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Charged Up

ELECTRIC VEHICLE ASSOCIATION OF SAN DIEGO (EVAOSD)
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Regular Meetings: Our meetings are on on the 4th monday of every month (except December).

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

Next Meeting: ***October 24th, 7 PM***

Program: New Location, New People

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Presidents Message:

We are going to have a quick vote at this meeting. After talking to many members, we think we have the positions narrowed down for the rest of this year. **We are at the SDG&E Innovation center for the rest of this year.**

For Sale:

Epic EV is still having a sale of extra stuff:
I have 4 brand new WARP-DRIVE CLASSIC CONTROLLER, 260 VOLTS, 1400 AMPS that we no longer will be able to use. I will be returning them with a restock fee.
I wanted to see if you knew anyone that might be interested in them before I return them.
My cost is $2520/unit-retail is $3500

I still have 85 batteries in house that I would like to sell for $190/piece
Model # 31-PC2150-Retail is $375/piece!

I also have a couple of pallets of Delta Q Chargers as well.
Model #922-7254 QuiQ-dci ICON Charger 72V / 12V DC-DC Converter
$450/ charger
Bill Hogan
General Manager
Epic Boats/Epic EV
(760)466-2799 Phone
(760)466-2796 Fax

As the Crow Flies: The Speed of Charging

by Dave Crow

(written: 18 October, 2012)

I'm going to take a chance and introduce a different, if not new, term for describing part of the performance of an electric vehicle. As EV enthusiasts and ambassadors, we are asked frequently about how long it takes to charge an EV up to a "full tank". For a gasoline powered car, that can take anywhere from five to thirty minutes depending on how much of the "drive ,wait, pump, and pay" process you want to include. For an EV parked in your garage, it can take you thirty seconds to start and stop the charge. For the car it will take hours. That long period of charge time is one major concern of the general public and we enthusiasts need to be able to talk about it.

So, here is the term: Miles Per Hour of Charging. I have seen this parameter mentioned a few times in other articles; but, only as a side note. For reduced keystroke sake, I'll abbreviate it to "MPHc" - much like MPGe. MPHc refers to the number of drivable miles your EV can recover during an hour of charging. For a gasoline car, this number is probably 800 to 3,000 depending on how much of that drive-wait-pump process you care to consider. For an EV, MPHc is comparatively pretty small. Unfortunately, a bigger number is a better number. WIth the range of EV capabilities on the road right now between conversions and production cars, MPHc is realistically anywhere from 4 to 60. For example, this number will determine how long you'll need to take for lunch while you charge, how late you may be getting home tonight if you are stopping to charge on the way, or how early you need to plug in your car at night to "fill up your tank" for the next day. If you've over-extended your errands for the day and you need 20 more miles of range to get home, how long will you need to park at the Blink charger to be able to load up that additional 20 miles of juice? It depends.

There are a few key variables in the line of charging components that effect MPHc. The three I'll discuss are: (1) the car and it's driving efficiency, (2) the EV's charger capacity, and (3) where you are plugging in. For simplicity, I'll only discuss lithium format battery packs. Lithium packs can take some fairly high charge rates and rarely turn out to be the bottle neck in the charge process. Lead acid guys will need to talk with me offline, later.

Considering the car that you converted or purchased, many of the same factors for mile per gallons apply to MPHc. Sparing you the long technical lecture, the efficiency parameter of interest is watt-hours per mile. You'll see a version of the number on the EPA EV stickers as KWHR per 100 miles. For a fixed charging rate of watts, a small and efficient car like a 914 conversion or a TESLA roadster will have a MPHc three or four times better than a Toyota RAV4 EV or the Cadillac Escalade that Jack Rickard recently converted. The Leaf and Volt are somewhere in the middle of that efficiency range. Therefore, to improve your MPHc, pick the most efficient vehicle that will meet your needs. And always remember that EV MPHc will depend on your driving habits, too.

Now pay attention to what charger you have put in your conversion or has been designed into your Leaf, Mitsubishi-I or Volt. The important parameter on the charger is effective output wattage. Some conversions will have something small at around 2,000 watts. The 2012 Volt and Leaf use a 3,300 watt charger. My Manzanita charger in my converted VW is rated at about 4,400. The Mitsubishi I, the Ford Focus, and the Honda Fit EV have a 6.600 watt rating. If you plug into a 240 volt source that can handle the largest of these, you see that the range of MPHc just based on this selection of chargers varies by more than 300%. Therefore, do your homework before your final conversion design or signing the papers at the dealership.

The third and final item to consider is where you are plugging in. The main two options are either (1) "Level-One" 120 volts and 13 amps out of any of the five billions outlets in America, or (2) "Level Two" 240 volts at 20, 30, or 40 amps from an EVSE or other appliance outlet set up in your house. As of this date, there are only two or three "Level Three" DC fast chargers in San Diego county, so they can't be considered an option, yet. If you limit yourself to a standard 120 volt outlet, you have five billion "gas stations" available, but, you'll be plugged in all night. If you have spent the money for

your own EVSE in your garage, or can find a parking spot at a Blink station around town, your MPHc will be three to five times higher than an ordinary outlet.

The MPHc numbers can come from several different sources: (1) Do the number crunching in a spreadsheet using all of the parameters I mentioned above plus a few more. (2) Write down the results you see from your own EV and figure out a number for 120 volts and one for 240 volts. (3) Find the numbers in your production car owners manual. Or, (4) check the EPA sticker for your production vehicle. In researching this topic and due to my love of engineering, I have developed a lot of data tables that represent the permutations of these three variable and I will spare you from all of those number this time around. In general, these are the results:

1- Small charger conversion or Leaf or Volt on "trickle charge" 120 volt outlet: 4 to 5 MPHc

2- 2012 Leaf or Volt at a 240 volt EVSE: 11 to 13 MPHc

3- 2012 Mitsubishi I or Honda Fit EV at a 240 volt, 30 amp EVSE: 20 to 25 MPHc

4- Tesla Roadster at a 240 volt, 50 amp, custom home charger: 60 MPHc

5- Nissan Leaf with a CHAdeMO, Level three, 400 Volt DC: 110 MPHc

6- Tesla Model S at a 400 volt, 250 amp, "supercharger": 300 MPHc

As you answer the hundreds of EV questions from interested people, I suggest you have two answer available. One answer is the MPHc for your vehicle and then one of the higher numbers stated above that will indicate where the technology is moving towards. It will only get better and better.

Laguna Seca

by Richard Rodriguez

I went out to Laguna Seca Mazda Raceway for the REFUEL 2012 event again this year. It had a much different flavor from previous years in that now there are more production cars available.

Production entries at REFUEL 2012 included:

5 Tesla S Models, 8 Tesla roadsters, a few Coda models, 5 BMW active-E cars and 5+ Nissan Leafs. Unfortunately there were no Ford Focus electrics.

Jack made a good point about the Model S cars superior handling due to their low center of gravity. They may be sedans but with their water cooled motors and large battery packs creating a low CG they actually outperformed the Tesla Roadsters. The Roadsters have air cooled motors that reach thermal cutback racing around at Laguna Seca or so I have heard.

In the conversion group:

The red Miata driven by Roger Derryberry was probably the fastest conversion but he had battery problems related to his BMS I think. As a result he did not make it to the time trials.

Steven Johnsen had a Pontiac Fiero with Duel 8” DC motors stacked using a 2K Zilla controller. However he was using Lead Acid batteries and blew one of his cells. He and his crew frantically pulled the bad cell and ran in the time trials but with

reduced voltage. He is building an A123 pack but was not able to have it ready for REFUEL 2012. When he gets the lead out it will be interesting to see how he does.

There were only 5 conversion cars this year (less than last year) I came in first place in the conversion time trials despite the fact that I did not have the fastest car. In my case, driving on a racetrack with Prius tires (Bridgestone Ecopia 100's) is not the best way to go. However, it was great fun and it was like being 12 years old again.

There were also production electric motor cycles and conversion motor cycles as well as prototype cars and motorcycles. They even had electric go-carts this year. In addition, there were a few odd balls included like an electric wheel barrel.

This year at REFUEL it has become apparent, electric cars are on the rise!

I wanted to provide an update on my car one year later after doing my video last year in July 2011.

As of today 07/22/2012:

On my xantrax link pro, I now use the Backlight mode Function F6.3 I have driven 19,135 miles battery operated. I have gone 140 miles on a charge. I average 222 Wh/mile Max. speed 107 MPH

A month ago I had to run a few errands and I noticed I was running very efficiently at about 1.3 Ah/mile. So... I decided to do a long distance maximum range test.

This was mostly Freeway driving @ 65mph driving like a granny not 75-80 like I usually drive. At the end of the test, I was driving around my neighborhood with a volt meter attached to my windshield wiper connected to my cell #25. This is my lowest capacity cell from prior tests.

I also wanted to see how the voltage sagged on that cell when I was accelerating. Cell #25 sagged to 2.25v under 50amp load at the end of my trip. As soon as I pulled into my garage, I checked cell voltages and #25 was at 2.41v. I hit the 2.5 volts on cell 25 just down the street from my house. So stupidly I kept going. I was so close after all.

Cell voltages ranged from 2.71v to 2.41v with an average of 2.62v. I bottom balanced a year ago and my pack is still pretty much bottom balanced.

I got exactly 140 miles using 194.2 Ah

That's 1.387 Ah/mile and 168.4 Wh/mile with a 2,300lb car.

After almost 2 years of commuting 45 miles to work and back (total round trip =45) I consistently use between 1.29Ah/mile and 1.95 Ah/mile. In the first month before I did my alignment and the brakes loosened up I went as high as 2.29 Ah/mile but now that the car is a

bit more fine tuned I never consume that much energy. When I am being a lead foot and trying to use as many Ah as I can, I get only 1.95AH/mile

With the exception of Laguna Seca Raceway

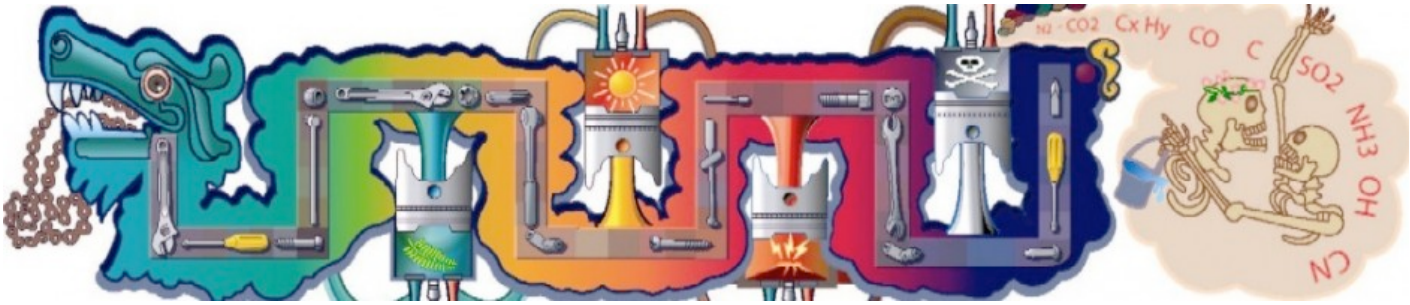
With an average of 1.82 Ah/mile = 221.6 Wh/mile, I do a little better than the average conversion using the “Rule of thumb” for every 100lb of car you use 10Wh/mile. Given my car weighs 2300lbs. However my average is pretty close .

2300lbs/100lbs x10Wh/mile=230Wh/mile

I wanted to see if I could compete in the ENDURO run being planned for EVCCON 2012. It's a who can go around 127? miles event.

However, as it turns out, I will be hiking in the Grand Canyon with my wife in September. The hiking group we belong to has planned a big trip in September and it conflicts with EVCCON.

BUT NO EXCUSES I WILL BE THERE NEXT YEAR.



The Kick Gas Car Club is a support group for current and future electric vehicle owners, established in 2007 and based in San Diego, California. Our mission is to convert and maintain electric vehicles for green trees, clean air, blue sky’s and healthy oceans EVerywhere, a local effort with global significance. Our hearts also tell us to do this for EVery current and future Jack and Jill see “About Puff the Mechanical Dragon” our Kick Gas Car Club mascot and a metaphor for the four stroke cycle engine which has been polluting our environment for over one hundred years. Club members collectively own and operate a car conversion shop stocked with specialized tools and equipment needed to undertake the conversion process safely and quickly. To date the Kick Gas Car Club has converted or has had a hand in converting well over two dozen ICE cars (Internal Combustion Engine) to NICE cars (No Internal Combustion Engine) powered by electric batteries. We also offer EV conversion workshops for a small fee and to date almost two hundred people have participated. The Kick Gas Car Club is self funded by its members on a voluntary donations basis. Please come and join us for one of our EV workshop held the first Saturday of each month or for one of our EV Work-a-Days held each remaining Saturday of the same month. If you do decide to visit, you will find us diligently working on Kick Gas Car Club member EV’s as we share technical knowledge, sweat equity labor and great meals with like minded friends who choose to love and live POWERFUL as they drive NICE-ly by EVery gas stations in their neighborhood and hopefully sometime soon in the whole WORLD ! Why not? Saz the KGCC

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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