for the Standard Range model, which will follow about six months later. Many questions remain with a myriad of details as full specifications are revealed in due course.



Version 3 Supercharger delivering 239 kW into Model 3 at nearly 1000 miles (of range gained) per hour! It really works!



Left: Model Y rear hatch view open with seats down and liftgate raised



Right: Frontal / side view of new Model Y prototype



Edison Electric Light

Sometimes we have to be reminded of the preconceived notions that people harbor when confronted with new technology. (It was about 139 years ago that the incandescent light bulb was introduced to the public. Today we are witnessing a revolution in transportation with electrified mobility catching the attention of thousands every day.

https://photos.google.com/share/AF1QipN99yOxqkM2mAshLnfK7-blT8ez9m0ehU4_OIP_8C8ha3-EaU4LHn-Vbotrol4NHA/photo/AF1QipNNJQTHZ-doxraC0yTfEvP2P-4aIdMRNIXUUzo9s?key=MmlabHI3bEdRcEFLNXhEQUk0aU1pbWVGaIFsTExR



Tesla Model 3 = Best Selling Electric Car In Germany — CleanTechnica EV Sales Report

By Alex Voigt

[Ed. The German market will respond to this current competitive Model 3 product offering more strongly than our “Detroit Three” automakers, largely because fuel in Europe is still wickedly expensive, (average price for Germany, France, Sweden and UK is about \$5.57 per US Gallon) and many new owners can take advantage of electricity with home-based charging. This despite the first EV from a major European OEM having just recently shown up on the market (Jaguar iPace and Audi e-tron®).]



Many have predicted that the growth of Tesla in Germany will be limited by different factors that are unique to the market and differentiate it from markets like the US, Norway, and the Netherlands. The first of those factors is the German auto industry, which is

without any doubt the dominant industry (including suppliers and suppliers of suppliers and suppliers of suppliers) in the largest economy in Europe. As such an influential industry, it has a large influence on politics, laws, and regulations.

Secondly, Germans have grown up with strong loyalty to their own brands — VW, Audi, BMW, Mercedes, Opel, and Porsche are each famous for different vehicle aspects and styles. Together, they span the entire field of segments

continued next page

a car buyer can wish for. The average German is pretty nitpicky and expects a superior quality of car, a test that most companies from abroad fail to deliver one way or the other.

Be it panel gaps, the sound of the door closing, the interior materials, the cockpit leather seam, or an outstanding drivetrain experience (feel and sound), there's an expectation for a flawless car together with an awesome delivery process that beats your best ever Christmas moments as a kid. This is the norm for buyers, and any deviation from it results in immediate complaints and bad press.

Lastly, a large portion of Germany's GDP, as well as jobs and livelihood, depends on those companies. People working there or their family or friends live and breathe in an echo chamber of positive news about the company they work for every day. It paid for their house, provided loans with low-interest rates like banks do, and provided free doctor services onsite. Soon, all friends you have are somehow also connected to your car company and talk the same talk. You live a good life and you never bite the hand that feeds you.

Living in Germany and working for the auto industry has been good so far. But for a few years, there's been something happening that is disturbing the peace. A new technology — electric vehicle technology — appeared and is changing most aspects of the traditional gas car. Electric vehicles (EVs), like Apple and Amazon, are promising a new world. People smiled and joked about them at first, but the joy the managers of the German auto industry had has disappeared.

More of those EVs have come to market year after year, but they've been nicely staying below 1% of market share, with modest gains in terms of



volume. The general assumption had been — nothing to worry about. These incumbents decided to build some too, be it because of public or political pressure, to prove that they can do so as well.

When Tesla appeared on the market, the German auto industry did put an eye on the young company (and one of them even helped to fund it for a bit). As the company grew, they announced that more electric vehicles would be released soon. However, more and more delays of those releases have been announced lately, and consumers are still waiting for a long-range

yet affordable electric vehicle from Germany.

There's a lot of talk and a constant notion of competitive fully electric cars (BEVs). The German auto industry has promised these for years, but for different reasons, they've yet to arrive, with the exception of Audi's young e-tron, a car that reportedly has a loss of €3,000 per vehicle sold*. [Editor's note: These kinds of criticisms are common in the industry and often come down to scale. With higher production volumes, per vehicle "losses" come down until a crossover point where

continued on page 34

Tesla Model 3

continued from page 33

the model becomes profitable — starts making money in net. Of course, there are also cases where the model is genuinely underpriced for the cost or where that crossover point is never reached.]

Back to the top, there are many reasons for Tesla to not do that well in Germany, in contrast to other markets in Europe where it has successfully seen growing sales over the years.

Tesla Model S and Model X sales in Germany, taking into account the country's 82 million people and the buying power of those citizens, have been pretty modest. That is true even though German manufacturers as of today have no credible competitor to compare with Tesla's models, and especially not with the now much more affordable Model 3.

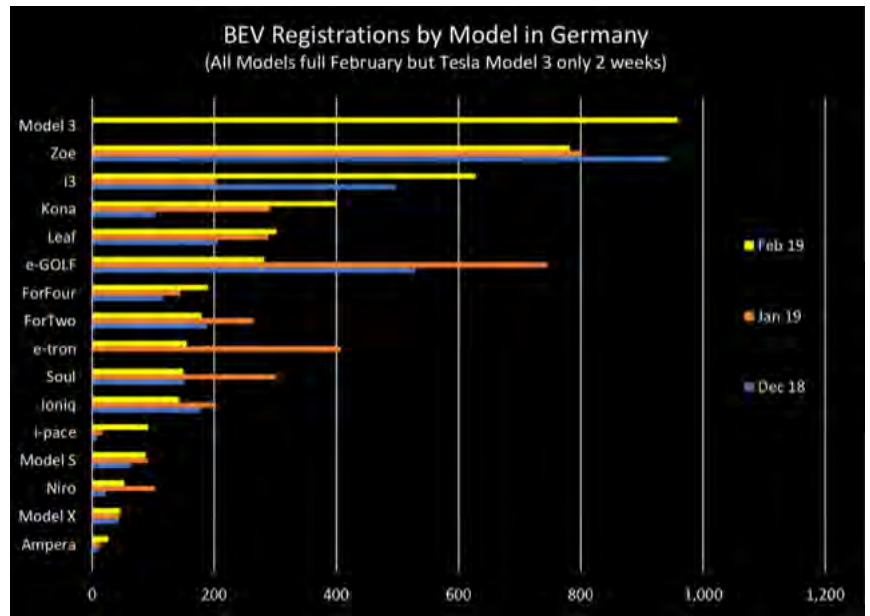
Since German deliveries of the Model 3 started in Munich on February 13, 2019, people have been speculating whether the lower cost Tesla will make a difference and how it will be received in a country where auto industry managers say they have petrol instead of blood in their veins.

Now the time has come to look at data and facts, since the first official delivery numbers were released for February 2019.

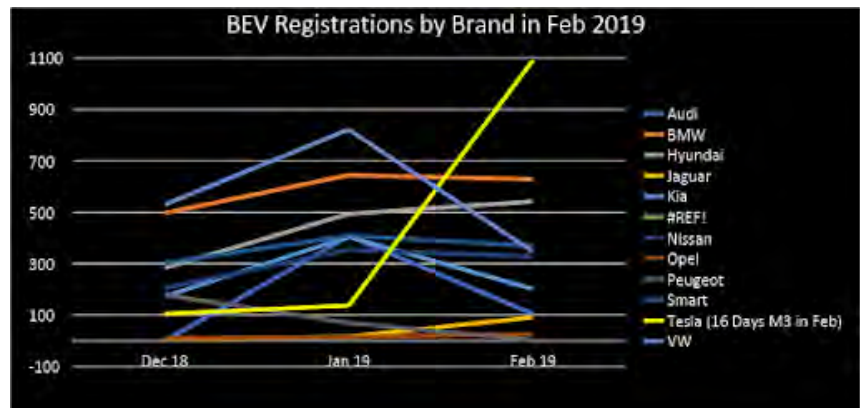
In order to get any car delivered, an official registration at the KBA (Kraftfahrtbundesamt) has to happen. Then you get license plates and can drive your new car on German roads. Registration numbers are released once a month and give us solid information about how many cars have been registered and delivered.

Who's Winning? Who's Losing?

It's fair to assume that some of the models that have lost market share since January — like the VW e-Golf, Nissan LEAF, and Kia Soul EV — have been affected by the appearance of the Tesla Model 3.



In just 16 days, about half the month of February, Model 3s were delivered in different centers in Hamburg, Neuss, Düsseldorf, Frankfurt, Berlin, Stuttgart, Nuremberg, and Munich. Those are the delivery centers I am aware of, but there may be more out there.



In those two weeks of February, the Model 3 Long Range AWD already became the best-selling electric vehicle in Germany — even looking at the entire month. Only the Long Range premium Model 3 has been delivered so far, with two variations and a price point between about €45,000 and €76,000. Since March 1st, prices have actually been reduced and it can be fairly assumed that demand will further increase.

Crunching some numbers, we could say that, from February 13th to February 28th, 32% of all electric cars sold in Germany were Model 3s. Every third buyer in that period decided with her or his hard-earned money to buy the Model 3 from US manufacturer Tesla. The next best selling model was the Zoe from Renault, which is about 50% lower in price, but the Model 3 still sold 115% more units.

As a reference, last month in January 2019, the best selling BEVs were:

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EV SALES REPORT

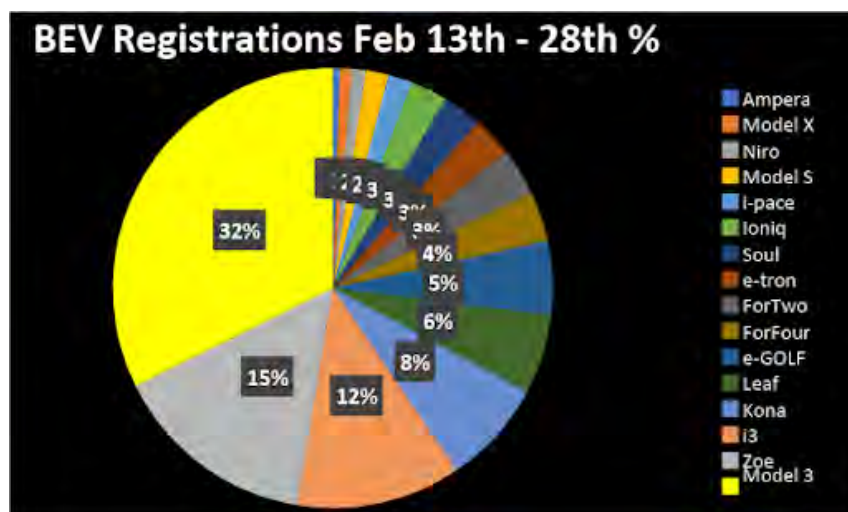
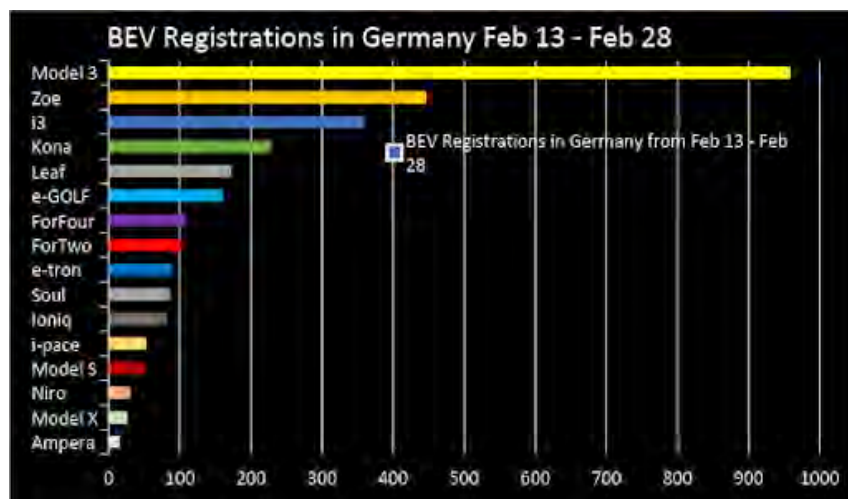
- Renault Zoe: 17.7%
- VW e- Golf: 16.5%
- BMW i3: 14.3%

In just two weeks, the Model 3 went from 0% to market leader in battery electric vehicles in Germany, doubling the share of the next best BEV, and I do predict this is just the beginning.

The deliveries started slowly and increased over the course of the month, with much higher deliveries per day reported at the end of the month. That is understandable because the delivery centers themselves have been under construction and urgently needed more service personnel to deliver the vehicles.

Many people complained about a chaotic situation during the delivery process, but after they drove their own Model 3s home, they knew it was the right decision and have been in love ever since. In my previous article here on CleanTechnica, I reported quotations from Germans expressing their true love for the Model 3. In fact, out of all cars delivered, only one person reported that he returned the car due to quality issues and that owner wants to order a new one after receiving the refund. If we take that into account and look at the first reports in early March, we can predict that BEV market domination of the Model 3 in Germany will be even stronger in March and Q2 under the constraint that Tesla is able to supply enough vehicles.

Other countries in Europe have been much better places for Tesla sales, and early data from Norway show us 1,351 Model 3s have been registered from the middle of February to the end, with a rate of more than 100 per day. Right now, we don't have any reason to believe that other places in Europe will be much different, and the 28 member states of the European Union have 512 million citizens who will happily buy a car that is faster, safer, more reliable, lower in maintenance costs, and in a few months (with the launch of the standard-range Model 3) will also be lower in purchasing price than the gas or diesel car they drive today.



Looking forward, the \$35,000 Standard Range and \$37,000 Standard Range Plus models that were announced last week will be available in Germany in ~6 months, the time of year where electric vehicles have more demand simply because it is summer (you have more range and it's more fun to drive). Read more of this article at the URL below:

https://cleantechnica.com/2019/03/09/tesla-model-3-best-selling-electric-car-in-germany/?utm_source=quora&utm_medium=referral

How Growing Cities Can Support At-Home Electric Vehicle Charging



Apartment buildings and condos often lack charging stations for electric vehicles. Credit: Pixabay

By Jerome Mayaud, The Conversation

Rapid urban population growth is driving many cities around the world to reduce their carbon footprints. In Canada, two major policy agendas are designed to achieve this: boosting urban density and promoting low-carbon transportation such as electric vehicles (EVs).

Despite their overlap, these goals are often pursued separately through disjointed planning strategies. In time, ad-hoc policies could be counterproductive and stall the shift to EVs, by making ownership expensive, inefficient and complicated.

Most Canadians live in cities, where the deployment of EVs has two main advantages.

First, EVs can drastically reduce local emissions as long as their electricity comes from sustainable sources. Second, their driving ranges are suited to short urban trips. For example, 95 per cent of driving trips in Vancouver are less than 30 kilometres, well within the range of an EV.

However, as cities swap single-family homes for multi-unit dwellings to increase population density, reduce housing prices and lower carbon emissions, the installation of EV charging stations in existing multi-unit dwellings is lagging behind. Our research found ways to change that.

EV sales on the rise in British Columbia

British Columbia is an attractive location for EVs because roughly 90 per cent of the province's electricity comes from large renewable hydropower. Widespread EV usage could cut B.C.'s greenhouse gas emissions by up to 98 per cent. Residential electricity rates in B.C. are now low enough that charging a vehicle at home is less expensive than fuelling a conventional gasoline vehicle.

Together with B.C.'s EV subsidies, these factors more than doubled provincial EV sales between 2013 and 2017. However, EVs still make up only two per cent of all vehicles on B.C.'s roads. What's more, B.C.'s current regulations mean that EVs will likely only have a 10 per cent market share

continued next page

by 2040, far below the Canadian government's goal of 30 per cent by 2030. This suggests more stringent policies are needed.

Consumers are switching to EVs as the number of models on the market grows and battery prices decrease, but drivers want to be sure they will be able to charge their vehicles quickly, easily and cheaply.

Electrified transportation is still beset by the classic chicken-and-egg problem: fuel providers will not invest in fuelling infrastructure until enough EVs are in circulation, and people will avoid buying an EV until sufficient charging points exist.

Few incentives to retrofit

While a dense network of public charging points will be important for reducing range anxiety among users, almost 90 per cent of charging takes place at home. Yet the installation of home charging stations is complicated in buildings with multiple dwelling units, because of competing interests in the common spaces shared by residents. So-called "Multi-Unit Residential Buildings" now account for over a quarter of all households in B.C. and are forecast to make up 70 per cent of all new residential constructions in the province by 2020.

As of 2019, all new multi-family residential developments built in Vancouver must include EV charging infrastructure. But the city has no policies to encourage building owners to retrofit existing buildings with charging points.

Our research found financial and technical issues were the most significant barriers to installing charging points in multi-unit residential buildings, mostly due to the imposing electrical loads EV charging stations place on the buildings' existing power systems. Other barriers include the lack of support from non-EV drivers, unclear regulation concerning the rights and obligations of drivers and landlords, and overly conservative regulatory requirements for buildings.

Breaking down barriers

Municipal governments throughout B.C. could break down these barriers with a few key policy changes.

They could start by introducing financial policies that create incentives for both EV owners and building owners. So-called "demand-focused" policies include programs that provide financial aid to building owners to develop retrofit plans, and to mandate them to retrofit a minimum number of charging stations. EV ownership could be incentivized



Government incentives could bring more EV charging stations to multi-unit residential buildings. Credit: Shutterstock

through rebates that cover the cost of a new vehicle: B.C. already offers rebates of up to \$5,000, but this is much lower than in Québec.

Municipal governments should also clarify the rights and obligations of builders, building owners, residents and others when it comes to charging infrastructure. For instance, who should pay for the installation and running costs of charging points in condos? What sort of upgrades are needed to deal with the extra electrical loads from EV charging?

Non-governmental associations such as the Condominium Home Owners Association of B.C. and the Building Owners and Managers Association of B.C. offer some guidance, but confusion remains.

Finally, governments can help raise public awareness and acceptance of EVs by introducing programs to educate people who have less trust in, and understanding of, EV technology. Many municipalities around the world could adopt these suggestions to encourage the installation of at-home EV charging points, while also boosting urban density.

Cities generate 80 per cent of global GDP and are responsible for 70 per cent of carbon dioxide emissions, so they are critical arenas for addressing the sources and effects of climate change.

As vehicle electrification gains ground in Canada and elsewhere, we will need policies that do a better job of recognizing the obstacles and opportunities around residential charging. The high densification and mobility challenges experienced in B.C.'s urban areas illustrates the challenges faced by many modern cities.

Provided by: *The Conversation*



<https://phys.org/news/2019-01-cities-at-home-electric-vehicle.html>

Keep Up on all Auto Shows & EV Related Conferences

US and International Events

EVERYTHING EV - LONDON, ENGLAND
04/02/19 - 04/03/19

WASHINGTON AUTO SHOW
04/05/19 - 04/14/19

ALABAMA INTERNATIONAL AUTO SHOW
04/04/19 - 04/07/19

NEW MEXICO INTERNATIONAL AUTO SHOW
04/05/19 - 04/07/19

ELECTRIC VEHICLES: EVERYTHING IS CHANGING 2019 BERLIN, GERMANY
04/10/19 - 04/11/19

FORMULA E: ROME E-PRIX
ROME, ITALY 04/13/19

WASHINGTON DC AUTO SHOW
04/05/19 - 04/14/19

TULSA, OKLAHOMA AUTO SHOW
04/12/19 - 04/14/19

NEW YORK INTERNATIONAL AUTO SHOW 04/19/19 - 04/28/19

FORMULA E: PARIS E-PRIX
PARIS, FRANCE 04/27/19

ELECTRIC & HYBRID VEHICLE TECHNOLOGY EXPO EUROPE
05/07/2019 - 05/09/2019

NEW MEXICO INTERNATIONAL AUTO SHOW 05/07/2019 - 05/07/2019

All the Information You Need, in One Place! EVERYTHING EV – LONDON April 2&3 2019

<https://www.solarenergyevents.com/resources/list/category/everything-ev>



Clean Fuels Ohio Newsletter

March 2019



Your Partner for Implementing Clean Transportation Technology in Ohio

Drive Electric Dayton Leader Receives Award

[See page 22](#)

Tim Benford, Drive Electric Dayton Chapter Leader, just received an award from the Electric Auto Association for "MVP of the Midwest" for his efforts to organize a Dayton chapter of the Electric Auto Association. Drive Electric Dayton is a chapter of Drive Electric Ohio, which is an initiative of Clean Fuels Ohio. The MVP awards recognize outstanding achievement in leadership, market impact, and creativity. Formed in 1967, Electric Auto Association is a national membership organization that works to accelerate the widespread adoption of...



https://www.cleanfuelsohio.org/newsroom?fb_comment_id=1755674431128294_1763627556999648



Articles of Interest

2019 Subaru Crosstrek Hybrid Review: Subaru's First PHEV Offers its Loyal Customers a Taste of Zero-emission Miles



By John Voelcker

[Ed: In the past decade we have watched some of the Japanese automakers produce a pure battery EV, some hybrids and plug-in hybrids, on and off again. However, where were Subaru (and Mazda)? Here at last, one of this pair shows their offering. Will the other soon emerge too?]

Any new plug-in vehicle from a maker that hasn't previously offered one is cause for excitement, even if volumes are low at first.

So I approached my six-day test of the new plug-in Subaru Crosstrek Hybrid with anticipation. Sure, its rated 17-mile electric range is below the curve, but at least it's a start – and with Toyota plug-in hybrid electrical components borrowed from the Prius Prime, I expect a Subaru PHEV to be a good new addition to the market. I should note up front that I'm on my fourth Subaru, this one an Outback that will celebrate its



20th birthday this fall at the relatively modest mileage of 138,000. Moreover, Subaru's legendarily outdoorsy, nature-focused, active-sports buyers seem a very good fit for a car that can run at least partly with zero emissions from its tailpipe.

My verdict after six days and 360 miles, covering about one-third urban

and suburban errand duty and about two-thirds highway miles, was mixed.

The pros

Reassuringly, the Crosstrek Hybrid remains every bit a Subaru. The hybrid variant shares all the Crosstrek's appeal, as the sole compact hatchback that comes standard with all-wheel

continued on page 40

Subaru

continued from page 39

drive. And it delivered the brand's legendary and reassuring traction on my steep, wet, muddy, uphill drive and a few other locations where traction was crucial.

But as the name signals, if you evaluate the car purely as a hybrid, it does well. It's rated at 35 mpg combined (versus 29 mpg for the standard Crosstrek with continuously variable transmission) and I saw 38.1 mpg on the trip computer over my time with the car. (I didn't have enough time to test fuel economy by measuring the distance on multiple tankfuls, unfortunately.)

Subaru says the hybrid Crosstrek can run solely on electric power at speeds up to 65 mph, and I confirmed that number – on flat or downhill roads under relatively modest power demand. It also quotes a 0-60 acceleration time that's one second faster than the standard Crosstrek, though it doesn't give actual numbers. The electric motors definitely gave the hybrid a bit of extra pep compared to the conventional model, which borders on slow.

Subaru also gets points for smoothness and good blending of regenerative and friction braking. The smoothness is helped by the use of Toyota's two-

It's not hugely fast, but neither is the Prius Prime whose battery and power electronics it shares.

motor system, as opposed to the single-motor systems used in plug-in hybrids from Hyundai, Kia, Volkswagen and others.

Finally, as a strong hybrid, I found it easy to keep the car accelerating on



electric power alone. It's not hugely fast, but neither is the Prius Prime whose battery and power electronics it shares. The Subaru, incidentally, doesn't use the two-motor hybrid system from the Prius Prime, contrary to some reporting. Instead it uses the more powerful system from the Camry Hybrid. That was necessary to move a car that's 500 pounds heavier than

the standard Crosstrek, per Garrick Goh, Subaru's US Car Line Planning Manager for Electrified Vehicles.

The cons

The Crosstrek Hybrid proved frustrating in a few ways, however. Unlike the Prius Prime, it's not programmed to run entirely on battery power until its

continued next page

electric range is exhausted. Accelerate hard onto a highway, and the engine kicks on and stays on for a couple of minutes until the catalytic converter has warmed up.

To be fair, that's not terribly surprising. The Prius Prime was optimized for efficiency, with a much sleeker shape and lighter weight. The hybrid Crosstrek is an adaptation of an existing vehicle, retrofitted to meet California state regulations that require sales of set volumes of vehicles that have some zero-emission capability. It weighs more than 3,700 pounds, compared to the Prime's 3,350 pounds.

The Subaru also suffers from a noisy engine, an area in which the Prius Prime was vastly improved over its predecessor. Partly that's because the flat-four engine note is more distinctive, but it's also due to the fact that the engine has been retuned for maximum efficiency at higher speeds, with the battery providing the low to medium power the conventional car's engine had to offer as well.

When more power was needed, the result was thrashy and loud engine noise from under the hood, along with quite a lot of "motorboating," or the experience of engine noise and road speed being entirely disconnected. Subaru's conventional continuously variable transmissions (CVTs) have been tuned superbly to eliminate that sensation, so it was jarring to feel it return as if the car were an older Prius.

There was also a remarkable amount of whine from the electronics, especially on deceleration, a problem I noticed Toyota has all but eliminated in the Prius Prime. Goh suggested that the majority of this was the car's pedestrian-alert feature, which he likened to the whine of a 1960s flying saucer in a movie.



Finally, the need to retrofit a largish battery pack into the Crosstrek while retaining mechanical all-wheel drive meant it couldn't go under the rear seat as it does in the Prius Prime – which does not offer AWD. Instead, the battery sits under a considerably higher load deck, cutting into cargo volume in the same way it did in the (now

discontinued) Ford C-Max Energi PHEV. A conventional Crosstrek has 55.3 cubic feet of cargo volume with the seat folded, and 20.8 cu ft with the rear seat up, and still has room for a space-saver spare. The hybrid has 22 percent less, at 43.1 cu ft (or 15.9 cu ft with the rear seat up), and no spare tire at all. *continued on page 42*

Subaru

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Did the Subaru live up to its rated 17-mile range? More or less; I got 15 miles each of two times I charged to full and then ran the battery to empty. That's within the 10-to-12-percent margin I give hybrids on ratings. Temperature played a role too: Unlike mostly temperate California, my upstate New York location saw temperatures that likely dipped below 40° F at night, and rose only into the low 50s at the warmest part of the day.

How did we get here?

I suspect Subaru is at best lukewarm about the prospect of building cars powered partly or in full by battery packs. The company had a small program 10 years ago that resulted in sales of about 400 Stella EVs, but that ended in 2011 after the minicar with a 9 kWh battery pack languished in the market.

The powerful California Air Resources Board, however, has extended its ZEV sales mandate from the six largest makers to what it dubs mid-size manufacturers, including Jaguar Land Rover, Mazda, Subaru, Volkswagen, Volvo and others. Of those, Subaru and Mazda are the smallest non-luxury brands.

Globally, Subaru sells only a bit more than one million vehicles a year, a total just one-tenth that of GM, Toyota, Renault-Nissan-Mitsubishi, or the VW Group. So it has to spend its limited capital funds carefully and wisely. Over five years, it has completely redesigned its engine and launched a new vehicle architecture that underpins everything from the Impreza/Crosstrek compacts to the Ascent seven-seat crossover utility.

That means that electric cars have been a distant second priority for the small



As for the company's future all-electric cars, we know considerably less.

company. It turned to Toyota for the electrical components, integrated into a car that kept its flat-four “boxer” engine and all-wheel drive. That's the car I drove.

As for the company's future all-electric cars, we know considerably less. Subaru could turn to Toyota for the platform it will launch, reluctantly, in 2020. That's what Mazda will do, for instance. But Subaru's then-CEO Yasunuki Yoshinaga said in 2017 that the company planned to offer one or more existing models in fully electric versions, contrary to Mazda's likely plans for a new model name affixed to its first all-electric production car.

In the end, if you want a more fuel-efficient Subaru Crosstrek that works

well (if noisily) as a conventional hybrid, this is your only choice – and a good one. If you want a Subaru that plugs in, it's also your only choice. In either case, it's a Subaru first and offers those qualities second, which will reassure loyal owners – of which the brand has a lot.

Those dedicated owners who want the car, however, may have to work hard to get it. The company hasn't commented on projected sales volume, but I strongly expect that it will sell only the number of units required to meet CARB ZEV regulations, and only in those states that follow California's emission rules.

That means California and Oregon
continued next page

SUBARU CROSTREK REVIEW

first, with the rest of the California-ruled states to follow. Subaru says every dealer in those states will have inventory of the hybrid, but like several other electric and plug-in hybrid cars, it will not be made available outside those areas. Dealerships in other states will not be offered the Crosstrek Hybrid.

In those states, repairs to the car's unique electrical and electronic components may take an extra day for the company to bring in a regional Field Service person who's been trained on those components. (Regular servicing, which doesn't include those components, can

be accomplished at any Subaru dealer.)

All things considered, I ended up liking the Crosstrek Hybrid. It's a Subaru first and foremost, it's fuel-efficient, and if you regularly plug it in, you can cover notable amounts of electric miles when your travels include shorter trips and lower speeds. Did I mention I tend to be partial to Subaru?

The company says initial demand has been higher than it expected, but it's still considering what sustained sales might look like. As of now, the plug-in hybrid Crosstrek is sold only in parts

of the US, with plans for Canada now being developed.

The 2019 Subaru Crosstrek Hybrid I tested had a sticker total of \$38,470, composed of the \$34,995 base price; a \$2,500 option package that bundled the power moonroof, heated steering wheel, navigation system, and HD audio; and a mandatory \$975 destination and delivery fee. It is eligible for a \$4,500 federal income tax credit and a \$1,500 California purchase rebate, among other incentives.

This article appeared in Charged Issue 41 – January/February 2019

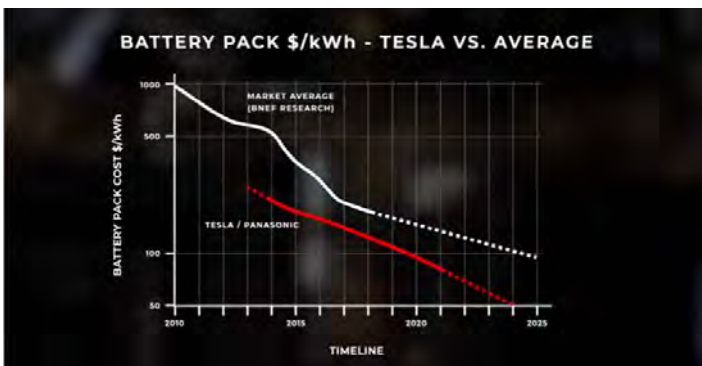


Don't Miss These...

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 of Interest

Tesla's Quest for Batteries



This is an informative summary of today's state of battery technology and how ultracapacitors differ, in part, answering that lingering question: when will those batteries need to be replaced? Where are they heading with their recent acquisition of Maxwell Technologies? Bottom line: for them it'll soon be cheaper to manufacture much better cells which last longer, everyone's goal!
https://youtu.be/DE_PZQ13YTY

HONDA e Prototype | Fully Charged



Dispelling the Myths of Batteries and Supercapacitors



Matt Ferrell helps us understand the benefits of continued research and development in the fields of batteries and ultracapacitors. Massachusetts-based Ionic Materials has a solid state electrolyte for a "next generation" lithium cell which avoids some of the failure modes in today's cells. Also mentioned is the development of a glass-like battery electrolyte that uses no cobalt, (another expensive ingredient manufacturers are looking forward to having no need for), and showing promise of over 20,000 charge-discharge cycles!
<https://youtu.be/XjX3deXDtmQ>

Here we share a secretive press viewing in Stuttgart Germany where Honda has brought their "e-prototype". When announced in late 2017, it was deemed the most popular at the Frankfurt Auto Show, (October CE pg 20) -many were also "oogling" it at the Tokyo Auto Show, which we covered in the November 2017 CE on pg 12-15. Supposedly it will go on sale later this year in Europe as a rear-wheel drive, 4 seats, using Panasonic cells (hmm, we've heard that name elsewhere...). But it is billed strictly as an "urban" car with about 124 mile range! With no side mirrors, we wonder if those cameras will survive the regulators when it arrives in the US maybe next year. Johnny discusses the realization with the lead designer, revealing some interesting features in this 31 minute preview. At 13:45 the interior is shown, with full dash width display screen coverage.

<https://youtu.be/MfD67KCFxqI>

Don't Miss These Videos (cont.)

Polestar 2 Reveal | 100% Electric | Full Presentation 40 min

Polestar jumps on the EV bandwagon! The iconic Swedish automaker produces a hybrid and then front and center – their first EV. Initially, the CEO's assistant give a quick tour of their new Gothenburg Sweden facility, and then the CEO Thomas Ingenlath makes his presentation in this 40 minute video.

Production of this Polestar 2 EV is being readied now in Chengdu, China, in Sichuan province, in the southwestern corner of the country.

By 2020 they will have 60 major world cities covered with retail sales spaces, five in North America, but mostly in Europe and China. (Map at 5:46) The first will open in Oslo, Norway this spring.



Nio – Chinese Auto Manufacturer



Nio is a young Chinese automobile manufacturer headquartered in Shanghai, specializing in designing and developing electric and autonomous vehicles. They were started in 2014 and since August 2018 are publicly traded on the NYSE; they also enjoy government backing for their efforts at home, employing over 4,000 at four locations there. They currently offer a 7-seat SUV which has comparable features and capabilities as Tesla and other high-end manufacturers (e.g., Jaguar, Audi, Mercedes) but significantly less expensive. Having opied Tesla's business model the excitement levels surrounding their marketing efforts are equally impressive. Look closely at the many high resolution images taken inside the Shanghai store which was visited by the author. See [https://en.wikipedia.org/wiki/NIO_\(car_company\)](https://en.wikipedia.org/wiki/NIO_(car_company)) With an on-board “personal assistant” (which, at this time, only speaks Chinese) extensive spoken commands can be used; there are many additional features are beyond what we have ever seen here on US products. Stay tuned to hear more about this quickly moving target!

Here are their abbreviated #Polestar2 specifications:

- All-electric, five-door fastback
- Two electric motors totaling 300 kW (408 HP)/660 Nm (487 lb-ft)
- Electric all-wheel drive
- 78-kWh battery pack using 324 long and narrow “pouch” cells, (bundled as 12 cells per module, with 27 modules) each cooled by bottom-mounted liquid cooling plate
- 500 km (300 mi.) range, per the WLTP
- 0-100 km/h (62 mph) in 5 seconds
- Available in 6 colors, (shown at 34:20)

A complete list of safety features appears at 30:04, which is in keeping with the legacy Volvo automaker reputation.

It's going to Geneva, Switzerland and two other cities in Europe in the next few months. Taking the lead from others, with a large touch display, OTA updates, voice prompting, navigation, a super sound system, etc., they are joining a field that is rapidly evolving.

Priced to start at 39,000 Euro, with their AWD version 59,900 Euro (\$68k USD). The market focus will be China, Canada, California and six European countries, discussed at 41:00.

Their configurator tool is available now at

<https://www.polestar.com/cars>.



The photo and the article appearing here are based on this URL:

<https://www.youtube.com/watch?v=kVg5ycWTAhQ>



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Business Supporter (three issues), "Who Killed the Electric Car"
movie

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Fiat Concept Centoventi Electric Car Opens Mopar Toolbox, Looks Beyond 500E

Fiat is 120 years old, and for the Geneva Motor Show the Italian automaker is presenting an electric concept car that celebrates the brand's "democratic mobility" charge while providing a glimpse of what that idea could mean in the future.

The carmaker started with a boxy-hatchback design that looks like it used the iconic 1980s Fiat Panda as a jumping-off point. The Centoventi blends Italian design with a "less is more" concept and what Fiat terms "rugged, compact, almost monolithic proportions, with dimensions that make the most of every space."

The little hatchback is about 145 inches long, 69 inches wide, and 60 inches high, with a wheelbase of about 96 inches. That yields a cabin good for four—with seats made of 100-percent recycled yarn—and the rear seats have a retractable bench that can add load capacity by turning into another "trunk."

Otherwise, the Centoventi aims for a "blank canvas" approach to the car, with the customer able to choose from four roofs, four bumpers, four types of wheel covers, and four wraps. Interiors can also be configured with accessories.

And oh, there are a lot of accessories—including a total of 114 specially designed by Mopar (yes, this is an odd break from tradition and heritage). The customization possibilities include also include cupholders that can be 3D-printed, and Lego-like holes that can accept additional dashboard components, like a glove compartment or cooler.

One instrument-panel choice makes the smartphone the centerpiece, with a 10-inch gauge cluster. A second choice keeps that gauge cluster but adds a 20-inch display with integrated driver aids (and a smaller screen facing outward for car-sharing messages.)

Fiat offered few details about the powertrain, but it says that a factory-supplied battery allows a 62-mile (100-km) range, while the car can hold up to 3 additional batteries in a sliding rail, plus another under the seat, for a total of 311 miles (500 km).



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Fiat Concept

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The charge port is at the base of the windshield, equidistant from either side, and an available solar panel can generate up to 50 watts.

With the Fiat 500e near the end of its life cycle, we asked Fiat Chrysler about the chances of such a vehicle being offered in the U.S. Company spokesman Bryan Zvibleman told *Green Car Reports* that “at this stage it is too early to discuss as it is a concept.”

FCA plans four new fully electric Jeep variants by 2022. Meanwhile there haven’t been a lot of details on how Fiat is going to electrify its lineup. Former CEO Sergio Marchionne, who had bluntly pointed out that the company was losing in the range of \$10,000 per 500e electric hatchback, noted last year that its plan was “to focus the Fiat brand on products that are able to cover the cost of the new electrified technologies.” It would seem that philosophy applies here—where, as with Mini and formerly Scion, brands are able to recoup the costs of more technology by getting people excited about customization and individuality.

In a further statement from Zvibleman, FCA details: “We continue to offer four models in North America: the 500, 500X, 500L and the 124 Spider. As outlined in the five-year-plan on June 1, 2018, Fiat (together with Chrysler and Dodge) will get 25 percent of investment spend and will represent 20 percent of net revenues.”

The Panda never sold in the U.S., but given FCA’s apparent desire to move on from the grist of the 500e, the Centoventi could be the way to create a stylish small car that’s simple but eye-catching—one that might actually make money.



https://www.greencarreports.com/news/1121930_fiat-concept-centoventi-electric-car-opens-mopar-toolbox-looks-beyond-500e



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