Volume 23, Issue 8 EVAOSD Newsletter August 2013

Charged Up

ELECTRIC VEHICLE ASSOCIATION OF SAN DIEGO (EVAOSD)
An affiliate of the Electric Auto Association (EAA)
2755 Dos Aarons Way, Suite A, Vista, CA 92081
Ph: (760) 670-3388 Fax: (760) 266-9505 Email: EVAOSD.Newsletter@DriveGasFree.com
Website: www.evaosd.com

Officers:

President: Joseph S. Gottlieb

Vice President: Lloyd Rose

Treasurer: Richard Rodriguez

Secretary: David Crow

Program Chairman: Staff

Newsletter Editor: Tom Dulaney

Webmaster: Russ Lemon

Librarian & AV: Lloyd Rose

Regular Meetings: Our meetings are on a different schedule, please check date below (No Meeting in December).

Location: SDG&E Innovation Center
4760 Clairemont Mesa Blvd.
San Diego, CA 92117

Next Meeting: ***August 28th, 6:00 PM (WEDNESDAY)***

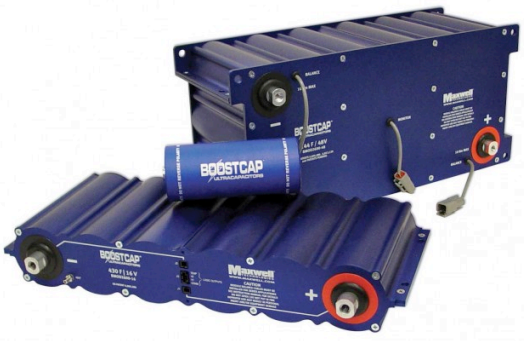
Program: What to wear when driving an EV?

Inside this issue:

Newsletter Topics:

David Crow says **Hills are Hard** .

Digital Trends article on air charging and capacitors.

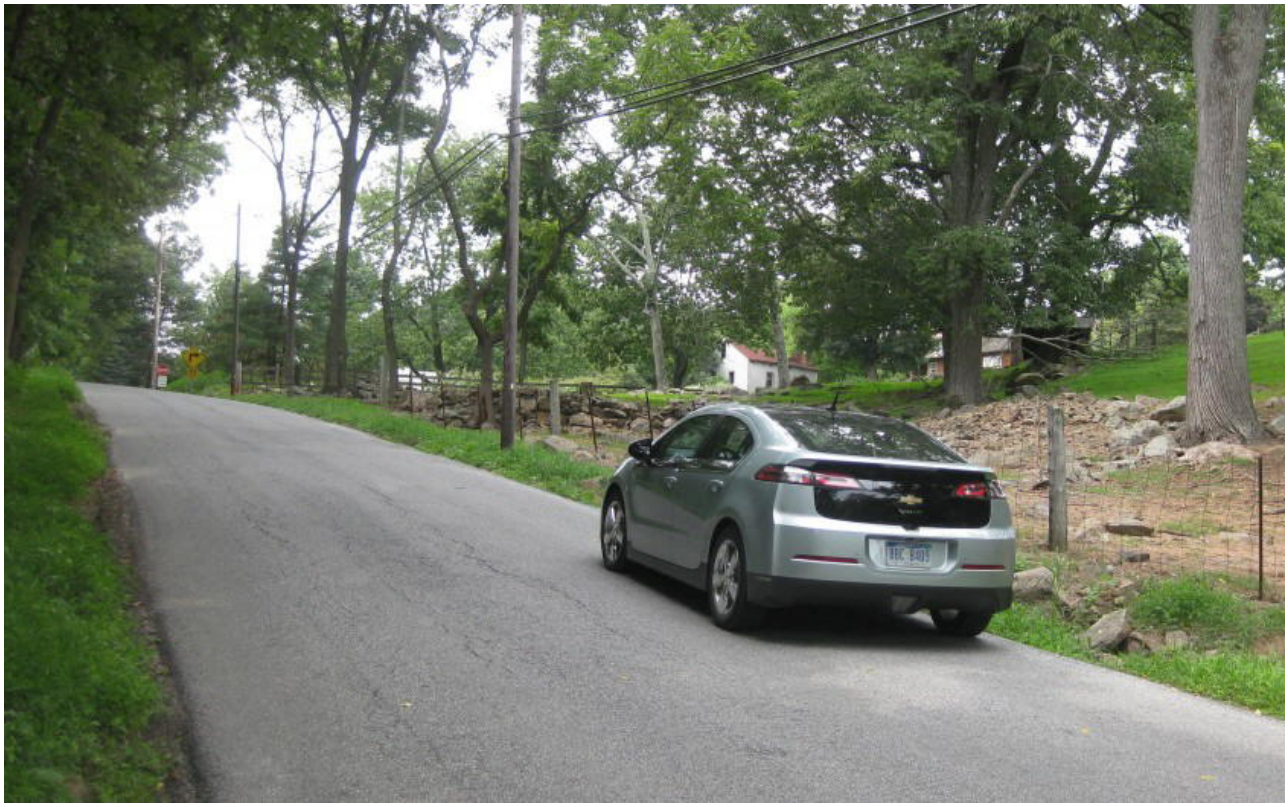


Hills are Hard on Electric Vehicle Range

Dave Crow, August 2013

We all know that San Diego is full of hills and that it shortens the range of our electric cars. But how big is the effect? This past Spring I made the leap from lead acid batteries to Lithium cells and haven't look back. It increased my 25 mile range up to 65 miles! So now I can get into a lot more trouble as I venture further from home and my "range bravery" gets bigger and bigger. I prefer not to wait around for public charging to get me around; so 99% of my charging is at home and I plan my trips around getting out and back on one charge. I can quite reliably predict my overall range on flat ground at reasonable speeds; but, then comes those pesky hills that mess up all of my estimates. My next EV adventure will be to make the trip from my house in Point Loma to Bob Van Gorder's ranch in Ramona. It's about 41 miles - no problem. It's a 1300 foot climb in elevation - that could be a problem. I can recharge at his place while we are tinkering on cars, but, can I get there in the first place? Having a great love of spreadsheets and data, an AH meter in the car, and a 200 foot climb to work each day, I figured it out.

Analyzing a series of runs with my 2600 lbs car, it costs me about 1/6 th of a KWHr per 100 feet of climb. Due to system efficiency losses between driving and regenerative braking, I get about 2/3 rds of that back on the downhill run with my AC drive system. So, for my climb to Ramona, I'll spend about two KWHr just changing altitude.
For me, that's about six miles of range. ANSWER: No problem, Bob, I'm on my way up. Just make sure there is a plug waiting for me or I'll need to use the BLINK in downtown Ramona before I head home.



I expect that my GM Volt and Nissan Leaf friends will see similar results in their more efficient, but, heavier cars. If you are really interested in all of this, you can find various altitudes off the USGS topographic charts online. I use the www.pickatrail.com website. it's easier to navigate than the USGS site, IMHO.

As a footnote, considering the physics of accelerating from a stop, even on level ground, is just like climbing a "mini-hill". So, if you can keep a steady speed in your driving, you'll always go farther. Regen helps reduce the loses in start and stop traffic; but, it's not a complete recovery of energy when you use it to slow down.

As a second footnote to all of my DC motor buddies, sorry no regen for you; but our uphill cost in range will be about the same. Go EV!

Digital Trends By **Rob Enderle** — July 13, 2013

The first generation of electric cars arrived in the early days of last century, and died out largely because batteries couldn't compete with gas tanks. The second generation arose largely in the last decade, led by Tesla, but while batteries have improved significantly over the last century, they're still the limiting factor. Meanwhile, the economy of gasoline cars has also improved significantly, giving electric stiffer competition than the gas guzzlers of decades ago.

While the third generation of electrics will bring a number of improvements, the most important ones will address the pressing issue of power. There are a number of technologies that could, separately or together, finally make electric vehicles kick gas-powered cars off the playing field.

Inductive charging allows a device – whether a smartphone or an electric car – to charge without a physical connection to a power source. Interestingly, Nissan and Infiniti will be among the first to offer it, even though Tesla has led pretty much every other aspect of electric vehicles since it launched in 2003. (This is especially unusual since one of the first demonstrations of this technology on a car was with a Tesla Roadster, but apparently without much interest from Tesla.)

With 1,000 mile range, you wouldn't have to worry about chargers much.

Qualcomm has a version of inductive charging, called Halo, designed for both parking spots and interstate highways. It requires close proximity, but not contact, which would still be a vast improvement over having to actually plug the car in. Part of the improvement is that the device could be completely buried, making it far more difficult to vandalize, or for inexperienced drivers to damage. In most cases, you simply park your car and any power your car consumes is either free (as an incentive to get you to park there, something a shopping center or retailer might do) or you'd get a bill at the end of the month for whatever you consumed.

Unless this technology was installed in roads, as Qualcomm is promoting, it wouldn't solve the battery-life issue, but it would reduce the related problems, making charging far more transparent and reliable. However, there could be a problem with conflicting standards (a problem that already plagues the electric car industry) which could mean you'd have to look for a parking spot your car will function with and make in-street solutions unworkable. This might be what's holding Tesla up. Right now, Tesla has a unique native charging system far faster than the implemented standard, and I expect it wants to do the same thing initially for inductive chargers.

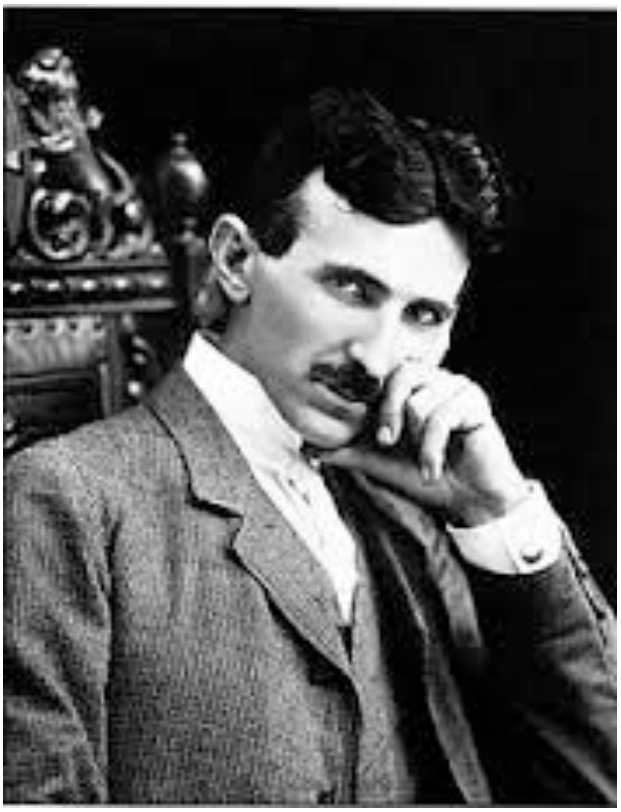
IBM and others are working on a promising technology called lithium air, which approaches the energy density of a gas tank. There have been significant advances in metallurgy over the last several years making a battery based on lithium-air technology viable within a decade. If you can have the same energy capacity in a battery that only has to be the same size as a gas tank, and were to place it in the massive battery bank of a Tesla S, you likely could likely take that car's range and quadruple it. With 1,000 mile range, you wouldn't have to worry about chargers much. More likely, engineers would just use a smaller battery, ultimately making the car lighter and cheaper. Coupled with more prevalent chargers, this would be a game changer for the electric-car industry, and represents the potential for energy efficiency better than gas.

Supercapacitors and ultracapacitors are an alternative to batteries that is actually already being implemented in commercial vehicles. Capacitors are solid state, they have a nearly unlimited cycle life, and they can both charge and discharge thousands of times more quickly than a lithium-ion battery without damage. In a way, capacitors are to ordinary batteries what flash memory is when compared to magnetic hard disks. Initially flash performed far better, but was far more expensive than magnetic media. Even iPods initially had hard drives. But as flash dropped in price, it took over more and more of the market, and now magnetic drives are in the process of being phased out.

Unfortunately, capacitors are still at the beginning of that transition. Right now, they are just god awful expensive, they lose charge over time, and they have low energy density even when compared to batteries. This all makes them an unlikely near-term solution, but like flash, prices are expected to drop sharply, energy density should increase, and self-discharge rates (likely the biggest problem) will improve. Over time and they could sidestep the battery problem all together. However they're already being used in hybrid configurations, where you can charge the capacitors fast, say in minutes, then they charge the batteries as you drive. This is a fascinating technology that I don't think folks are looking at closely enough.

Where's the next Tesla?

I'm not referring to Tesla the company, but Tesla the man. He was, until his mysterious and untimely death (apparently connected to a mystical death ray), working on broadcast power. Intel and others have been making great inroads into this lately, but they are still likely years away from getting this to work with personal electronics, and decades away from getting it to work with cars. But once developed, this would remove batteries as a problem forever and we'd live in an electric world. Granted, there are some health concerns that will have to be overcome: Although the idea of glowing in the dark could be kind of cool, we'll need to get around the "death ray" part. In any case, I think broadcast power will herald the final, lasting generation of electric vehicles. If we move to something else after that, it won't be electric, and most of us likely won't be around.



Read more: http://www.digitaltrends.com/cars/whats-next-for-the-electric-car-wireless-power-lithium-air-batteries-and-more/#ixzz2d2CQPisQ
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The very first Volt sold in Michigan (2011). The owner, Norm Schroeder, said "It's the best car I've ever owned." He said he's getting about 256 miles to the gallon since he uses electricity most of the time: Photo taken 8-5-13.

Electric Auto Association (EAA) Membership Application Form

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

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

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

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

I support the _____EAA Chapter (addional chapters, $10 each) _____

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

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

☐ New Member ☐ Renewal

Name _____ email _____

Mailing address (Apt. #) _____ Home phone _____

Mailing City, State & Zip-8 _____ Work phone _____

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

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

please include miles driven and type of vehicle _____

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

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

☐ Owner/Driver ☐ Hobby/Builder ☐ Professional/Business ☐ Competition (Rallies, Races, Records ☐ Plug-in Hybrids

☐ Environmental/Govt. Regs ☐ Social (Rallies, Shows, Events ☐ New Technology & Research ☐ Solar & Wind Power

☐ Promotion & Public Awareness of EVs ☐ Student or General Interest ☐ Electrathon/Bicycle/Scooter/Other

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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Vista, CA 92081

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