Electric Auto Association

CURRENTEVENTS

October 2017 Promoting the use of electric vehicles since 1967 Vol. 49 No. 10

National Drive Electric Week
Reaches All 50 States with 276 Events

7th Annual Event Achieves Biggest, Widest Reach in History

Amherst, Massachussets.
Photo Credit: Andrew Breiter-Wu

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A custom Corbin Sparrow is displayed for the EV Showcase at the 2017 Ohio Pawpaw Festival (Lake Snowden, Albany, Ohio) Photo: UpGrade Ohio.

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Current EVents Back Issues on the Web

The EAA has put most of its -issues from 2001 to 2017 on its website.

Please visit
http://electricauto.org/ and from the home page, click on "*Documents*" in the top navi-gation bar.

The resulting page has a listing of years (in a folder), which when selected will list the issues for each month. There is a downloadable pdf file which averages five MB.

SLIMMING OF THE DUCK

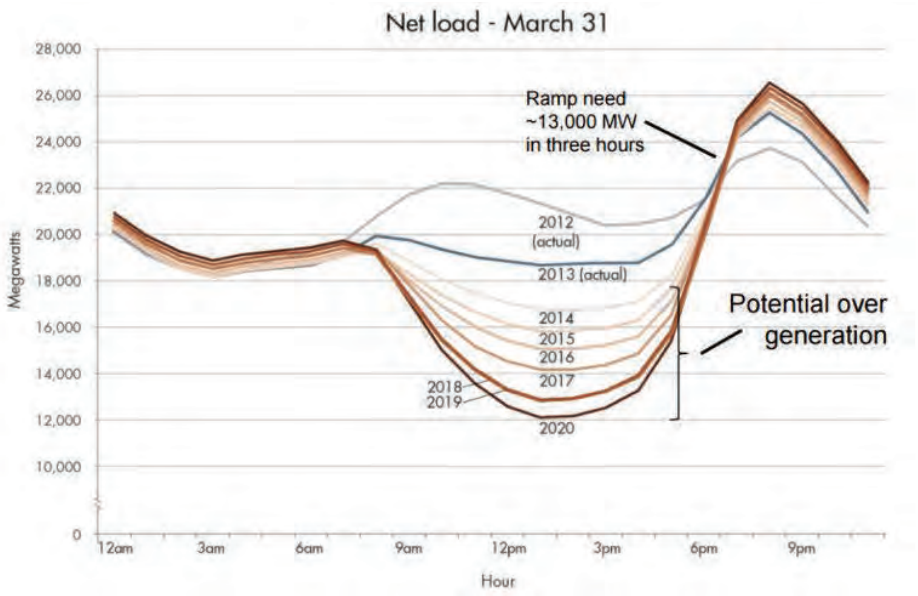
California to plan storage and use DERs for peak demand

EV drivers have long understood that an EV plus PV will help them become more self-sufficient in their energy use. At a higher level, the state is moving in a similar direction too. California Gov. Jerry Brown has signed a bill directing utilities to plan carbon-free alternatives to natural gas generation for meeting peak electric demand.

The bill SB 338 <*http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB338*> would compel utilities to evaluate how storage and distributed energy resources (wind and solar) can meet peak power needs, while reducing the need for new electricity generation and new transmission in achieving the state's energy goals.

Could EVs play a role in an aggregated scheme of storage and as a widely distributed mobile resource in the distant future? This new law is a step in that direction.

California utilities will now be legally obligated to plan for how carbon-free resources can help combat the solar "duck curve[1]." The state regularly receives hours of plentiful (renewable) solar generation at midday, followed by a steep increase in evening power demand, nicknamed the "duck curve" for the shape of its load chart.



[1] For more information on "The Duck Curve" *https://www.caiso.com/Documents/FlexibleResourcesHelpRenewables_FastFacts.pdf*

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Energy Plan

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The 'rate of change' during that increase and mitigating the ramping and over generation is their crux of the problem. High variability in net load seen is a problem because conventional generators require long periods of time to start or stop producing power.

Because of this, power generation cannot easily be scaled down during the midday and reinstated in time for the post-sunset bump. To further complicate matters, non-dispatchable generators (like nukes, geothermal, or hydropower) at minimum production levels cannot be set to produce less than a certain power level.

Today, the evening demand ramp is handled by natural gas generators. However, California utilities have a mandate to cut carbon emissions (40% below 1990 levels) by 2030, so they have limits. Clean energy advocates say solar and storage can meet local power needs cheaper than outdated capacity analyses, as they tell regulators.

With this new law, grid level storage will now get a large boost. By installing batteries such as now seen on the island of Kauai, daytime energy collected can be stretched by releasing it for use during the critically needed evening hours. Installing battery-based peaker plants in carefully watched locations determined thru analysis by grid operators will bring immediate relief without building new or enlarging a fossil fuel fired peaker. Still, the state regulations are in flux, as the state and world adds more EV drivers and some of them add solar to their homes, to offset changes seen in household expenses as a result of going to electric mobility.

This bill is one of two proposed earlier this year pushing utilities to use more of that renewable energy during peak demand hours. Now that it is law, utilities will have to alter their IRP processes to evaluate "the role of existing renewable generation, grid operational efficiencies, energy storage, and distributed energy resources, including energy efficiency" to meet the hours of peak demand.

Tesla launched its Powerpack 2 project on the Island of Kauai to help get more out of its solar power. (Photo from Electrek)

These bills build upon a proposal in Arizona called the "Clean Peak Standard" which recommends altering the state's renewable energy mandate to require a certain percentage of carbon-free power be delivered during peak hours. That proposal is currently on hold as Arizona considers other changes to renewable energy policy. Earlier this year, Elon Musk said his Tesla Energy products could solve Southern Australia's rolling blackouts within 100 days of contract signing using his battery packs. The Australian government accepted his challenge. With their deadline looming on December 1st, now Tesla is similarly discussing assisting Puerto Rico in rebuilding their devastated infrastructure. Musk seems bent on showing off the prowess of Tesla's battery storage packs to solve hefty grid challenges.

We are in the center of an energy market change. Storage plus renewables will soon replace baseload power, which historically has been comprised of coal and nuclear plants. EVs continue to make inroads where for decades petroleum-based propulsion was the only reasonable alternative. Batteries have improved because of demands for portable power (starting with the portable music players, handheld games, then early cell phones, and laptops users all demanding more play/talk/compute time). Improvements have rapidly spilled over into other areas, and now can be scaled to the local power grid level.

It is clear that siting of an energy storage facility is much less difficult and can be done more quickly than planning a new power plant construction project. What could become more difficult could be managing a collection of storage facilities with four wheels and constantly changing connection locations. But that problem can surely be addressed with technology. Progress is being made on many fronts every day. We can look forward to connecting to a renewable largely battery-based distributed electric grid!

FIRST 10 DEPOSITS RECEIVED FOR "SUN FLYER 4"

New Electric Aircraft Promises "Disruptive Affordability"

From Aero Electric Aircraft Corporation, www.SunFlyer.com

The developer of the 4-seat "Sun Flyer" aircraft, called "Sun Flyer 4," announced that 10 deposits have been received for the airplane that was unveiled at EAA AirVenture Oshkosh 2017.

"Academy of Aviation," with training operations in Farmingdale, Long Island and White Plains, Westchester County Airport, New York, took the final delivery position for the Sun Flyer 4 in the "Oshkosh special" announcement. Chris Richards, President/Director said, "Academy of Aviation believes in innovation and embraces change to provide a superior product and experience. The Sun Flyer will advance this next-gen cost-effective capability to a whole new level — this changes everything."

The 2-seat Sun Flyer, "Sun Flyer 2," will be the first FAA-certified all-electric trainer aircraft under FAR Part-23. The new 4-seat IFR-capable aircraft will closely follow the certification of the 2-seat version. Features of the Sun Flyer 4 include a 46-inch cabin width, 38-foot wing span, ballistic parachute recovery system and a gross weight of 2,700 lbs., with a full 800 lbs. of payload for pilot and passengers. The projected flight endurance is 4 hours.

Sun Flyer will be the first FAA-certified, U.S.-sponsored, practical, all-electric airplane to serve the flight training and general aviation markets. It features a low operating cost, low aircraft unit cost, low noise and the elimination of

Inflight-front Sun Flyer 4

exhaust pollutants. Electric energy, or "fuel," cost for Sun Flyer is multiples lower compared to the per-hour cost for piston-engine leaded avgas.

Watch video at:
https://www.youtube.com/watch?v=UkKALH9Av6c&feature=youtu.be

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- 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

NDEW Recap

continued from page 1

ACM JORDAN ISWSA
Attendees at Jordan's first-ever Drive Electric Week event learned that the faux trunk (frunk) of a Tesla Model S is roomy enough to hold a person!
Photo Credit: Amjad Daoud

A vintage automobile from the early 1900s happened to pass by our EV Showcase in this photo taken from the State House, emphasizing our theme of the Future Meets History in Annapolis.
Photo Credit: Scott Wilson, EVADC

For the first time, National Drive Electric Week has reached all 50 states. This year's coordinated network of 276 community events ranged from massive displays of electric vehicles in cities like San Diego, CA, Cambridge, MA, and Grapevine, TX, to ride and drive and electric vehicle financing education in Los Angeles' Watts neighborhood, an electric vehicle parade in Honolulu, and the opening of the newest of six fast EV chargers along the Massachusetts turnpike. These ride & drives, driveway chats and family-friendly festivals give electric vehicle drivers the chance to showcase the value and benefits of electric vehicles as not just clean, green technology, but fun to drive and increasingly popular.

"At first, consumers may have been motivated by the fact that these cars are zero emissions. Now, we're getting consumers who just know these are better cars—more fun to drive, lower maintenance and more responsive," said Joel Levin, executive director of Plug In America. "It's an extremely exciting time to see the electric vehicle movement evolve, and see the hundreds of thousands of people who are not just fans of these cars, but dedicated to a better world."

National Drive Electric Week is based on the belief that today's potential electric vehicle (EV) consumers need to hear straight from experienced drivers, and see the benefits up close of quiet, clean, zero emission vehicles. Event participants ask and answer questions, connect with other EV owners and hear from event sponsors—ranging from auto manufacturers to environmental organizations.

"Transportation is currently the single largest source of U.S. greenhouse gas emissions, but with electric vehicle sales rising 37% this past year, and more chargers in the ground and EVs on the road than ever before, it's clear there are no detours on the road to clean energy," said Gina Coplon-Newfield, Sierra Club Clean Transportation for All program director. "National Drive Electric Week events help drive away the dirty smog and soot that comes out of our vehicles' tailpipes by helping people make the switch to cleaner cars."

Highlights from this year's event included:

- A record number of events: 276 events, 262 cities, 6 countries and all 50 U.S. states and Washington, DC (a first!)
- More than 8,000 ride and drives.
- Governors Inslee of Washington, Sununu of New Hampshire, and Ige of Hawaii issued National Drive Electric Week proclamations for their states, and many mayors from North Dakota, Maryland, Kansas, Illinois, Iowa, California, and elsewhere issued EV proclamations for their cities as well. Dozens of mayors, state legislators, and other public officials who spoke at the events, including Congressman Paul Tonko of New York and Los Angeles' Board of Supervisors member, Sheila Kuehl.
- First-ever events in Mississippi, Nebraska, West Virginia, and the nation of Jordan.
- The San Diego event had the largest number of EVs registered at 243.
- The Grapevine, TX event had 183 EVs registered with a collective 4.9 million electric miles driven.
- In Natick, MA, the Department Secretaries of Transportation and Energy and Environmental Affairs opened the newest of six fast EV chargers along the Massachusetts turnpike.

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- The Dupont Circle Advisory Neighborhood Commission in D.C. introduced a resolution in support of the electrification of DC Circulator Buses on Wednesday, September 3, right before the NDEW kick-off.
- 19 Massachusetts mayors sent a letter to the state Department of Transportation calling for a swift shift to zero emission transit buses.
- Several events featured zero emission transit buses, including in Los Angeles, CA; San Diego, CA; Schenectady, NY; Worcester, MA; and Steilacoom, WA.
- 688 media hits and over 4.2 million impressions on social media.

This year's National Drive Electric Week is timed with a number of industry-changing recent announcements:

- The highly-anticipated next-generation 2018 Nissan LEAF debuted at eight National Drive Electric Week events.
- The nation's second largest public transit agency – the Los Angeles County Metropolitan Transportation Authority – is set to switch to all zero emission electric buses by 2030.
- The Federal Transportation Administration announced $54.9 million in new grant funding for zero emission transit bus investments at 51 U.S. transit agencies.
- Volvo announced that starting in 2019, all of its new models will be electrified.
- More than 400,000 registered customers are eagerly awaiting the widespread commercial release of the Tesla Model 3.
- France announced it plans to end sales of new gasoline- and diesel-powered vehicles by 2040 and the UK by 2050. They join Germany, India, Netherlands and Norway, which have already made similar commitments.

U.S. consumers have been asking for, and deserve progress toward sustainable policies that are good for business, consumers and our communities," said Ron Freund, chair of the Electric Auto Association. "National Drive Electric Week is more than a week full of fun events–it's a rallying cry for our leaders and corporations to do more to take advantage of readily available technology that makes our auto and energy systems more sustainable, and our communities more resilient."

Manufacturers have announced plans for more than 120 EV models, from economy to luxury class, available for purchase by 2020. Bloomberg New Energy Finance recently projected that by 2040, 54 percent of new car sales and 33 percent of the global car fleet could be electric. Sierra Club, Plug In America, and many other groups are working to advocate for smarter EV infrastructure and incentives policies, as well as continuing innovations in fuel efficiency standards.

Nissan's all-electric LEAF® has served as National Drive Electric Week's exclusive automotive sponsor since 2013. Lyft, ClipperCreek, Inc. and California Air Resources Board are also national sponsors.

Next year, National Drive Electric Week will take place September 8-16, 2018.

Members and supporters of Village Bakery's (Athens, OH) new EV charger installation and the local EV Cruisers electric car club. Photo Credit: UpGrade Ohio

EVs at Arlington's NDEW
Photo Credit: Kelsey Crane, Sierra Club

Sydney Maddox, Jacob Early, Alex Ledbetter, and Evan Early exploring a Tesla Model X
Photo Credit: Todd Lista Aiken, SC

Ann Arbor Michigan Drive Electric Event 2017 Photo Credit: Paul Pancella, Michigan Electric Auto Association.

NDEW – Nearly 500 unique media hits in one week!

The 2017 National Drive Electric Week numbers from earlier this month are in, and they are exciting for our efforts to engage the masses about EVs:

- Nearly 500 unique media hits about National Drive Electric Week 2017 on TV, radio, print, etc, and nearly 1,000 media hits if you count duplicates. That's millions of people reached!
- 276 EV promotion events in 262 cities, all 50 U.S. states, and six countries.
- More than 113,000 people in reported attendance.
- More than 8,000 test drives/rides.
- More than 145 elected officials in reported attendance.
- More than 4.2 million impressions about #NDEW2017 on social media.

Above: The Schenectady, New York National Drive Electric Week event. | Photo by Glenn Marcucio

Sierra Club, Plug In America, and the Electric Auto Association (the national organizers of National Drive Electric Week) couldn't have pulled this off if it weren't for the hard work of our "city captains" who organized all the local events. Thank you! Thanks also to the event sponsors as well as all the companies and organizations that promoted the events.

There were upward of 1,000 media hits about the events, mostly in local publications. What a terrific way to expose the masses to EVs. "Timing is perfect," said Antinette R. at the Los Angeles event. "We were watching KTLA Morning News, and there was Gayle [the reporter] talking about this event. My husband and I know we want to buy a car, and decided we were going test driving this weekend."

Drive Electric Week Events Kick Gas in All 50 States

In its seventh year, National Drive Electric Week (NDEW) demonstrated once again that not only are plug-in electric vehicles (EVs) just incredibly fun to drive but also that the public is starting to catch on. This year, all last week, more than 100,000 people attended 279 EV promotion events in all 50 states — a first! — with international events also taking place in Argentina, Australia, Canada, Croatia, Denmark, England, Jordan, and New Zealand.

From tailgate parties and electric bus rides to carpool karaoke — every event was unique, but most centered on giving the public a chance to kick the tires and see for themselves what it's like to sit in the driver's seat and experience instant torque first hand. At least 8,000 people took test drives at the events in all 30 fully electric and plug-in hybrids on the market today, and next month we're betting we'll see an uptick in their sales as a result.

Above: Ann Vail, Executive Director of Louisiana Clean Fuels and Mayor Broome speak for an EV owner at an electric vehicle at the Baton Rouge EV Day for #NDEW2017. Photo: East Baton Rouge Mayor's staff / Mayor Broome

http://www.sierraclub.org/compass/2017/09/drive-electric-week-events-kick-gas-all-50-states

NDEW in Morristown
Detroit Electric Celebrates 100 Years

The photo at the left is of Chris Neff holding a cake, as he and other owners are prepared to celebrate the 100th birthday of the Detroit Electric car behind him. The owners of the 1917 Model 68 (above right), were the recipients of the cake. The celebration took place at the National Drive Electric Week celebration in Morristown, NJ. The photo on the left was taken by Lauren Cranmer. What a difference a century worth of automotive (and materials) progress makes!

https://driveelectricweek.org/event.php?eventid=525

Palo Alto Ranks Top in Nation with Electric Vehicles

The city of Palo Alto, CA ranks as one of the top in the nation to embrace this clean technology. In 2016, more than 22% of all new vehicles purchased in Palo Alto were electric – the highest percentage of any California community.

Driving and charging an EV in Palo Alto especially makes sense due to the City's carbon neutral electric and gas utilities and low electric retail rates. To learn more about financial incentives for EVs, charging equipment and locations for charging stations in Palo Alto, visit:

http://www.cityofpaloalto.org/electricvehicle

http://www.cityofpaloalto.org/gov/depts/utl/business/sustainability/electric_vehicles/default.asp

Progress on the JuiceBox offering at eMotorWerks

eMotorWerks
Tesla Model 3 charging at eMotorWerks headquarters on JuiceBox. Great big trunk, sexy look.
http://bit.ly/2x2N8Cx

Get a FREE smart charger for your EV from @Sonoma Clean Power! SCP is offering their customers incentives for a limited time. eMotorWerks is proud to be a provider JuiceNet-enabled charging solutions as a part of SCP's program. A number of JuiceNet-enabled devices such as ClipperCreek JuiceNet edition, AV JuiceNet Edition, and JuiceBox Pro. Go to DriveEV.org for details! Northern Sonoma County customers may also qualify for a $1000 rebate on charger installation--see if you live in the qualifying area at:
http://sonomacounty.ca.gov/Air-Quality/Electric-Vehicle-Rebates/

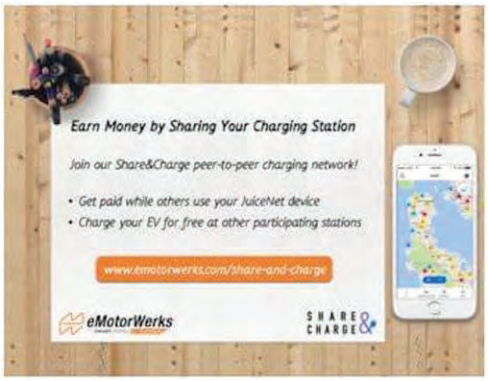
@Sonoma Clean Power customers: SAVE THOUSANDS with purchase credits & incentives on EVs at local dealers and get a FREE home charger. Why? SCP fuels the cars with clean, renewable electricity. Learn more at DriveEV.org eMotorWerks is proud to be a provider JuiceNet-enabled charging solutions as a part of SCP's program. A number of JuiceNet-enabled devices such as ClipperCreek JuiceNet edition, AV JuiceNet Edition, and JuiceBox Pro are available through our custom SCP webstore that can be accessed through DriveEV.org.

We're excited to announce the new UL Listed JuiceBox Pro 40. While we knew our products were always safe, this stamp of approval opens new eligibilty for incentives such as Charge Up LA, and Glendale Water and Power!

continued next page

"Charging station owners gain the opportunity to have their station pay for itself over time, while drivers can feel confident in knowing they'll always have enough charge to get where they are going" says Val Miftakhov, CEO of eMotorWerks. eMotorWerks has partnered with MotionWerk, an Innogy Innovation Hub company, to launch the early access program of Share&Charge's peer-to-peer charging app. Sign up for the limited enrollment program today, and start making money with your JuiceNet smart-grid charging station.

If you drive an electric vehicle and live in California, you can charge for free in our early access program with Share&Charge's peer-to-peer charging app! The program aims to increase the availability of public charging stations and decrease range anxiety for EV drivers. This opportunity is limited and first-come, first-served, so sign up today! *https://emotorwerks.com/share-and-charge*



Make money with your JuiceNet Device by renting it out via @ Share&Charge. California owners of our EV charging stations are invited to join MotionWerk's Share&Charge peer-to-peer charging app. This limited-release, first-come, first-served program aims to increase the availability of public charging stations and decrease range anxiety, revolutionizing e-mobility for current and prospective EV drivers.

Introducing our new, UL Listed JuiceBox Pro 40. It's got some great new features, including: front LED status display, low-profile high-gain antenna, and upgraded internals for improved reliability and performance. Better-than-ever hardware now complements our #1 #JuiceNetsmartphone app.

We always knew our products were safe, now we have the certification to prove it! Check out the new UL Listed JuiceBox Pro 40. New features include front LED status display, low-profile high-gain antenna, and upgraded internals for improved reliability and performance.

Even having shipped over 20,000 smart-grid EV charging stations, we've not yet encountered #JuiceBox safety issues; yet nonetheless, it's great to announce UL certification of our JuiceBox Pro 40. As I'm sure many of you know, receiving the official "UL Listed" sign of approval is a big task, representing yet another milestone for the company. UL certification opens up JuiceBox for additional city and state incentives for residential, commercial and utility usage... so, purchase a new, UL-listed JuiceBox and recommend one to your friends going electric!
http://ow.ly/cgDR30dTTHG

Tesla Model 3 owners are sharing more info on model as deliveries increase

Early adoption means many features are still a work-in-progress.

By Jonathan M. Gitlin

If the past is anything to go by, we expect it might be some time before Tesla has any Model 3 electric cars for us to review. The company's order books are overflowing, and in the past we've seen that any production capacity is prioritized for paying customers rather than the press. But as Model 3s start finding their way into the hands of customers who aren't Tesla employees, plenty more details about the hotly anticipated car are becoming public, thanks to owners at the Model 3 Owners Club.

Members of the club complied a list of over 80 different features of the car they're curious about, including questions about how the car operates (does the card unlock all the doors, where does the UI show you that your turn signals are active), physical aspects of the car (what does the tow hitch attachment look like, how much stuff can you fit in the front and rear cargo areas), and subjective details (how aggressive is the energy regeneration, does that wood trim cause glare).

At least two members of the club have received delivery of their cars, and unlike Tesla employees and special friends of the company who have cars, they appear to be under no requirement to keep this info quiet. So far, we've learned a few interesting facts. For instance, the windshield wipers are turned on and off by a stalk like just about every other car on the market, but changing the speed (slow/fast/intermittent) is handled by a menu on the touchscreen. The stalk also does double duty turning on the headlights, and there are no rain sensors for the wipers.

Still under development

The touchscreen UI really is the only way to interact with every other function, according to owners, even the rear air vents are controlled from up front (although there are USB ports in the back). Rear seat passengers also won't get seat heaters from what we gather—unless Tesla plans to activate them in a later software update—and the steering wheel is not heated either.

The two buttons on the steering wheel do not appear to be user-configurable. Instead, the left button primarily deals with audio functions (scroll up and down for volume, left and right to change track) while the other one is for adjusting the mirrors and steering wheel position while in those menus in the UI. Additionally it appears that as of now, there's no way to tab through a different part of the UI without taking your hands off the steering wheel.

Many of us had assumed that the controls on the wheel would allow the driver to interact with the car's different menus without taking a hand off the wheel, and it's disappointing to hear that this isn't the case. The problem is compounded in this case due to the fact that one needs to interact with a touchscreen that may preclude building up muscle memory, and as of now even changing cruise control speed requires the touchscreen. Human factors are definitely Tesla's weak point compared to the clever engineering that goes into the powertrain, and we hope that some attention is paid to this in a future software update.

Future software updates will also be necessary to add features to the infotainment system, which currently doesn't have the ability to stream FM radio or browse the internet yet. And at least one person is a little sad that there's no physical AM radio, although we can't say we're terribly surprised given that it's 2017 and not 1957.

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https://arstechnica.com/cars/2017/09/tesla-model-3-owners-are-sharing-more-info-on-model-as-deliveries-increase/

Analysis: EVs dominate efficiency vs hydrogen, gas and diesel


2018 Nissan Leaf

By Sebastian Blanco

If you want to drive the absolute cleanest car possible – and if you're reading this site, we're willing to wager that you do – then you need to calculate the total well-to-wheels energy use of the car and everything you put into its tank or battery.

When it comes to comparing types of vehicles – hydrogen, standard gasoline and diesel, or battery electric – then a full accounting of the averages reveals that EVs are the total efficiency winners.

At least, they are in a new study from the UK-based Transport & Environment.

The results are not even close.

Starting with all renewable energy for either charging or to process the gasoline or hydrogen, all-electric vehicles managing an overall efficiency rating of 73 percent, compared to 22 percent for hydrogen fuel cell vehicles, and just 13 percent for standard fossil fuel vehicles using gasoline made with the Fischer Tropsch process. Of course, there are details that need to be picked apart here.

For example, T&E says that fossil fuel vehicles lose 70 percent of the energy in their sloshing tanks because of inefficient engines.

That may be a good average, but Toyota made a big point of saying that its latest Prius has a 40 percent thermal efficiency, which means 60 percent energy loss, not 70 percent.

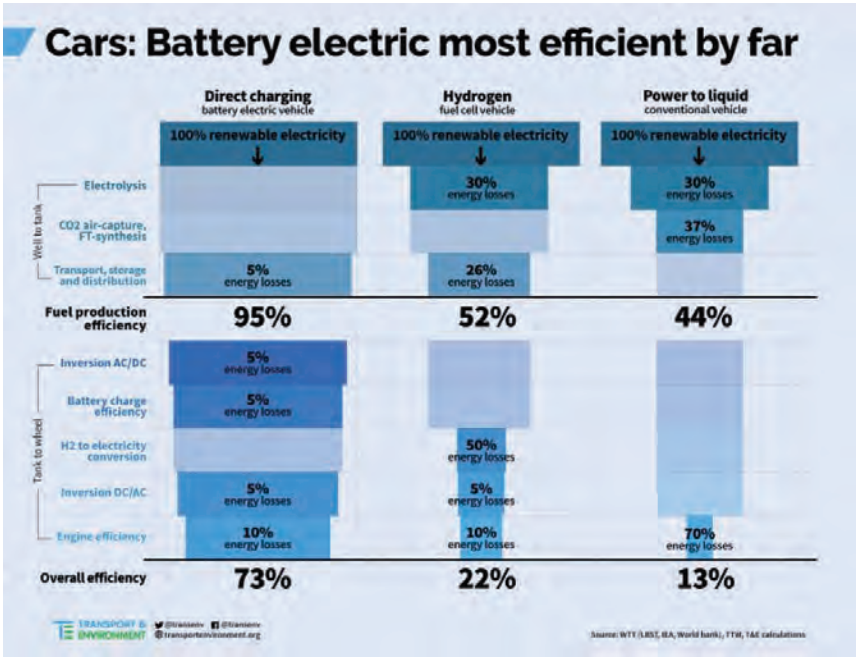
Also, the efficiency rate at which an EV charges also plays a big role in the well-to-wheels efficiency.

Lastly, given T&E's location, we assume it is basing the numbers in the study on the European electric grid and European MPG figures. Oddly, we can't find the original T&E report to confirm this guess, but if you do, please let is know in the comments. Of course, any study like this is not necessarily applicable to your personal situation.

As we discussed when we looked at similar comparisons of EVs and hybrids in the U.S., there are a lot of regional differences – to say nothing of the variations in your specific vehicle.

Given all those minor and major variables, in some rare cases (i.e., for three percent of U.S. drivers), driving an electric vehicle is not the most efficient option.

Even so, when you look at the averages, you're most likely going to be better off plugging in than gassing up. If anyone says otherwise, ask them to show you the math.



UK's Transport & Environment says that electric cars are the most efficient

http://www.greencarreports.com/news/1113175_electric-cars-win-on-energy-efficiency-vs-hydrogen-gasoline-diesel-analysis

Why utilities need to respond now to the EV boom

Utilities can either embrace electric vehicle growth or be caught "flat footed" when new power demand materializes, an RMI report warns.

By Herman K. Trabish

Accelerating growth forecasts for electric vehicles have energy analysts urging utilities to start planning for their impacts on the grid today.

By 2021, Bloomberg New Energy Finance (BNEF) forecasts U.S. electric vehicle (EV) sales could reach 800,000 annually. By 2025, the Edison Electric Institute, a utility trade group, estimates there could be 7 million zero-emission vehicles on U.S. roads.

"EV sales in the U.S. have been growing at a compound annual growth rate of 32% for the past four years," said Chris Nelder, electricity practice manager at the Rocky Mountain Institute (RMI). "2017 monthly sales data suggest that rate is accelerating. Under some reasonable assumptions, there could be 2.9 million EVs on the road in the U.S. within five years."

That many EVs could add "over 11,000 GWh of new load to the U.S. power grid," said Nelder, co-author of RMI's new report, "From Gas To Grid: Building Charging Infrastructure To Power Electric Vehicle Demand." *https://www.rmi.org/wp-content/uploads/2017/10/RMI-From-Gas-To-Grid.pdf*

EVs are only 1% of total vehicles sales today, "but 11,000 GWh of load is about $1.5 billion in annual electricity sales that utilities may need to accommodate within their current planning horizons," Nelder said. "Are utilities and system operators ready for that?"

Failing to prepare for EV growth with grid upgrades and rate design reforms could leave utilities "flat footed" when this new load materializes, Nelder said. But if utilities reform their rate designs and infrastructure planning to account for EV growth, they could spur more deployment than than the most optimistic of forecasts and deliver savings even to customers who don't own the cars themselves.

Ratepayer benefits of EVs

The pressure to prepare for EV growth is felt by many in the power sector, said Bill Boyce, electric transformation supervisor for the Sacramento Municipal Utility District (SMUD).

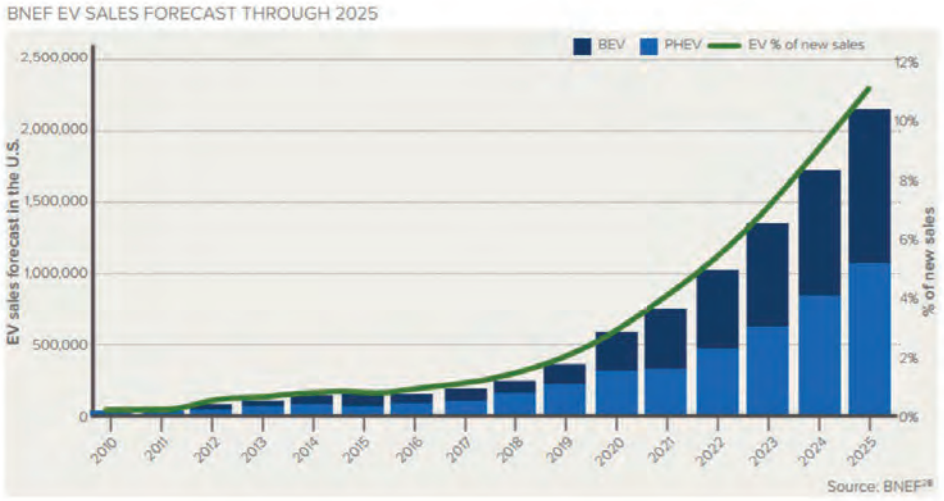
The BNEF forecast shifted the attitude of the utility industry and marketplace

continued next page

"from 'if' to 'how soon'" EVs would come to dominate, he said.

Using the BNEF numbers, the RMI paper reports U.S. EV sales will be 500,000 in 2020, just over 1,000,000 in 2022, and 2,000,000 in 2025. Growth will accelerate because "an EV is a good investment," Nelder said

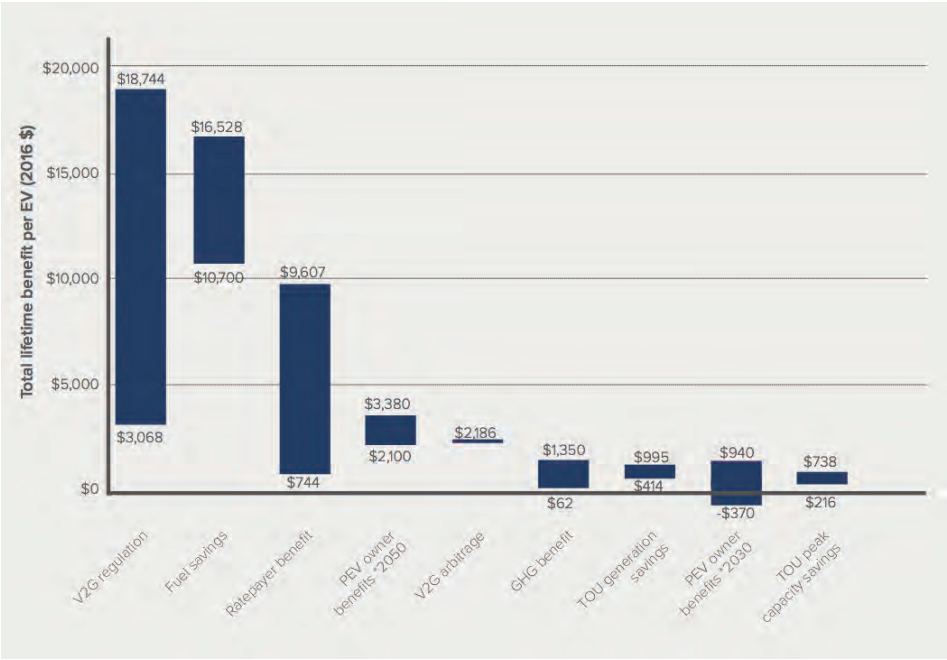
Utility rate design will be crucial to that investment decision, said Jim Lazar, senior advisor at the Regulatory Assistance Project. Once vehicle-to-grid charging technology becomes widespread, the opportunity for EV rate arbitrage will be "virtually unlimited," he said.



Credit: RMI transportation electrification report

With the proper time-varying rates, an "essentially unlimited" number of EVs could be charged with low-priced power from midday solar generation or nighttime wind and discharge at a profit to EV owners during peak demand periods, he said. "And a lot of utilities are moving toward that."

But having more EVs on the system could have benefits even for utility customers who do not own them, Lazar said. Higher utility payments from EV owners could help cover a greater proportion of grid costs, lowering bills for everyone else.



Range of stakeholder benefits for EVs from the literature Credit: Rocky Mountain Institute

That "ratepayer benefit," Lazar said "depends on getting people to charge when demand on the grid is low." That, in turn, depends on time-varying rates, or TVR.

"Without TVR, much of the benefit is limited to EV drivers," Lazar said. "With TVR, non-EV-driving ratepayers also benefit."

If utilities continue to move toward TVR, assumptions about EV growth are likely to be correct, Lazar said, "and we will need charging infrastructure."

"That leads to a discussion about rates and infrastructure ownership," he said.

Barriers to deployment

The single biggest threat to realizing the benefits of the forecasted EV adoption is inadequate charging infrastructure, Nelder said.

The vast majority of EV charging — up to 85% — is now done at home with level one (L1) 120-volt outlets.

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EV Boom

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That takes 10 hours or more. The bulk of the charging will likely evenutally be done at homes, workplaces, and commercial and public venues through level 2 (L2) 240-volt chargers that can provide 80 miles of range in 2 hours to 5 hours.

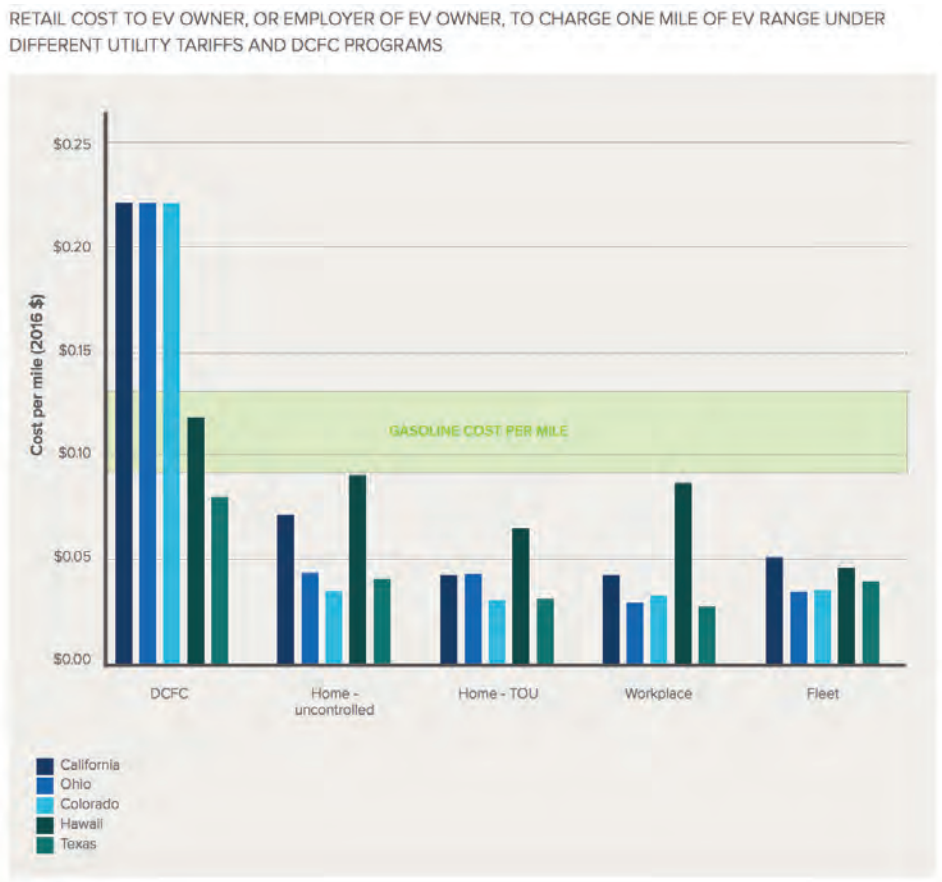
A small proportion of EV charging will be done through DC fast chargers (DCFC), which draw 240 volts and can provide 80 miles of range in 3 minutes to 24 minutes.

DCFCs are expensive and costs will likely keep them from wide deployment, Lazar said, but "a limited number is necessary for long distance drives."

Getting those chargers deployed is likely to be a challenge. Because DCFCs can use 50 kW to 400 kW, they can cause a sharp spike in an otherwise low utilization profile. That drives up the demand charge for DCFC owners, so much that the use of DCFCs is typically uneconomic today.

To get around that, RMI proposes de facto subsidies in utility rate design to spur DCFC deployment, "such as scaling up demand charges over time, shifting some cost recovery to volumetric charges initially, and using dynamic adders to recover the cost of providing service during system peaks." Such techniques can "accommodate the novel loads of public DCFC" until the EV market matures. Performance-based incentives for utilities and/or tax credits to the private sector might "improve the business case for owning and operating charging stations," RMI adds.

Lazar agreed that some form of support for DCFCs will be needed. But L2 chargers, which will not require subsidies, will be "the backbone of the charging system," he said. That will allow utilities to use TVR and currently available communications technology to control charging to obtain system and ratepayer benefits.



DCFCs are critical to allow long-haul EV driving, but charging is currently more expensive than gasoline across multiple jurisdictions. Credit: RMI transportation electrification report

Utilities and their regulators would do well to act quickly on charging infrastructure, RMI argues Recent sales projections from BNEF and Union Bank of Switzerland should make it difficult "to argue for further delay in making infrastructure investments."

States that don't begin building charger infrastructure now may face what happened to those that didn't prepare for air conditioning, Nelder said. The resulting high unplanned infrastructure and peak generation costs and higher electricity prices "could happen again now, only at a much larger scale and a much higher cost," RMI argues. "It is absolutely critical to get the programs and infrastructure for vehicle electrification right from the start, with appropriate tariffs, well-planned charging infrastructure, and the ability to manage chargers."

Should utilities lead?

The single most prominent debate about charging infrastructure deployment is whether utilities should own and operate it or whether it should be left to private sector providers, Nelder said.

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"It is a fraught and complicated debate," he said. Each state's regulators and stakeholders should consider the different ownership models and whether their policies will produce the outcomes they want."

The paper reports that data is inadequate "to unequivocally say one ownership model is better than another." Jurisdictions may need to use pilots and demonstrations to test multiple ownership options," RMI adds. Policymakers and regulators can collaborate with stakeholders, including utilities and charger providers, before making final decisions "but they should not delay," it insists.

Most jurisdictions have agreed utilities should be permitted to build and own the make-ready, which is the infrastructure that delivers electricity to where a charging station can be installed. Regulators in a number of states have allowed cost recovery for make-ready expenditures and expenditures to interconnect the make-readies.

Allowing utilities to use their access to low-cost capital to install, own, and recover costs for charging stations could be the fastest way to build the network and drive the market, RMI reports. But regulators are charged with protecting the private sector from monopoly utilities' undue leverage.

"Regulators who do allow utility ownership of charging stations should take care to preserve some opportunity for private sector companies," RMI argues.

The paper examines in detail the way California, Colorado, Hawaii, Ohio, and Texas are managing their charger deployment, but comes to no conclusions on the superiority of any state's approach.

The vast majority of EV charging — up to 85% — is now done at home with level one (L1) 120-volt outlets.

Karl Popham, electric vehicles and emerging technologies manager at Austin Energy, said his utility has tried both utility-controlled and rate-driven, market-based programs.

"It is less complicated to operate the rate design-based program, though more complicated to design and implement it," he said. "Managed charging through direct utility control is feasible but we want to at least have the framework for a new rate design set up for when EV adoption becomes more significant."

SMUD's Boyce is working with private sector providers on identifying system locations where deployment will serve both the utility and EV drivers. SMUD is especially focused on strategically locating "charging plazas" where grouped L2 chargers may impose 2.5 MW to 3 MW loads.

The utility also has an innovative approach to demand charges. In addition to a special DCFC rate for stations with below 15% utilization, SMUD offers an incentive to battery storage providers to build at DCFC sites, Boyce said.

Power could be stored when demand and price are low, like during the Duck Curve's midday belly. It then would be available to charge EVs, instead of using grid electricity, when the station's usage peaks. That would flatten the station's demand spike and its demand charge.

"The utility could use the stored electricity the rest of the day," Boyce said. "It is one utility investment that enables three business models."

The "other future" of AVs

RMI acknowledges that, on the heels of an EV transformation, a transition to shared autonomous electric vehicles is coming. Lazar is confident that "other future" will be a reality by the mid-2020s. But that is not a barrier to the EV transition now underway, Nelder said.

"We are at one place now, we will be at a different place as EV adoption grows, and we will be at a third place when the robo-taxi future arrives," he said. "It is important to build charging infrastructure now. But planners must remember that what is built now can either be important in that future or stranded assets."

This paper is a way "to think about 10 years in the future," Nelder said. "We need to understand how and where to build charging infrastructure, and then start building it to meet the coming demand."

http://www.utilitydive.com/news/why-utilities-need-to-respond-now-to-the-ev-boom/506761/

EVs dominate at Frankfurt auto show

[Comments are excerpted from an article by David Mchugh for phys.org PHOTOS are from AutoBlog]

Carmakers are spending heavily to develop and improve electric cars to meet increasingly tough government regulations limiting air pollution. That is even though current electric models do not enjoy high sales because of limited range, higher price, and a lack of fast-charging stations. Analysts think that as batteries get better and costs come down, electric sales may eventually take off. According to research and analytics firm IHS Markit, battery-only cars were 0.57 percent of global production in 2016 and will increase to 0.86 percent in 2017.

"Now the big question that everyone is asking is, 'When will we see (electric cars) in mass volume?'" Volkswagen CEO Matthias Mueller said Monday ahead of the show. "But it is not just a matter of what is being offered from manufacturers but also the electric charging infrastructure. That's why it is important to have a fact-based conversation about the urgent problems with electric mobility and how they can be solved. This needs to be discussed jointly, with electricity companies, with states, with local authorities."

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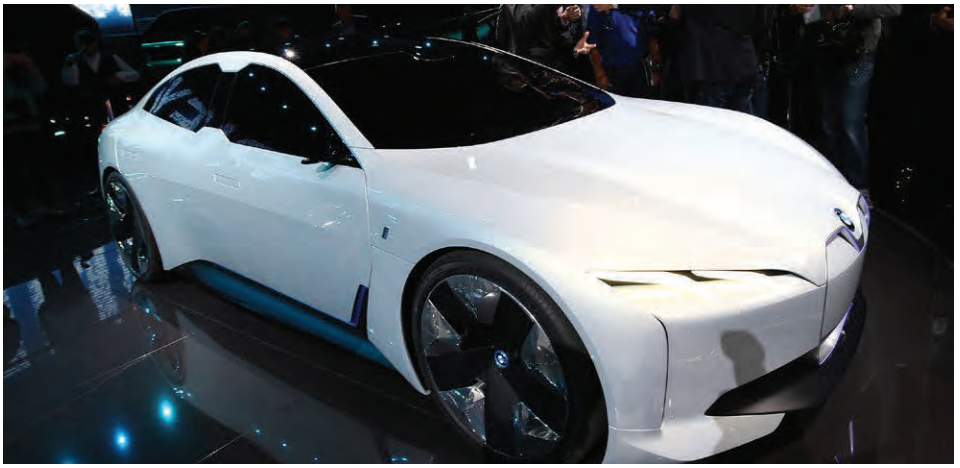


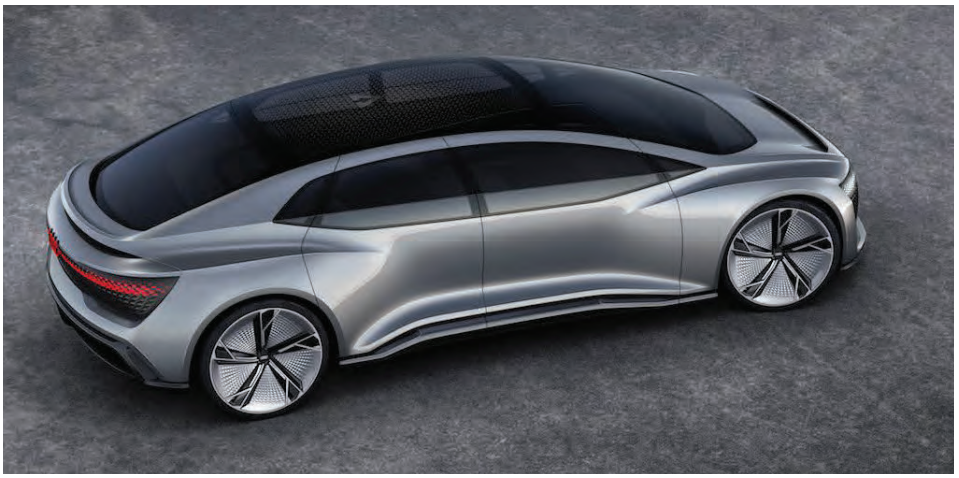
BMW AG began by showing off the four-door i Vision Dynamics electric concept vehicle to join its i3 and i8 electric models. The company says the i Vision Dynamics can hit 200 kph (124 mph) and accelerate to 100 kph (62 mph) in a quick 4.0 seconds.

Mercedes' new all-electric concept EQA car shows just how serious the company is about taking on Tesla – it claims can drive 250 miles on a single charge.

BMW's flagship electric car got a new dose of power at this year's show. It will have a 184-horsepower electric motor, up from the 170 hp that's been standard since 2014.

BMW also showed a new Mini concept that will serve as the basis for a production model coming in 2019. There's no word on specs yet but we're hoping for a 200-mile range.

Daimler, Mercedes' parent company, showed off an adorable smart car concept. Called the Smart Vision EQ Fortwo, the tiny car will be powered by a 30kWh battery.



Audi showcased its Aicon concept car, a luxury electric sedan that is said to travel 500 miles on a single charge.

Britain and France have proposed eliminating internal-combustion cars by 2040. China's industry ministry is developing a timetable to end production and sale of traditional fuel cars and will promote development of electric technology, state media reported Sunday.

Volkswagen AG showed off a revised version of its electric ID Crozz crossover SUV concept vehicle as it announced a long-term electrification campaign, saying its brands would introduce 80 new electric vehicles by 2025. The company plans to invest 20 billion euros ($24 billion) in upgrading plants, creating two new electric car platforms and training workers.

The company said that depending on market developments it could sell three million battery-only vehicles a year in 2025.

The arrival of battery-powered cars is just one anticipated change. Automakers are also searching for ways to adapt to a future in which people find ways of getting from one place to another without necessarily owning a car, such as car-sharing or ride-hailing through smartphone apps. They are also working on developing autonomous vehicles that could drive themselves — under limited circumstances such as corporate campuses or limited access freeways at first, and possibly more widely later.

The three German luxury carmakers were the home team and showed it with large display areas. Some other carmakers are skipping the Frankfurt show this year because of costs, the ability to display cars in other ways, like livestreams, and less focus on Germany and Europe as a market. No-shows include Fiat Chrysler's

continued on page 20

Debut EVs

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namesake Fiat and its Jeep and Alfa Romeo brands, Peugeot and its DS luxury division, plus Nissan, Infiniti and Volvo. General Motors, which sold its European subsidiary to PSA Group, is also not attending.

Even Porsche, part of Volkswagen, didn't wait for the show but showed off its new Cayenne SUV on Aug. 29 with an elaborate streamed event from its base in Stuttgart, Germany.

Small SUVs are also a theme at the show as manufacturers crowd into a segment that has proven a winner with consumers. New offerings of SUV or SUV-like body stylings on compact car platforms include: Volkswagen's T-Roc, the SEAT Arona, Jaguars E-Pace, Kia Stonic, Citroen C3 Aircross and the Skoda Karoq.

And high-end cars remain a fixture as before. Daimler unveiled its Mercedes-Benz-AMG Project ONE, a low-slung, race-car like two-seat hybrid with an overhead air scoop and a long carbon-fiber tail fin. It generates 1,000 horsepower for a top speed of 350 kph (217 mph).

Read more at:
https://phys.org/news/2017-09-electric-cars-small-suvs-dominate.html#jCp

In accordance with Title 17 U.S.C. Section 107, this material is distributed without profit to those who have expressed a prior interest in receiving the included information for research and educational purposes.

Another Audi debut is an electric SUV concept, the Elaine. Both the Aicon and Elaine will preview Audi's vision for self-driving tech.

Volkswagen brought its I.D. Crozz to Frankfurt, an electric SUV coupe in a gorgeous red. The SUV, which can drive 310 miles on a single charge, will launch in 2020. The 310-mile range is subject to change once the SUV is rated by the Environmental Protection Agency.

Honda's debut was its EV Concept, which the automaker has described as its "first EV for Europe." A production version will hit the European market in 2019. Honda wants two-thirds of its vehicles to be electric or hybrid by 2030.

See more photos at the url below
http://www.businessinsider.com/frankfurt-motor-show-2017-new-electric-cars-preview-2017-9/#honda-will-debut-its-ev-concept-which-the-automaker-has-described-as-its-first-ev-for-europe-a-production-version-will-hit-the-european-market-in-2019-10

Concept Cars show the Future in Frankfurt

By C.C. Weiss for New Atlas
Media days for the 67th Frankfurt Motor Show (IAA) have come and gone, leaving a large field of stunning, brand-new concept cars in their wake. From smooth, sexy SUVs and estates, to self-driving electric cars, to autonomous flying taxis, IAA is showing the world what the near and very distant futures of mobility will look like. One thing's for sure – they won't be boring.

[Read the rest of Mr. Weiss's report and see additional photos at the url below]

The Mercedes-Benz Future Bus with CityPilot helps to draw show goers to Daimler's hall
Photo: C.C. Weiss/New Atlas

Volocopter plans to use investment funds for developing its electric vertical take-off and landing (VTOL) technology, quickening introduction of the Volocopter taxi and improving its market position within the young flying taxi market
Photo: C.C. Weiss/New Atlas

https://newatlas.com/concept-cars-frankfurt-2017/51353/#gallery

Hyundai Kona Electric SUV Will Offer Two Batteries, Up To 210 Mile Range

By Steve Hanley

In the car business today, you either build crossover SUVs and light pickup trucks or you go home. And if you really want to sell electric cars, you target them fit into those market segments. Hyundai has three SUVs in its model lineup — the Tucson, Santa Fe, and Santa Fe Sport — but none of them goes head to head with the hottest selling compact crossovers — the Chevrolet Trax, Honda HR-V, Toyota CH-R, and Jeep Renegade. The new Hyundai Kona is supposed to fill that gap in the lineup and will be the first electric SUV from the Korean manufacturer.

The standard Kona is of little interest to the rabid electric car fans who frequent Gas2, but it will have a battery electric version that will get the attention of EV fans. At first, the reports out of South Korea were that the electric Kona would have a 40 kWh battery, which most American car buyers would consider too small for their needs.

But now comes word that Hyundai will offer a larger 64 kWh battery in the Kona. So equipped, it will have 500 kilometers of range. Convert that to miles and adjust for the optimistic European test cycle and you wind up with an electric SUV that should have an EPA range of about 210 miles. Now we're talking. That puts it close to the range of the Chevy Bolt (238 miles) and the base model Tesla Model 3 (220 miles). Base price of the Kona Electric with the larger battery is projected to be a whisker under $40,000 when it arrives in the US next year.

What is interesting about the Kona is that much of its powertrain comes from LG Chem, the same folks who provide the motor and battery for the Chevy Bolt. In fact, the motor for the Kona is the same 204 horsepower unit found in the Bolt. The battery size of the Kona is just slightly larger than that supplied to General Motors for use in the Bolt.

GM has just made a major announcement that it will have two new electric cars on offer within the next 18 months. As suppliers become more involved in the manufacturing process, some convergence between models should be expected. Will the Kona and one of the new GM electric car models be twin sons of different mothers? Could be.

When it gets here, the Kona Electric will have a full complement of electronic safety features and upgraded charging that will let it take advantage of the 150 kW chargers expected to become part of the charging infrastructure in coming years. It may not be suitable for the Rubicon Trail (few vehicles are, regardless of the macho stickers on their flanks) but it could be just what many shoppers want — an all electric crossover SUV that looks the part and has more than 200 miles of range. Bring it on!

http://gas2.org/2017/10/06/hyundai-kona-electric-suv-two-batteries-210-mile-range/

Frankfurt Auto Show Unveils World Premiere of the New BMW i3, BMW i3s & Mini EV Concept

World premiere of the new BMW i3 (combined fuel consumption: 0.0 l/100 km; combined electric power consumption: 13.6 – 13.1 kWh/100 km; combined CO_2 emissions: 0 g/km) and new BMW i3s (combined fuel consumption: 0.0 l/100 km; combined electric power consumption: 14.3 kWh/100 km; combined CO_2 emissions: 0 g/km). Striking design features and a second, extremely powerful model variant underscore the sporting character of the world's most successful electric vehicle in the premium compact segment. Innovative chassis systems deliver even greater driving pleasure to go with locally emission-free mobility. Unrivalled connectivity technology with features including the BMW Digital Charging Service.

Urban mobility is ingrained into the MINI brand's DNA; the city is its natural habitat. Indeed, this environment and the specific demands it places on a car provided the canvas from which the MINI design team brought the MINI Electric Concept to life. The responsive drive system, sublimely judged suspension tuning and use of aerodynamic add-ons produce driving dynamics very much in the MINI mould and a fine operating range. It all comes together to make the

MINI Electric Concept a highly attractive, zero-emission solution to the current challenges facing personal mobility in our cities and their surroundings.

https://www.press.bmwgroup.com/global/article/detail/T0273858EN/

Why Going 100% Electric in California Isn't as Crazy as It Might Seem

By Don Anair

California's top air pollution regulator, Mary Nichols, made headlines last week after making comments to a Bloomberg reporter about the possibility of banning gasoline cars in California. Shortly after that, California Assembly member Phil Ting announced he would introduce state legislation to do just that. Skeptics may raise their eyebrows, but if California is going to meet its long term climate and air quality goals then nearly all future cars and trucks must be powered by renewable electricity and hydrogen. The good news is the state is already on this path.

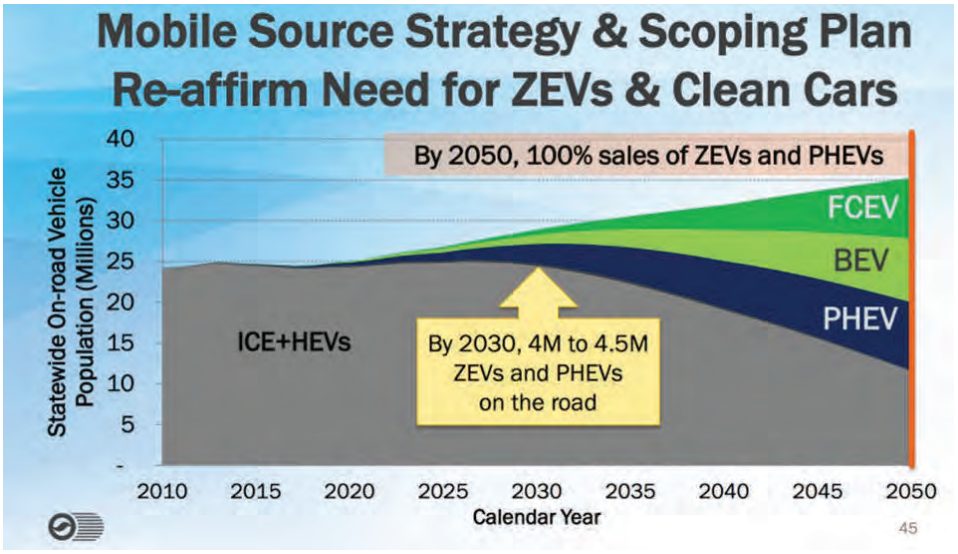


Figure 1: From a presentation by staff to the Air Resources Board in March 2017 showing that by 2050 the majority of cars on the road—and all of new car sales—are powered by electric motors.

Our Health and Our Climate Depends on Vehicle Electrification

It's no secret that widespread vehicle electrification is needed to meet California's climate and air quality goals. In 1990, the first Zero Emission Vehicle program was adopted—an acknowledgment that vehicles with zero tailpipe emissions were necessary to ensure healthy air in a state with a growing population and a whole lot of cars.

Climate change has only added to the importance of vehicle electrification, which takes advantage of the efficiency of electric motors and the ability to power vehicles with renewable electricity or hydrogen (fuel cell vehicles have an electric motor and zero tailpipe emissions similar to battery electric cars).

The state's recent assessment of vehicle technologies needed to meet our climate and air quality goals shows the importance of widespread vehicle electrification, suggesting that all sales of new cars should be electric by 2050 (including plug-in hybrids or PHEVs). A national assessment, Pathways to

continued next page

Deep Decarbonization in the United States and a California assessment, also point out a large-scale transition to electric vehicles (EVs) is needed to achieve the level of emission reductions needed to avoid dangerous climate change.

Banning Gasoline and Diesel Gains Popularity

In the wake of VW's Dieselgate, and with the impacts of climate change becoming more and more apparent, banning the sale of internal combustion vehicles is becoming a popular policy choice around the world, with France, Britain, India and China all making big splashes with recent commitments to eliminate them at some point.

With these strong commitments gathering steam, someone might ask if California is somehow losing its leadership on EVs. California isn't losing its leadership, it's starting to share it with many more parts of the globe. This is great news, as increased global demand for EVs will help drive down technology costs for everyone and help automakers recoup their investments in EV technology faster.

But is going to 100 percent electric vehicles practical? It might be hard to imagine a time when every car at your local dealership will be electric. But there are reasons to be bullish on the future of EVs. Battery prices are dropping with estimates that EVs could have comparable costs to gasoline vehicles sometime in the 2020s. And recent announcements by major manufacturers like Ford, GM, Volvo, VW and others about expanding electric vehicle line-ups over the next five years indicates the industry is betting on growth opportunities.

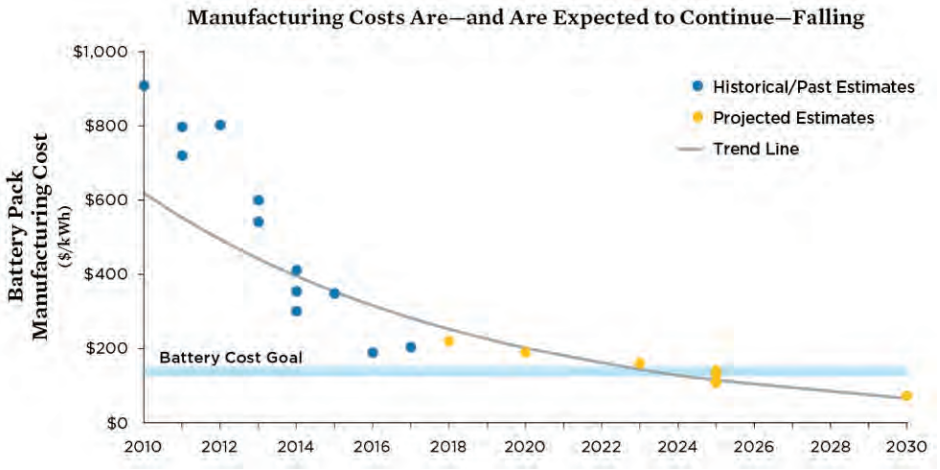


Figure 2: As recently noted in a blog by my colleague David Reichmuth, battery costs are declining and approaching the point where EVs achieve cost parity ($125-150 per kWh).

California is Taking the Right Steps to Making Electric Cars an Option for More and More Drivers

In addition, California is implementing policies to support the deployment of EVs. There's a long list, but some of the most critical are direct consumer rebates, incentives targeting low- and moderate-income households, utility investments to support the deployment of EV charging infrastructure, the Low Carbon Fuel Standard, and the Zero Emission Vehicle program, which requires automakers to bring EVs to market. Meanwhile, California's relatively clean electricity grid means that driving an EV results in global warming emissions equivalent to a 95 mile-per-gallon gasoline car. As California increases its reliance on electricity from renewable sources, emissions will continue to decline.

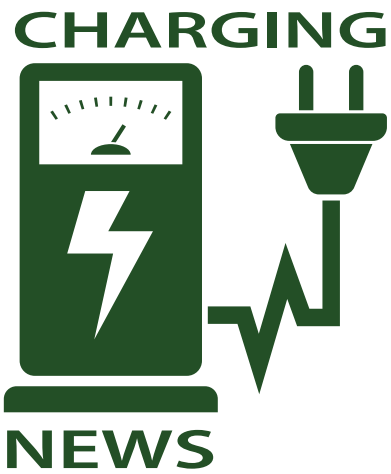
Long-Term Goals Must Be Matched With Near-Term Action

Adopting a ban on gasoline and diesel cars would certainly send a strong long-term signal that powering electric vehicles with clean energy is our ultimate destination. It could focus policy makers' and regulators' efforts on supporting the transition and give automakers, charging companies, utilities and entrepreneurs a vision and long-term target for the future to guide their investments.

However, it's the near-term efforts to make EVs more accessible to all Californians that will accelerate the transition. That means expanding current programs targeted toward individuals and businesses who buy or use new and used cars and increasing access to charging. And it also means supporting electrification for those who rely on other modes of transportation too (see my colleague Jimmy's blog on electric buses).

A future without internal combustion engine cars is consistent with a future of clean air and minimizing climate impacts. Ultimately, for a transition to a clean, electric transportation system to succeed, the system needs to be better than the one we have today. And it's the policies we implement today that will drive the investments needed to reach a tipping point, a point where choosing the EV is a no brainer for whomever is shopping for a car.

https://www.ecowatch.com/california-electric-vehicles-2492482323.html



IKEA just unveiled a massive bet on electric cars

By Oliver Pechter

From solar panel systems to wind power, Ikea wants to make itself known as sustainability champion. It's latest pet project could be its most audacious to date: electric vehicles.

Ikea's acting Head of Sustainability Pia Heidenmark-Cook revealed the Swedish furniture chain's global bet on EV's at an event at the New York Climate Week.

In practice, it means that 355 Ikea stores on 30 different markets will switch entirely to electric car transportation and infrastructure.

"The initiative concerns our own vehicles at the department stores and offices, but it also includes the partners who take care of our home deliveries. Moreover, we will install charging pods at all department stores to encourage both our employees and customers to switch to electric vehicles," she told Swedish daily Dagens Nyheter (DN).

Ikea hopes to boost sales for EV manufacturers and hence reduce the prices on electric vehicles. The relatively high prices of EV's are currently holding many potential buyers back, according to Pia Heidenmark-Cook.

Ikea is part of a coalition of ten global corporates, called EV100, that announced its support for electric vehicles this week. Ikea is joined by companies including Unilever, DHL, HP, Baidu and Swedish energy company Vattenfall.

"We want to make electric transport the normal," said Helen Clarkson, CEO for The Climate Group, the international nonprofit spearheading the effort.

Ikea sees the initiative, which runs towards 2030, as a springboard for making further investments.

"We are also looking at the possibility of investing in companies that promote the transition towards electric cars, or entering long-term partnership to show that this is important," says Heidenmark-Cook to DN.

http://nordic.businessinsider.com/ikea-just-unveiled-its-next-megaproject-electric-cars-2017-9

IKEA now offers home solar panel systems complete with a storage battery like Tesla's Powerwall

By Vilhelm Carlström

With over 700,000 solar panels installed worldwide to power its stores, IKEA is on its way to become energy neutral by 2020. But the company's sustainability ambitions don't end with itself.

IKEA has partnered with British solar panel manufacturer Solarcentury and started offering home solar panel and battery storage solutions in the UK. The retail giant has previously sold solar panels in the Netherlands and Switzerland, but the battery storage system is a novelty.

continued next page

IKEA at the original llocation in Älmhult, Sweden.

According to IKEA, a home solar panel installation is not only good for the environmental conscience but also for the cost conscious. The panel and battery system is supposed to be able to store excess energy generated and reduce electricity bills by up to 50%. The installation costs a couple of thousand pounds however so recovering the initial investment will take more than a decade (but you get 15% off with an IKEA Family membership).

Of course, the system's efficacy depends on factors like which direction the roof in question is facing, with directly South being optimal. To help households figure out whether it's worth it IKEA and Solarcentury offer an online calculator. The smallest system consists of six panels and requires less than 10 square meters of roof.

Customers could also chose to only by a storage battery, much like Tesla's Powerwall, from IKEA, to complement an existing solar panel installation. The storage battery is key because it allows solar power generated to be stored for later use instead of being returned to the grid. IKEA says as much as 60% of energy generated is usually not used by households.

Unfortunately the offer is only currently available in the UK, which IKEA is using to test the concept. M3 writes that IKEA chose to test the offering on the British market instead of the Swedish market because of the complexity in the rules surrounding home energy production in Sweden.

http://nordic.businessinsider.com/ikea-already-has-700000-solar-panels-installed-to-power-its-stores-now-its-begun-selling-panels-and-battery-storage-for-homes-2017-8/

New Smaller Superchargers in Urban Areas Coming

Tesla is installing Superchargers in urban areas where city dwellers and out of town visitors can easily charge. These stations are placed at convenient locations like grocery stores, downtown districts, and shopping centers so charging fits seamlessly into your life.

These inner city smaller charging stations are little pedestals that deliver 1/2 of the power of a full supercharger.

Tesla's Supercharger network will be making its way to a city near you, as the company looks to increase the number of charging stations in urban areas.

The roll out of Tesla's urban charger network is part of the company's strategy to accommodate apartment dwelling Tesla owners that may not have access to a private garage with charging. By providing drivers with access to the Supercharger network within a city, Tesla is making charging more practical for a new demographic of Model 3 buyers that presumably reside in more urban locations.

Unlike Tesla's existing high-powered Superchargers that are generally located at charging stations off of major freeways and interstates, and spaced roughly 100 mi (160 km) apart, Tesla's urban charger network will utilize Superchargers with slightly less power as a way to limit stress on the

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Urban Charging

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utility grid. Because driving within a city is generally limited by shorter travel distances, it's also unnecessary to charge beyond what's needed. Charging 30 minutes on a lower powered Supercharger will provide enough energy for inner city travel.

Tesla CEO Elon Musk confirmed through a tweet Wednesday evening that "Major increases in the Supercharger and Tesla urban charger network" will be taking place over the next several months.

Tesla announced earlier in the year that it looks to more than double the number of Superchargers and quadruple its Destination Chargers to 15,000 by the end of 2017. "Tesla will double that number to total more than 10,000 Superchargers and 15,000 Destination Charging connectors around the world. In North America, we'll increase the number of Superchargers by 150 percent, and in California alone we'll add more than 1,000 Superchargers." read a Tesla blog post published in April.

http://www.teslarati.com/tesla-expand-supercharger-urban-charger-network-apartment-dwellers-cities/

Asphalt helps lithium batteries charge faster

A touch of asphalt may be the secret to high-capacity lithium metal batteries that charge 10 to 20 times faster than commercial lithium-ion batteries, according to Rice University scientists.

The Rice lab of chemist James Tour developed anodes comprising porous carbon made from asphalt that showed exceptional stability after more than 500 charge-discharge cycles. A high-current density of 20 milliamps per square centimeter demonstrated the material's promise for use in rapid charge and discharge devices that require high-power density. The finding is reported in the American Chemical Society journal ACS Nano.

"The capacity of these batteries is enormous, but what is equally remarkable is that we can bring them from zero charge to full charge in five minutes, rather than the typical two hours or more needed with other batteries," Tour said.

The Tour lab previously used a derivative of asphalt - specifically, untreated gilsonite, the same type used for the battery - to capture greenhouse gases from natural gas. This time, the researchers mixed asphalt with conductive graphene nanoribbons and coated the composite with lithium metal through electrochemical deposition.

The lab combined the anode with a sulfurized-carbon cathode to make full batteries for testing. The batteries showed a high-power density of 1,322 watts per kilogram and high-energy density of 943 watt-hours per kilogram.

Testing revealed another significant benefit: The carbon mitigated the formation of lithium dendrites. These mossy deposits invade a battery's electrolyte. If they extend far enough, they short-circuit the anode and cathode and can cause the battery to fail, catch fire or explode. But the asphalt-derived carbon prevents any dendrite formation.

An earlier project by the lab found that an anode of graphene and carbon nanotubes also prevented the formation of dendrites. Tour said the new composite is simpler.

"While the capacity between the former and this new battery is similar, approaching the theoretical limit of lithium metal, the new asphalt-derived carbon can take up more lithium metal per unit area, and it is much simpler and cheaper to make," he said. "There is no chemical vapor deposition step, no e-beam deposition step and no need to grow nanotubes from graphene, so manufacturing is greatly simplified."

Research paper: *http://dx.doi.org/10.1021/acsnano.7b05874*
http://www.spacedaily.com/reports/Asphalt_helps_lithium_batteries_charge_faster_999.html

All-electric bus travels record 1,100 miles on a single charge

The Proterra Catalyst E2 has a claimed nominal range of 194 to 350 mi. (312 to 563 km) (Photo: Proterra)

By Fred Lambert

The electric buses from Proterra keep US-based electric bus manufacturer Proterra upgraded its 40-foot Catalyst E2, now called 'Catalyst E2 max', with a massive 660 kWh battery pack and brought it to the track at the Navistar Proving Grounds in New Carlisle, Indiana, to test it.

Unsurprisingly with that insane amount of battery capacity in the vehicle, they beat the record for the most distance traveled on a single charge by an electric vehicle.

The Proterra Catalyst E2 max traveled 1,101.2 miles before its battery pack was depleted.

Matt Horton, Proterra's chief commercial officer, commented on the achievement:

"For our heavy-duty electric bus to break the previous world record of 1,013.76 miles — which was set by a light-duty passenger EV 46 times lighter than the Catalyst E2 max — is a major feat. This record achievement is a testament to Proterra's purpose-built electric bus design, energy-dense batteries and efficient drivetrain."

The feat is more about proving the capacity of electric buses than a demonstration of a practical route, but it's part of Proterra's range of buses available to customers.

This year, the bus manufacturer has been positioning itself for significant growth of its business.

Fresh off an important $140 million investment round to expand production, they did another $55 million financing round led by BMW and Al Gore's venture firm last June.

Previously, the company hired Tesla's former Vice President of Manufacturing to lead a production expansion at their facility in Greenville, South Carolina, and their new factory in Los Angeles County in order to satisfy the increasing demand.

The production expansion comes amid a significant increase in demand as the economics start to favor electric powertrains in larger vehicles, like buses. The firm claims to have sold 400 electric buses already and orders keep piling up. For example, Seattle recently ordered 120 new all-electric buses.

Ryan Popple, CEO of Proterra, claims that electric buses are now cheaper than diesel/CNG and could dominate the market within 10 years.

[Go to the url below to watch a video and get a guide.]

https://electrek.co/2017/09/19/all-electric-bus-travels-record-1100-miles-on-a-single-charge/

Jaguar gives “the most beautiful car ever made” an electric upgrade

By Marc Carter

In 1961, the Jaguar E-type was labeled as one of the best looking cars of all time. Even Enzo Ferrari called it “the most beautiful car ever made.” Now Jaguar has turned the retro E-type into an EV, which the automaker calls the E-type Zero.

To create the E-type Zero, Jaguar started with a 1968 Series 1.5 Jaguar E-type Roadster. Its six-cylinder combustion engine was then swapped out for an electric powertrain with 295 horsepower. Its lithium-ion battery pack has the same dimensions and weight as the original engine and it’s even placed in the exact same location as the former transmission.

Even with the new electric powertrain and its components, Jaguar managed to cut 100 pounds from the original car’s weight. This means that it drives and handles just like the original E-type, while emitting zero emissions. Thanks to its electric powertrain, the E-type Zero is actually faster than the original E-type with a 0-62 mph time of 5.5 seconds, about one second quicker than the original. The electric powertrain uses some of the same parts as the upcoming I-Pace electric car and has a driving range up to 170 miles.

In accordance with Title 17 U.S.C. Section 107, this material is distributed without profit to those who have expressed a prior interest in receiving the included information for research and educational purposes.

Marc Carter grew up in Los Angeles listening to the sound of vintage Chevys and Fords being tweaked in his parents’ garage. Five years ago he founded The Torque Report, the “go-to” destination for late and breaking news on the auto industry.

https://inhabitat.com/jaguar-gives-the-most-beautiful-car-ever-made-an-electric-upgrade/

A Better Place?

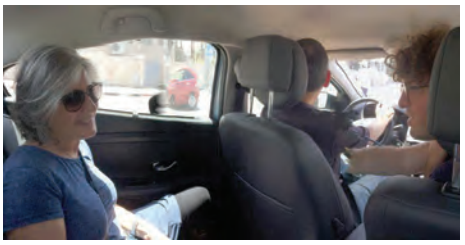
Not that long ago, an Israeli vehicle was about to change the world. But it didn't. In today's episode, we find out why the Better Place electric car generated such excitement and inspired such devotion, and why its ultimate demise was so devastating.

By Brian Blum

In 2007, long before Tesla and Elon Musk became household names, a thirty-nine-year-old Israeli tech entrepreneur by the name of Shai Agassi came out with an announcement that rattled the world: He was going to revolutionize transportation, make countries oil-free by 2020, and curb the effects of climate change. Agassi hoped to put millions and millions of drivers, all around the globe, behind the wheel of an inexpensive electric car, with virtually unlimited range. And that, he told anyone who would listen, was going to make the world a "Better Place."

Brian Blum is a Jerusalem-based journalist and author whose new book, *Totaled: The Billion Dollar Crash of the Startup that Took on Big Auto, Big Oil and the World,* chronicles the unraveling of that dream.

On a hot day of early summer, Brian and Jody Blum of Jerusalem drove their electric car to the local Renault dealership. This seemingly uneventful errand was, in reality, deeply symbolic. It represented the end of a dream—a dream that people like Bill Clinton and Shimon Peres believed was going to usher in a new global era.



When a billion-dollar electric car startup crashed and burned, global investors and average car buyers alike asked: What happened? Business and technology journalist Brian Blum reveals the answer in his new book

The Tesla 3 has grabbed the spotlight as the first "affordable" all-electric vehicle, but Israel's Better Place came first.

http://israelstory.org/en/ episode/29-better-place/

Want to learn more about electric-drive vehicles?

We apologize that all links on these four pages are not "live" (click-able). This note is placed here because we want these pages to be printable, in case anyone wants to display this piece at a show in plastic sleeves.

U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Electric-Drive Vehicles

Electric-drive vehicles use electricity as their primary fuel or to improve the efficiency of conventional vehicle designs. These vehicles can be divided into three categories:

- Hybrid electric vehicles (HEVs)
- Plug-in hybrid electric vehicles (PHEVs)
- All-electric vehicles (EVs)

Together, PHEVs and EVs can also be referred to as plug-in electric vehicles (PEVs).

Hybrid Electric Vehicles

HEVs are powered by an internal combustion engine (ICE) and by an electric motor that uses energy stored in a battery. The extra power provided by the electric motor allows for a smaller engine without sacrificing performance; the battery may also power auxiliary loads like audio systems and headlights and can reduce engine idling when the vehicle is stopped. Some HEVs can drive short distances at low speeds on electrical power alone. All these capabilities typically result in better fuel economy and lower emissions than comparable conventional vehicles. HEVs cannot be plugged in to charge the battery. Instead, the battery is charged through regenerative braking and by the ICE.

Regenerative Braking

Regenerative braking allows HEVs, PHEVs, and EVs to capture energy normally lost during braking by using the electric motor as a generator and storing that captured energy in the battery.

All-electric and plug-in hybrid electric vehicles are charged by plugging the vehicle in to an electric power source. *Photo by Dennis Schroeder, NREL 35158*

Plug-In Hybrid Electric Vehicles

PHEVs use batteries to power an electric motor and use another fuel, such as gasoline, to power an ICE. PHEVs can be plugged in to an electric power source to charge their batteries; their batteries can also be charged by the ICE and through regenerative braking.

PHEVs have larger battery packs than HEVs, providing an all-electric driving range of about 20 to 50-plus miles in today's light-duty models. As long as the battery is charged, a PHEV can draw most of its power from electricity stored in the battery during typical urban

Electric-Drive Vehicles at a Glance

HEVs are powered by a traditional gasoline or diesel ICE and by one or more electric motors that use energy stored in a battery. The battery is charged by the ICE and through regenerative braking. The vehicle cannot be plugged in to charge.

PHEVs are similar to HEVs but have a larger battery that allows them to travel on electricity alone. The battery can be charged by plugging in to an electric power source, through regenerative braking, and by the ICE.

Unlike EVs, PHEVs don't have to be plugged in before driving. They can be fueled solely with gasoline, like an HEV. However, they will not achieve maximum fuel economy or take full advantage of their all-electric capabilities without plugging in.

EVs run on electricity alone. They are powered by one or more electric motors that use the energy stored in a battery (larger than the batteries in an HEV or PHEV). EV batteries are charged by plugging the vehicle in to an electric power source and through regenerative braking.

continued on next page

Check out this Clean Cities fact sheet for information on hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and all-electric vehicles (EVs).

driving. The ICE may power the vehicle when the battery is mostly depleted, during rapid acceleration, at high speeds, or when intensive heating or air conditioning is required.

When running on battery power alone, PHEVs produce no tailpipe emissions. Even when the ICE is operating, PHEVs consume less gasoline and typically produce lower emissions than similar conventional vehicles, performing similarly to HEVs. A PHEV's gasoline consumption depends on the distance traveled between charges. If the vehicle is never plugged in, its gasoline-only fuel economy will be about the same as that of a similarly sized HEV. If the vehicle is plugged in to charge and driven distances within its all-electric range, it may be possible to use only electric power.

All-Electric Vehicles

EVs (also called battery-electric vehicles, or BEVs) do not have ICEs but are driven solely by one or more electric motors powered by energy stored in batteries. The batteries are charged by plugging the vehicle in to an electric power source and EVs can also be charged through regenerative braking. EVs produce no tailpipe emissions, although there are "life cycle" emissions associated with the majority of electricity production in the United States.

Today's EVs typically have shorter driving ranges per charge than conventional vehicles have per tank of gasoline. Most new EVs have ranges of about 100 miles on a fully charged battery, although an increasing number of models have ranges exceeding 200 miles. According to the U.S. Department of Transportation, 90% of all household vehicle trips in the United States cover less than 100 miles.[1] An EV's range varies according to driving conditions and driving habits. Extreme ambient temperatures tend to reduce range because energy from the battery must power climate control systems in addition to powering the motor. Speeding, aggressive driving, and heavy loads can also reduce range.

Drivers of EVs and PHEVs have access to thousands of charging stations across the country. *Photo by Dennis Schroeder, NREL 22658*

What electric-drive vehicles are available?

In 2017, there were about 87 light-duty HEV, PHEV, and EV models available from major auto manufacturers, according to FuelEconomy.gov. Medium- and heavy-duty options are also available. For up-to-date information on today's models, use the Alternative Fuels Data Center's (AFDC) Vehicle Search tool (*afdc.energy.gov/tools*) and the Find a Car tool on FuelEconomy.gov (*fueleconomy.gov/feg/findacar.shtml*).

How much do they cost?

Electric-drive vehicles are generally more expensive than their conventional counterparts. However, lower fueling and maintenance costs can make them a competitive option. As battery technology improves, the cost of electric-drive vehicles is expected to continue dropping. Federal and state tax credits and rebates are also available to help offset the cost of these vehicles. For information on available vehicle incentives, see the AFDC Laws and Incentives page (*afdc.energy.gov/laws*).

How do these vehicles "fuel up"?

Charging stations provide electricity to charge the batteries of PEVs. The charging unit communicates with the vehicle to ensure that it supplies an appropriate and safe flow of electricity.

Charging equipment for PEVs is classified according to the rate at which the batteries are charged. Two types—AC Level 1 and AC Level 2—provide alternating current (AC) to the vehicle, with the vehicle's onboard equipment converting AC to the direct current (DC) needed to charge the batteries. The other type—DC fast charging— provides DC electricity directly to the vehicle.

Inductive charging equipment uses an electromagnetic field to transfer electricity to a PEV without a cord. This technology has been developed and introduced commercially. Currently available wireless charging stations operate at power levels comparable to AC Level 2, though this technology has been used internationally at higher power levels in mass transit applications.

Charging times range from less than 20 minutes to 20 hours or more, based on the type or level of charging; the type of battery, its capacity, and how depleted it is; and the size of the vehicle's internal charger. EVs generally have more battery capacity than PHEVs, so charging a fully depleted EV takes longer than charging a fully depleted PHEV.

The cost of charging stations also varies with the level of charging (see Charging Options table). Level 1 charging can be as simple as plugging in to a standard 110-volt outlet, whereas DC fast charging units can cost over $40,000. Some states and utilities offer financial incentives for charging stations; see the AFDC Laws and Incentives page for more information (*afdc.energy.gov/laws*).

Charging units can be installed in residential, fleet, workplace, and public settings. As of July 2017, there were

1 National Highway Travel Survey, U.S. Department of Transportation, Federal Highway Administration, 2008, *https://www.fhwa.dot.gov/policyinformation/pubs/pl08021/fig4_5.cfm*.

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more than 42,000 public and private charging outlets across the country. To locate public stations, use the Alternative Fueling Station Locator (*afdc.energy.gov/stations*), which is also available as an iPhone app and Android app.

How much does it cost to fuel these vehicles?

Fuel costs for HEVs, PHEVs, and EVs are lower than those for similar conventional vehicles. Electric drivetrains are mechanically more efficient than internal combustion engines; EVs convert about 59%–62% of the electric energy from the grid to power at the wheels, while conventional gasoline vehicles only convert about 17%–21% of the energy stored in gasoline to power at the wheels. HEVs and PHEVs use significantly less gasoline or diesel fuel than their conventional counterparts, and the more electricity a PHEV uses, the lower its fuel costs. Additionally, electricity prices are less volatile than gasoline and diesel fuel prices, so drivers can reasonably forecast their fueling expenses over longer periods of time. Over the life of the vehicle, electric-drive vehicle owners can expect to save thousands of dollars in fuel costs, relative to the average new vehicle.

To find fuel economy ratings and fuel cost comparisons among currently available vehicle models, visit *FuelEconomy.gov*.

How do their emissions compare with those of conventional vehicles?

HEVs, PHEVs, and EVs typically produce lower levels of emissions than conventional vehicles. HEV emissions benefits vary by vehicle model and type of hybrid power system. EVs produce zero tailpipe emissions, and PHEVs produce no tailpipe emissions when in electric-only mode.

Life cycle emissions are generated when fuel or electricity are produced, as well as during the manufacturing of the vehicle itself. The life cycle emissions of a PEV largely depend on how the electricity powering the vehicle is generated, and this varies by region. In geographic areas that use relatively low-polluting energy sources for electricity generation, PEVs have substantial life cycle emissions advantages over similar vehicles running on gasoline or diesel. In regions that depend heavily on conventional fossil fuels for electricity generation, PEVs may not demonstrate as strong a life cycle benefit. In all cases, consumers may have the option of purchasing or installing renewable energy generation to further reduce emissions.

Charging Options

	Amperage	Voltage	Power Output	Typical Charging Time	Primary Use	Unit Cost Range*
AC Level 1	12 to 16 amps	120 V	1.3 to 1.9 kW	2 to 5 miles of range per hour of charging	Residential and workplace charging	$300 to $1,800
AC Level 2	Up to 80 amps	208 V or 240 V	Up to 19.2 kW, typically 7.2 kW for residential applications	10 to 20 miles of range per hour of charging	Residential, workplace, and public charging	$400 to $6,500
DC Fast Charging	Up to 200 amps	208 to 600 V, typically 208 V or 480 V	24 to 150 kW	50 to 70 miles of range in less than 20 minutes	Public charging	$10,000 to over $40,000

** 2015 costs for single port, excluding installation.*

Sources: "Costs Associated With Non-Residential Electric Vehicle Supply Equipment," U.S. Department of Energy, afdc.energy.gov/uploads/publication/evse_cost_report_2015.pdf.

HEVs work well for both light-duty and heavy-duty applications, particularly those that require frequent stops and starts. *Photo from Odyne Hybrid Systems, NREL 34045*

What about safety and maintenance?

HEVs, PHEVs, and EVs undergo the same rigorous safety testing as conventional vehicles sold in the United States and must meet Federal Motor Vehicle Safety Standards. Battery packs meet rigorous testing standards, and vehicles are designed with insulated high-voltage lines and safety features that deactivate electric systems when they detect a collision or short circuit. For additional safety information, refer to the AFDC's Maintenance and Safety of Hybrid and Plug-In Electric Vehicles page (*afdc.energy.gov/vehicles/electric_maintenance.html*).

continued next page

What are the Benefits of Electric-Drive Vehicles?

Benefits	Hybrid Electric Vehicles	Plug-In Hybrid Electric Vehicles	All-Electric Vehicles
Fuel Economy	*Better than similar conventional vehicles* Most mid-size HEVs achieve combined fuel economy ratings higher than 40 mpg.	*Better than similar HEVs and conventional vehicles* Most PHEVs achieve combined fuel economy ratings higher than 90 mpge.*	*Better than similar HEVs, PHEVS, and conventional vehicles* Most EVs achieve fuel economy ratings higher than 100 mpge.*
Emissions Reductions	*Lower emissions than similar conventional vehicles* HEV emissions vary by vehicle and type of hybrid power system. HEVs are often used to offset fleet emissions to meet local air quality improvement strategies and federal requirements.	*Lower emissions than HEVs and similar conventional vehicles* PHEVs produce no tailpipe emissions when in electric-only mode. Life cycle emissions depend on the sources of electricity, which vary from region to region.	*Zero tailpipe emissions* EVs produce no tailpipe emissions. Life cycle emissions depend on the sources of electricity, which vary from region to region. Emissions reductions are substantial in most regions of the United States.
Fuel Cost Savings	*Less expensive to run than a conventional vehicle* HEV fuel cost savings vary by vehicle model and type of hybrid power system. For many HEV models, fuel costs are approximately 8¢ per mile.**	*Less expensive to run than an HEV or conventional vehicle* In electric-only mode, PHEV electricity costs range about 2¢–4¢ per mile. On gasoline only, fuel costs range about 5¢–10¢ per mile.**	*Less expensive to run than an HEV or conventional vehicle* EVs run on electricity only. Electricity costs for a typical EV range 2¢–4¢ per mile.**
Fueling Flexibility	*Can fuel at gas stations*	*Can fuel at gas stations; can charge at home, public charging stations, and some workplaces*	*Can charge at home, public charging stations, and some workplaces*

Sources: AFDC (afdc.energy.gov), FuelEconomy.gov

** PEVs are rated not in miles per gallon (mpg) but miles per gallon of gasoline equivalent (mpge). Similar to mpg, mpge represents the number of miles the vehicle can travel using a quantity of fuel (or, alternatively, electricity) with the same energy content as a gallon of gasoline.*

***For conventional sedans, costs range about 10¢–15¢ per mile.*

Because HEVs and PHEVs have ICEs, their maintenance requirements are similar to those of conventional vehicles. The electrical system (battery, motor, and associated electronics) requires minimal scheduled maintenance. A manufacturer's warranty of a battery typically covers 8 years or 100,000 miles, and the expected battery lifetime is 10 to 12 years under normal operating conditions. Brake systems on these vehicles typically last longer than those on conventional vehicles because regenerative braking reduces wear.

EVs typically require less maintenance than conventional vehicles or even HEVs or PHEVs. Like their hybrid counterparts, EV electrical systems require little to no regular maintenance, and their brake systems benefit from regenerative braking. In addition, EVs have far fewer moving parts and fewer fluids to change.

Find additional information on HEVs, PHEVs, and EVs on the AFDC at *afdc.energy.gov/vehicles/electric.html.* ■

Scan this code to learn more about electric-drive vehicles.

Clean Cities
U.S. Department of Energy

U.S. DEPARTMENT OF ENERGY
Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

For more information, visit:
cleancities.energy.gov

cleancities.energy.gov

Keep Up on all Auto Shows & EV Related Conferences

US and International Events

SANTA CLARA, CA
ELECTRIC VEHICLES
11/16/2017 - 11/17/2017

SAN FRANCISCO AUTO SHOW
11/18/2017 - 11/26/2017

SAE 2018 HYBRID & ELECTRIC VEHICLE TECHNOLOGIES SYMPOSIUM
SAN DIEGO–MISSION VALLEY, CA
2/20/2018 - 2/22/2018

http://www.sae.org/events/hybridev/

11th Annual International Conference

Read the latest news about what's happening in podcar development and find details about the conference by downloading our first conference newsletter:
http://podcarcity.org/wp-content/uploads/2017/08/PodcarCity-Las-Vegas-Newsletter-1-August-2017.pdf

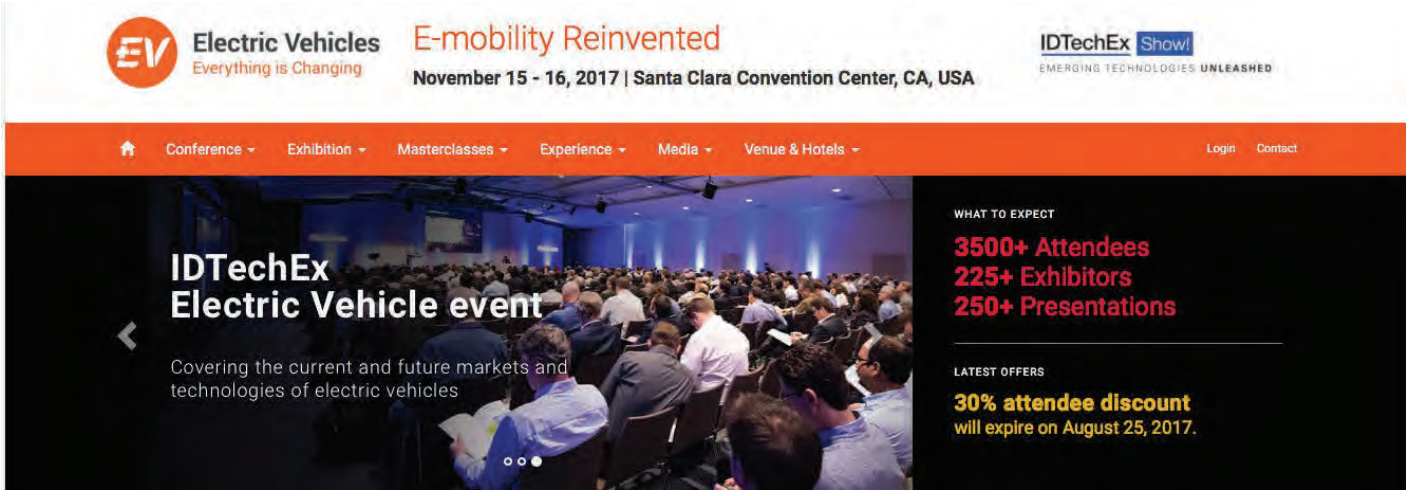
Closing Plenary Speaker: *Neil Degrasse Tyson on November 10*

https://www.greenbuildexpo.com/en/home.html

Plug-In Electric Vehicle Test Drives Presented by PG&E Electric Vehicle Ride and Drive

See the details at the url below.

http://www.sfautoshow.com/special-attractions/plug-in-electric-vehicle-test-drives-presented-by-experience-electric-in-partnership-with-pge/



http://www.idtechex.com/electric-vehicles-usa/show/en/

Save the Date...

Save The Date! ITEC 2018 will be held at the Long Beach Convention Center in Long Beach, CA. The Conference will be held from June 13-15th, 2018. *http://itec-conf.com/*

Electric trucks to grow fast from now through 2030: report

By Sean Szymkowski

In the coming years, the world's auto industry will continue to shift its product mix to electric and electrified vehicles to meet growing concerns over carbon emissions and stringent fuel-economy regulations across the globe.

However, the passenger-car segment isn't the only area that will see electric powertrains implemented.

A new study suggests the market for electric trucks—light, medium, and heavy-duty commercial trucks—is on the verge of booming.

Released by McKinsey Energy Insights, the study looked at three key factors that will influence the adoption of electric trucks.

The most important drivers of adoption, it said, will be cost parity between electric trucks and diesel-powered trucks, electrification readiness, and a supportive electric-vehicle environment.

With those three factors in mind, the study projected electric trucks' upcoming boom in the marketplace; by 2030, the electric models could account for 15 percent of total truck sales.

The sales figures will vary by area, since each of the three major markets the study studied—China, Europe, and the United States—has unique characteristics.

McKinsey Energy Insights pins Europe as the earliest adopter of electric trucks, thanks to higher fuel prices and a supportive environment for electric vehicles in general.

Specifically, it projects light-duty trucks will reach cost parity between now and 2021, while heavy-duty trucks will achieve parity in Europe by 2027.

In the United States, the study paints a very different picture.

Cummins Urban Hauler Tractor concept

Chanje medium-duty electric truck

Arrival UK Royal Mail electric postal van

continued next page

Don't Miss These...

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

Videos & Articles of Interest

Elon, Finland is Ready!

Tom Mouloughney attended Germany at the IAA Motor Show Frankfurt and was picked as one of six finalists froms "Next Visionaries" Idea Pitch!

https://www.facebook.com/nextvisionaries/videos/vb.268299630263823/337712903322495/?type=2&theater

Tesla Blows Minds In Eastern Kentucky

The team from the new documentary, "EVOLVE: Driving a Clean Future in Coal Country," took a Tesla to Eastern Kentucky to offer residents the ride of a lifetime. Please support the full film now thru September 28th on Indiegogo at: *http://igg.me/at/evolveky*

See the video at: *https://www.youtube.com/watch?time_continue=66&v=HLMxGatsuyI*

Continued from page 38

Thanks to lower price differentials between diesel and electricity, the U.S. isn't likely to embrace electric trucks as quickly as Europe.

The U.S. is also a vastly different landscape, and batteries will be tasked with going longer distances—boosting costs and perhaps requiring additional technology and other improvements.

While Europe reaches cost parity by 2021, neither the U.S. nor China will likely achieve parity until 2030 or later, the study says.

China faces similar hurdles to those in the U.S.: range, battery technology, and distances covered.

The supply of electric trucks will likely outweigh a sufficient charging infrastructure in the U.S. and China for some time, per the study.

Regulatory forces make up the final facet of electric truck adoption rates.

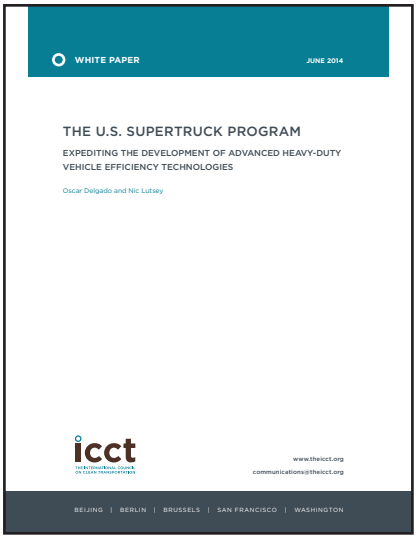
A few European countries have already announced various bans on fossil fuel-powered vehicles in the coming decades, and China has just rolled out its first electric-car quotas to begin in 2019.

These regulations will increasingly shape the electric truck market as they materialize.

In the United States, it remains somewhat unclear how particular states and cities could or would implement such regulations.

If similar bans occur, you can probably count on CA to lead the change in the U.S.

[*Green Car Reports* EDITOR'S NOTE: Green Car Reports thanks our tipster, who prefers to remain an International Man of Mystery.] [Photos from *Green Car Reports*]



White Paper Reference fromCummins, Daimler, Navistar and Volvo products

http://www.theicct.org/sites/default/files/publications/ICCT_SuperTruck-program_20140610.pdf

http://www.greencarreports.com/news/1113045_electric-trucks-to-grow-fast-from-now-through-2030-report?fbfanpage

Electric Auto Association (EAA) Membership Application Form

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Electronic Current EVents □ $35 USA & non-USA

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

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

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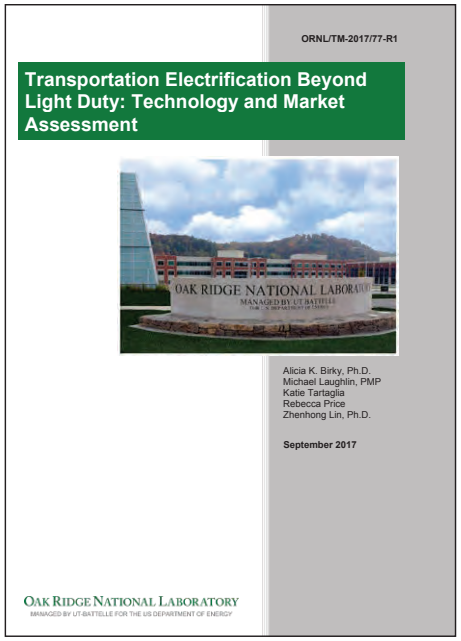
Transportation Electrification Beyond Light Duty



Commercial fleets form the backbone of the nation's economy, getting people and the things they need to the places they need to go and performing services necessary to keep public and private physical infrastructure in working order. Commercial fleets include a wide range of vehicle and equipment types, typical uses, and sizes, and involve millions of on-road and off-road vehicles. This diversity means there is no single solution for reducing fuel consumption and operating costs.

This document focuses on electrification of government, commercial, and industrial fleets. These fleets have been divided into three market segments based on equipment use: service fleets, goods movement, and people movement. In particular, it addresses highway vehicles not used for personal transport; non-highway modes, including air, rail, and water; and non-road equipment used directly or in support of these uses.

Electrification offers the potential for addressing future transportation energy and emissions challenges in portions of the commercial fleet.

For more information about this issue and to download the pdf, visit the url below.

https://info.ornl.gov/sites/publications/Files/Dev296070.pdf

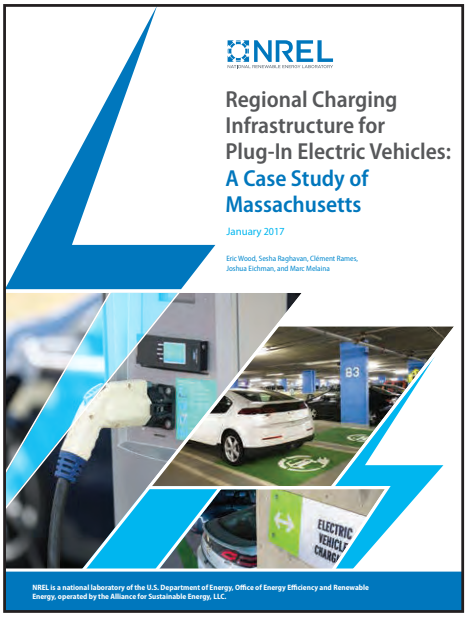
Regional Charging Infrastructure for Plug-In EVs

This analysis of regional plug-in electric vehicle (PEV) infrastructure was conducted to provide guidance on charging infrastructure for PEVs to regional stakeholders through the U.S. Department of Energy's (DOE's) Vehicle Technologies Office.

Given the complex issues associated with PEV charging and options in deploying charging infrastructure, there is interest in exploring scenarios of future charging infrastructure deployment to provide insight and guidance to national and regional stakeholders.

The complexity and cost of PEV charging infrastructure pose challenges to decision makers, including individuals, communities, and companies considering infrastructure installations. The value of PEVs to consumers and fleet operators can be increased with well-planned and cost-effective deployment of charging infrastructure. This will increase the number of miles driven electrically and accelerate PEV market penetration, increasing the shared value of charging networks to an expanding consumer base. Given these complexities and challenges, the objective of the present study is to provide additional insight into the role of charging infrastructure in accelerating PEV market growth.

To that end, existing studies on PEV infrastructure are summarized in a literature review. Next an analysis of current markets is conducted with a focus on correlations between PEV adoption and public charging availability.



Click the URL below to read the rest of this story

https://www.nrel.gov/docs/fy17osti/67436.pdf

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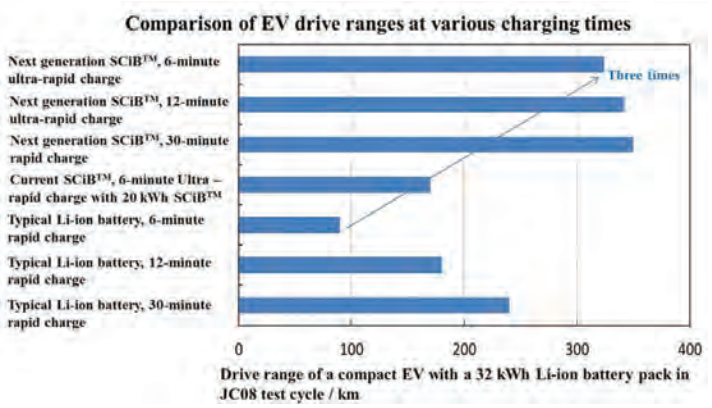
Toshiba's new fast-charging battery could triple the range of electric vehicles

Toshiba has tested out a 50-Ah version of its new SCiB battery



Toshiba says that if incorporated into a compact EV, its new SCiB battery would allow for a range of 320 km (186 mi) on just a six-minute charge

By Nick Lavars

A key focus of electric vehicle (EV) makers is maximizing the range users can get from each charge, and for that reason new battery technologies are poised to play a huge part in driving their adoption. Toshiba has developed a new fast-charging battery it claims could allow EVs to travel three times as far as they do now, and then be fully recharged again in a matter of minutes.

Toshiba's SCiB (Super Charge ion Battery) has been around in various forms since 2007, with its chief claim to fame an ability to charge to 90 percent of capacity in just five minutes. It also boasts a life-span of 10 years and high levels of safety, and has found its way into a number of notable EVs, including Mitsubishi's i MiEV and Honda's Fit EV.

The current SCiB uses lithium titanium oxide as its anode, but Toshiba says it has now come up with a better way of doing things. The next-generation SCiB uses a new material for the anode called titanium niobium oxide, which Toshiba was able to arrange into a crystal structure that can store lithium ions more efficiently.

So much so, that the energy density has been doubled.

Toshiba has tested out a 50-Ah version of the new battery and reckon that it too boasts excellent safety and a long life cycle, retaining more than 90 percent of its capacity after 5,000 charge cycles. It says that if incorporated into a compact EV, it would allow for a range of 320 km (186 mi) after just a six minutes of ultra-rapid charging, which is around three times the range offered by a standard, similarly charged lithium-ion battery.

"We are very excited by the potential of the new titanium niobium oxide anode and the next-generation SCiBTM," says Dr. Osamu Hori, Director of Corporate Research & Development Center at Toshiba Corporation. "Rather than an incremental improvement, this is a game changing advance that will make a significant difference to the range and performance of EV. We will continue to improve the battery's performance and aim to put the next-generation SCiBTM into practical application in fiscal year 2019."

Source: Toshiba

http://newatlas.com/toshiba-scib-battery-triple-range/51667/

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