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EV SURGE

JAN-FEB

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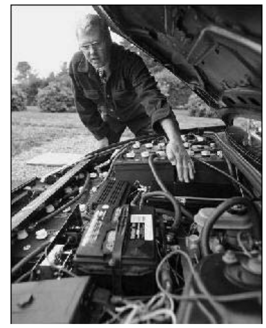
Homebuilt EV Conversion

drops gas bill from $10 a day to 60 cents.

Posted Dec 24th 2006 8:13PM by Mike Magda

We're seeing a lot of reports of homebuilt electric vehicle conversions these days. Most owners say they were motivated after seeing gas prices skyrocket last summer.

The latest success story comes from Oregon where Charles and Ronda Crockett ripped the gas engine out of a 1994 Saturn wagon and stuffed in 20 batteries and an electric motor. A school librarian, Charles says he's not much of a mechanic or electrician but he does know how to conduct research. The goal was to build a vehicle that could go 80 miles on a single charge.



The used Saturn cost just $900, the batteries were $1,700 and the conversion kit was $6,700. Charles says the cost of the conversion will be paid off in gas savings within two years. By his math, a daily commute

Continued on page 2 - Homebuilt

First eBox Delivered to Tom Hanks!

Actor Buys New Electric Car, *bids gasoline adieu!*

February 15, 2007

SANTA MONICA – AC Propulsion has delivered the first eBox customer car to Tom Hanks. The actor and producer, a veteran EV driver, ordered his eBox after driving the first prototype last July. "I still have a Toyota RAV4 EV and never spent a penny on gasoline for it", said Hanks, "What AC Propulsion is doing is fantastic. I drove their tzero electric sports car a few years ago, so when they put the same technology in a four-door I wanted one for myself. It has double the range, goes fast, uses Li Ion batteries, and is incredibly roomy and comfortable. Oh, and I will also never have to put any gasoline into it!"

The eBox, which made its public debut in December, is a pure electric car, not a hybrid. With no gasoline engine, the eBox transports its occupants serenely and efficiently, at speed or in traffic, with powerful acceleration and amazing regenerative braking. Recharging is as close as the nearest electric outlet because the eBox can plug in anywhere.

It seats five and has one of the roomiest rear seats in the business. Fold the rear seat and the eBox can take a huge haul. With air conditioning, electric heating, power steering, power windows, power mirrors and

Continued on page 2 - eBox

Homebuilt—from Page 1

costs between 30 and 60 cents. With his gas vehicle it was $10.

Source Autobloggreen.com

URL: http://www.autobloggreen.com/2006/12/24/homebuilt-ev-conversion-drops-gas-bill-from-10-a-day-to-60-cent/

eBox—from Page 1

remote door locks, the eBox matches comfort and convenience with any car.

And there is one convenience no conventional car can match – the eBox refuels at home. Plug it in and it charges while you sleep. In the morning, the 35 kWh Li Ion battery is ready to go up to 150 miles, more than enough for a typical day's driving.

Just before he drove off, silently, in his new eBox, Hanks observed, "There are three electric cars sitting on the moon, and now another one in my garage. The eBox makes even more sense in Los Angeles than in the Taurus-Littrow Valley of the moon. I can drive all weekend, hauling dogs and helping my friends move, and the only reason I'll need to stop at a gas station is for beef jerky and lottery tickets."

eBox

by AC Propulsion

Vehicle Performance

120-150 Miles / charge

0-60 mph in 7 secs

Top Speed = 95 Mph

Charge Rate = 30 Minutes

for 20 to 50 miles

Full Charge = 2 Hours (fast),

5 Hrs (normal)

Source: AC Propulsion

URL: http://www.acpropulsion.com/releases/02-15-2007.htm

{Used with permission}

Some Press Releases:

December 28, 2006:
Altair Nanotechnologies Inc. (NASDAQ: ALTI), announced today that it shipped ten rapid charge, high power NanoSafe™ battery packs to Phoenix Motorcars, Inc. on schedule. Phoenix Motorcars confirmed that the shipments of ten 35 KWh battery packs fulfilled and completed the $750,000 order placed by Phoenix in July 2006.

URL: http://www.b2i.us/profiles/investor/ResLibrary2.asp?BzID=546&GoTopage=&Category=856

January 3, 2007:
Cobasys and A123Systems announced today that they have signed a memorandum of understanding to enter into a partnership to develop, manufacture, sell, and service lithium-ion energy storage systems for hybrid electric vehicle (HEV) applications. The scope of the agreement will include joint development, marketing and supply of A123Systems nanophosphate lithium batteries and Cobasys systems integration and manufacturing of battery systems for HEV markets.

URL: http://www.a123systems.com/html/news/articles/010307_cobasys.html

January 18, 2007:
Electrovaya Launches MN-Series Lithium-Ion Superpolymer Battery Technology. The MN-Series, a Lithiated Manganese Oxide base system, delivers up to 50% Higher energy density and comparable safety characteristics to Electrovaya's Phosphate-Series solution.

URL: http://www.electrovaya.com/pdf/PR/2007/PR20070118.pdf

Jan. 26, 2007: Tesla Motors Opens Michigan Technical Center.
ROCHESTER HILLS, Mich.– Tesla Motors, today opened its Michigan Technical Center in Rochester Hills.

Rochester Hills Office is Expected to House 60 Engineers, Serve as Hub for Research & Development for Future Products.

The 19,240 square-foot facility, located at 1840 Enterprise Drive, will focus on research & development for future Tesla products, starting with a four-door electric sports sedan to be built by the Silicon Valley-based company. That project, named "WhiteStar," will be a four door, five-passenger, lightweight, high-performance sedan planned for production around 2009.

URL: http://www.teslamotors.com/media/press_room.php?id=250

Automobiles: Electric vs. Gasoline

Seikei University (Tokyo), 2001

It is well-known that electric vehicles produce almost no pollution on the road, but how much environmental impact can be attributed to their full life-cycle, including manufacture? And when all of these emissions are taken into account, are electrics really all that much better than gasoline automobiles? And what about hybrid gasoline-electrics? Kiyotaka Tahara and several of his colleagues at Seikei University in Tokyo recently published a study attempting to answer these questions.

Unlike the other LCA reviewed in this issue of the Leaf, this work is based on a "bottom-up" method of life-cycle assessment. Tahara et al did not rely on averaged data, but instead carefully catalogued the energy use and CO2 emissions of the various steps in a particular manufacturing process. This allowed them to make precise assessments of changes in energy consumption that would result from changes in altering only those parts of the automobile that determine whether it is electric or gasoline, leaving the body, interior, tires etc. unchanged. This ensures a fair comparison between the gasoline, electric and hybrid models.

Gasoline and hybrid automobiles both use gasoline (or a similar fossil fuel) for all of their energy during the use phase, so it is easy to make an accurate estimate of what the car's total energy (and therefore CO2) inventory will be. But because the use energy of a car is so much higher than the manufacturing energy, the source of an electric car's electricity will have an enormous influence on the automobile's environmental impact over its lifetime. In the United States, for instance, states with large coal reserves (e.g. Pennsylvania, West Virginia) have "dirty" electricity because it is generated mostly with coal, whereas electricity in other parts of the country is cleaner (e.g., the Northwest, where electricity is mostly hydroelectric).

The published article focused on CO2 emissions only, which are closely correlated to energy consumption. Figure 1 shows the CO2 emissions attributable to the life-cycle of the gasoline and hybrid models, and to the electric model under three different assumptions about the electricity source. Coal is the most CO2 -intensive form of electric generation, and hydroelectric the least. The method in between these two, liquified natural gas, is more common in Japan (the authors' country) than in the U.S., but is comparable to the direct natural gas firing that is common in the U.S., and is generally considered the cleanest fossil fuel-based method of electricity generation.

Figure 1 reveals that gasoline cars are responsible for the least CO2 emissions during manufacture, but the most during use, and therefore the most over the vehicle's total lifetime. Hybrid cars demand slightly higher CO2 emissions during manufacture, and electric cars the most. Electric cars' high emissions during manufacture are most likely related to their very large batteries. But certainly the most important lesson of this LCA is the importance of the source of electricity used to power an electric car. Coal-based electricity leads to CO2 emissions nearly as high as for a gasoline-powered car! Yet hydropower results in dramatically lower CO2 emissions. If you want to make an impact on CO2 emissions with your next car purchase, you need to know how the electricity in your region is generated before making your choice. And if in doubt, the best advice is once again to go hybrid, as we indicated in the last issue of the Leaf.

Source URL:
http://www.ilea.org/lcas/taharaetal2001.html

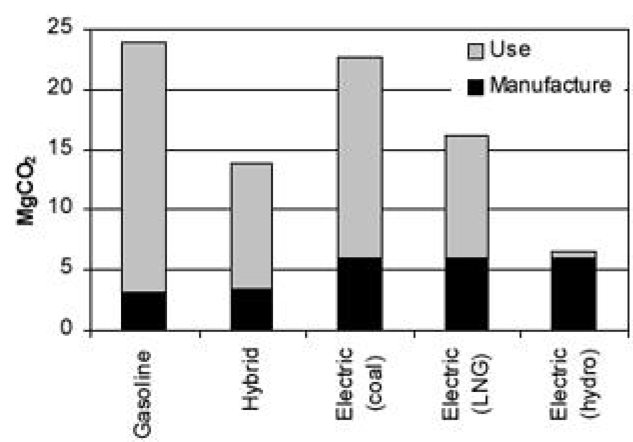


Figure 1 - Total carbon dioxide emissions over the lifetimes of gasoline, hybrid, and electric cars. The electric car is shown three times, with differing use energies depending on the method of generating electricity: coal, liquified natural gas, or hydroelectric.

Ontario RST Rebates for Vehicles Powered by Alternate Fuels.

RST Guide 702, August 2006.

Rebate Program Eligible Vehicles

People who purchase or lease new or used vehicles licensed under the *Highway Traffic Act* (e.g., automobiles, trucks, and vans) may qualify for a rebate of RST if the vehicles operate on alternative fuels.

Eligible non-hybrid vehicles operate or are converted to operate:

- exclusively on electrical energy
- exclusively on propane, natural gas, methanol, or other manufactured gases, or

as dual-powered vehicles (vehicles that use one of the alternative fuels mentioned above and that can also be powered by gasoline or diesel fuel).

Full information on this program available at the following URL: **http://www.fin.gov.on.ca/english/tax/guides/rst/702.html**

Putt-Putt Polution

If you are concerned about the amounts of pollutants your automobile spills into the atmosphere, you might want to be thinking about your lawn mower too.

According to studies, the average gas power mower will put out as many pollutants in one hour's work as a typical car emits in a 100-mile journey. Or, to put it another way, the California Air resources Board says that, gallon for gallon, a 2006 lawn mower engine contributes ninety-three times more smog-forming emissions than 2006 cars.

The Environmental Protection Agency is considering regulations that would mandate catalytic converters for small gasoline engines.

Battery News—Advances in Batteries, What's new, and coming!

Brown Engineers Build A Better Battery - With Plastic

Date: September 14, 2006

Science Daily — Brown University engineers have created a new battery that uses plastic, not metal, to conduct electrical current. The hybrid device marries the power of a capacitor with the storage capacity of a battery.

"Batteries have limits," said Tayhas Palmore, an associate professor in Brown's Division of Engineering. "They have to be recharged. They can be expensive. Most of all, they don't deliver a lot of power. Another option is capacitors. These components, found in electronic devices, can deliver that big blast of power. But they don't have much storage capacity. So what if you combined elements of both a battery and a capacitor?"

That's the question Palmore set out to answer with Hyun-Kon Song, a former postdoctoral research associate at Brown who now works as a researcher at LG Chem, Ltd. They began to experiment with a new energy-storage system using a substance called polypyrrole, a chemical compound that carries an electrical current. Discovery and development of polypyrrole and other conductive polymers netted three scientists the 2000 Nobel Prize in Chemistry.

In their experiments, Palmore and Song took a thin strip of gold-coated plastic film and covered the tip with polypyrrole and a substance that alters its conductive properties. The process was repeated, this time using another kind of conduction-altering chemical. The result: Two strips with different polymer tips. The plastic strips were then stuck together, separated by a papery membrane to prevent a short circuit.

The result is a hybrid. Like a capacitor, the battery can be rapidly charged then discharged to deliver power. Like a battery, it can store and deliver that charge over long periods of time. During performance testing, the new battery performed like a hybrid, too. It had twice the storage capacity of an electric double-layer capacitor. And it delivered more than 100 times the power of a standard alkaline battery.

But Palmore said the new battery's form, as well as its function, is exciting. In width and height, it is smaller than an iPod Nano. And it's thinner, about as slim as an overhead transparency.

"You start thinking about this polymer and you start thinking that you can create batteries everywhere out of it," Palmore said. "You could wrap cell phones in it or electronic devices. Conceivably, you could even make fabric out of this composite."

Palmore said some performance problems – such as decreased storage capacity after repeated recharging – must be overcome before the device is marketable. But she expects strong interest. Battery makers are always looking for new ways to more efficiently store and deliver power. NASA and the U.S. Air Force are also exploring polymer-based batteries.

"What we've got is a good concept," Palmore said. "Put electroactive molecules into conducting polymers and you can come up with all sorts of interesting materials that store energy."

Source: Science Daily
URL: http://www.sciencedaily.com/releases/2006/09/060914095053.htm
(*Used with Permission*)

Tayhas Palmore, an associate professor in Brown's Division of Engineering

A Word from Our President—Howard Hutt

It is too long since we were regularly receiving our bi monthly newsletter and the sad reason is the passing of our editor, Neil Gover. I miss him terribly and so does the membership. In the few years that man was active in our Society he made his mark in many different ways. Firstly, he was passionate in the promotion of electric propulsion.

After joining our group he joined Oshawa, Ottawa, and Vancouver EV groups, plus EAA. It was in an effort to get all the information on local EV activity and pass it on. In all that he did a great job. He assisted me and did most of the conversion of a test vehicle at Electrovaya, that is now running on Li-ion Super Polymer batteries. Their Maya 100. And in his spare time, he would supervise our web site, serve as our Treasurer and assist in all trade show events that Electrovaya and EVS might attend. I just wanted to remind you what we have lost. Thank you Neil.

Now we can welcome a new editor, Robert Brian Weekly. He too is passionate in his pursuit of EV technology. I am sure we will benefit from Robert's efforts to please his colleagues in our collective interests.

We, EVS members, are changing the web site to serve the EV community better. There are many new developments in EV related news that will be reflected in these pages. Pass this newsletter to a friend, consider our advertisers should you be interested in their type of product and watch for more EV news in future newsletters. Howard

EV Timeline Watch this Space

1834: Thomas Davenport invents the battery electric car. Or possibly Robert Anderson of Scotland (between 1832 and 1839). Using non-rechargable batteries. Electric vehicles would hold all vehicle land speed records until about 1900.

1859: Gaston Plante invented rechargeable lead-acid batteries.

1889: Thomas Edison built an EV using nickel-alkaline batteries.

1895: First auto race in America , won by an EV.

1896: First car dealer – sells only EVs.

1897: First vehicle with power steering – an EV. Electric self-starters 20 years before appearing in gas-powered cars.

From: www.eaaev.org/

Ken Norwick, Electric Vehicle Advocate-**Tuesday, 09 Jul 2002 CALGARY, Alberta, Canada**

I turn the key to the start position on my homemade 1996 Saturn electric car and hold it for about a second. The soft click that follows is the only indication that the car has started.

I push the clutch in and shift into reverse. With your foot off of the accelerator pedal there is no need to use the clutch in the conventional way, as an electric motor does not idle like an internal combustion engine. It simply stops turning and waits for the driver's next input from the "gas" pedal.

As soon as at least 10 amps of power starts to flow through the car's power grid, the E-Meter on the top of the dash comes to life, reporting the vital signs to the driver. These meters (or their equivalent from another manufacturer) are an important component of any electric vehicle conversion. A small computer inside is wired into the power circuits of the car, and control signals sent to this unit are constantly monitored. I can use a small switch on the face of the instrument to select from the various reporting functions.

The Saturn's E-Meter.
In car terms, you can think of the E-Meter as a fuel gauge, but it does a lot more than that. When I first built the car and installed the gauge, it had to be calibrated to this particular vehicle and its combination of system voltage, battery chemistry, and capacity. For example, this car uses 18 eight-volt batteries to store its energy for a total system voltage of 144 volts. The E-Meter knows this because I told it so when I first entered the system configuration into the computer. It also knows that these batteries have a storage capacity of 165 ampere-hours per battery. You might think of these as the functional equivalent of "gallons of gasoline."

You would be surprised how getting off of the main roads and using side streets can improve your commuting experience.

Source: Grist.org
URL: http://www.grist.org/comments/dispatches/2002/07/08/ken/index1.html

Driving Electric For fuel savings, reducing pollution, saving wear on my gas car!

By Robert Weekley

Some years ago, about December 1980, I saw my first Electric Powered Car, in person, at a Car Show in Phoenix, Arizona, at the Point Resort. It was a vehicle built by General Electric. They used a Bradley GT Kit Car, and gave statistics as a range of 100 Miles, and speed of 70 MPH! I was impressed, and saved the info sheet I got from them at the time.

After coming to work at Bombardier in December, 1995, I saw Bombardier's attempt to enter a new market for Low Speed Vehicles, with an Electric Neighborhood Car for Gated Communities, which program was since stopped, and – to my surprise – I met a man recently, Monte Gisborne, that acquired some of the assets from that program from Bombardier at a very good price – which he used in his conversion of a Firefly Convertible – called the Electrifly!

I am now owner of a 1989 Pontiac Firefly. It has been converted to Electric Drive by a group of students and teacher in 1994 at Marian Academy in Etobicoke. This car is actually their second conversion. The process of removing the Gasoline Engine and related Gas fixtures, tank, lines, etc., and installing a 90 Volt D.C. General Electric Forklift Motor and Controller along with arrangements for 8 x 12V Batteries was done by the students with the teacher supervision and guidance. The correct type – Deep Cycle Batteries, were initially installed when the conversion was done, but – have since been replaced for some reason with Marine Batteries, which are not as durable, and have been forgotten as to maintenance needs over the years.

I am currently testing some ideas in the area of Battery Reviving Chemistries, and Charge-Discharge activities, with some good results so far. Unfortunately – when I took the car to get a Safety Check for transferring the plates to me and putting it on the road, I was informed of the needs to have some serious bodywork done to the forward underbody and rocker panels. I have since done the first preparation for this by stripping the interior of seats, side panels, and carpet, so the bare metal is showing for easy(er) body shop estimation and repair.

My purpose in buying the car – for driving to work instead of driving my gasoline car, to save it wear and tear due to the short distance to work, have already begun to be accomplished, as I have used it for a few days to go to work in the colder weather, rather than start up my gas car and drive it. So – it is already going forward to help reduce Toronto's pollution from auto exhaust, and when its repairs and refurbishments are done, I expect to get as good as the students originally got – 60 Km per charge – which – for my drive to work needs, equal about a months driving. This means – driving for a month to work – while adding no pollution to the Toronto Air!

While it might sound strange – driving an electric car – we do it in plant all the time – with Cushman Electric Vehicles doing much of the parts delivery and garbage removal. Now – if it is important to have a pollution free vehicle running around in our plant, which is a closed environment, - think how important it is to have pollution free vehicles running around the closed environment of the Earth!

While some may rave and some may laugh, the reality is – we can't go on only thinking about short term costs like acquisition, but must think of the long term costs, like health car, gasoline spills, water and air pollution, poisoned wildlife, (Toxic Game Hunting, anyone?), and general generational issues like toxic children poisoned by our lifestyle choices of today. Asthma was not even a common word when I was a child, but today it is considered – just part of the normal reality of life!

If you are tired of being held hostage to Gasoline Price Fluctuations Daily, drive a moderate distance to work, and are looking for a new way out, consider converting an existing car to electric power – the most flexible fuel on the planet today, as it can be generated by Solar, Wind, Hydro, Tides, Geothermal, among the most familiar choices – on the environmentally clean slate, and Nuclear, Coal, and Natural Gas on the conventional side. As vehicles for some need to do everything – a pure electric just doesn't have enough range for the daily drive, the best choice is to go one step short – with a Plug-in Hybrid, based currently on the Toyota Prius or Ford Escape, but others will be created before long.

A Plug-In Hybrid – is a normal Hybrid, with an extra sized battery pack to get you all electric range of about 30 miles like a NEV (Neighborhood electric Vehicle), and the normal range and usage of the Standard Hybrid beyond that. While these are as yet expensive options, they allow a single car to do what otherwise would be a two car event, a pure electric car, and a separate gas powered car used less frequently.

Continued on page 7 - Driving

Electric Vehicles – The EV, What Makes Them Tick?

Electric cars are something that shows up in the news all the time.

The heart of an electric car is the combination of:

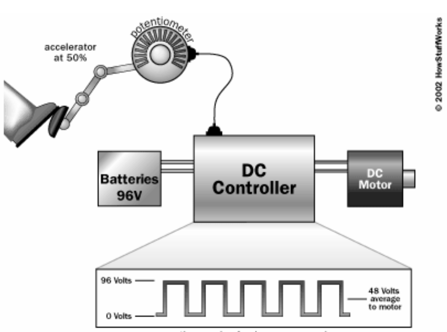
- The **electric motor**
- The motor's **controller**
- A Link from the **throttle** to the controller
- The **batteries**

Electric cars can use AC or DC motors:

A simple DC controller connected to the batteries and the DC motor. If the driver floors the accelerator pedal, the controller delivers the full 96 volts from the batteries to the motor. If the driver takes his/her foot off the accelerator, the controller delivers zero volts to the motor. For any setting in between, the controller "chops" the 96 volts thousands of times per second to create an average voltage somewhere between 0 and 96 volts.

A majority of the electric cars on the road today are "home brew" conversion vehicles. A typical conversion uses a DC controller and a DC motor.

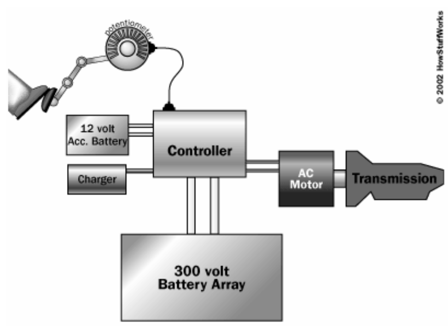
An AC controller hooks to an AC motor. Using six sets of power transistors, the controller takes in



300 volts DC and produces 240 volts AC, 3-phase. The controller additionally provides a charging system for the batteries, and a DC-to-DC converter to recharge the 12-volt accessory battery. If the motor is a DC motor, then it may run on anything from 96 to 192 volts. Many of the DC motors used in electric cars come from the electric forklift industry.

If it is an AC motor, then it probably is a three-phase AC motor running at 240 volts AC with a 300-volt or higher, battery pack.

DC installations tend to be simpler and less expensive. A typical motor



will be in the 20,000-watt to 30,000-watt range. A typical controller will be in the 40,000-watt to 60,000-watt range (for example, a 96-volt controller will deliver a maximum of 400 or 600 amps). DC motors have the nice feature that you can overdrive them (up to a factor of 10-to-1) for short periods of time.

That is, a 20,000-watt motor will accept 100,000 watts for a short period of time and deliver 5 times its rated horsepower. This is great for short bursts of acceleration. The only limitation is heat build-up in the motor. Too much overdriving and the motor heats up to the point where it self-destructs.

AC installations allow the use of almost any industrial three-phase AC motor, and that can make finding a motor with a specific size, shape or power rating easier. AC motors and controllers often have a regen feature. During braking, the motor turns into a generator and delivers power back to the batteries.

The DC-to-DC converter is normally a separate box under the hood, but sometimes this box is built into the controller.

Any electric car that uses batteries needs a **charging system** to recharge the batteries. The most sophisticated charging systems monitor battery voltage, current flow and battery temperature to minimize charging time. The charger sends as much current as it can without raising battery temperature too much. Less sophisticated chargers might monitor voltage or amperage only and make certain assumptions about average battery characteristics. A charger like this might apply maximum current to the batteries up through 80 percent of their capacity, and then cut the current back to some preset level for the final 20 percent to avoid overheating the batteries.

Usually, the person doing the conversion has a "donor vehicle" that will act as the platform for the conversion. Almost always, the donor vehicle is a normal gasoline-powered car that gets converted to electric. Most donor vehicles have a manual transmission.

The person doing the conversion has a lot of choices when it comes to battery technology. Lead Acid, Nickel-Metal Hydride, Lithium Ion, & Lithium Polymer. The vast majority of home conversions use lead-acid batteries, and there are several different options: Marine deep-cycle lead-acid batteries, Golf-cart batteries, and High-performance sealed batteries. The batteries can have a flooded, gelled or AGM (absorbed glass mat) electrolyte. The EV Challenge (**www.evchallenge.org**) is an innovative educational program for high school students around building electric-powered cars.

Driving—from Page 6

There are many choices, available, if we all must live more than walking distance from work, it is time to do more than just 'get the lead out' of our drive, but now it is time to 'get the gas out' of our commute! Think – No More Gas, and you have the makings of a whole change of environment!

The Electric Vehicle Society of Canada

Who we are - What we do

We are a non-profit group of Electric Vehicle (EV) Enthusiasts, Environmentalists and Engineers. We are vitally concerned with clean electric transportation.

We meet at Centennial College, Scarborough, Ashtonbee Campus, 7:30pm, room B204- the third Thursday of the month, excluding July and August.

We display EVs at the Toronto Auto Show, Skills Canada, Molson Indy, The Independent Power Producers Society of Ontario (IPPSO) and The Electric Distributors Association (EDA).

We encourage vehicle conversions from gasoline to electric by Canadian automotive students and we are available to offer a seminar to assist the students. To purchase an EV we will try to offer information on make and availability.

Individual $30.00, senior $20.00, business $100.00 that includes a bi-monthly newsletter, the "EV Surge". Forward to: Electric Vehicle Society, 21 Burritt Rd, Toronto, ON. M1R 3S5.

For information: Phone or Fax 416-755-4324 or Email: hwhutt@pathcom.com

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City ____ Fax ________________________

Province/State ________________________________ Postal Code ________________

E-mail Address ____

Engineers, Enthusiasts, Environmentalists Together

Members Corner: - a Place to Share Information between members.

Hear are two tables to use with Lead Acid (PbA) Batteries for making Load and Temperature Adjustments. The Original Calculations are available from robert.weekley@sumpatico.ca, ask for : Battery-Pack_Available-Energy+Distance1.xls

Discharge Rate Adjustment Factor

Reference Battery = 85 Ah

Rate Hrs	Adjustment	Amps x Hrs	Net Amps
20	100.0%	4.3	85.0
10	91.0%	7.7	77.4
8	87.0%	9.2	74.0
6	84.0%	11.9	71.4
5	82.0%	13.9	69.7
4	77.0%	16.4	65.5
3	74.0%	21.0	62.9
2	67.0%	28.5	57.0
1	57.0%	48.5	48.5

Temperature Adjustment Factor

Reference Battery = 85 Ah

Temp F	Power	Temp C	Net Amps
77	100.0%	25	85.0
62	88.0%	16	74.8
47	76.0%	8	64.6
32	64.0%	0	54.4
17	52.0%	-9	44.2
2	40.0%	-17	34.0
-13	28.0%	-25	23.8