



# EEVC NEWSLETTER

Published by the Eastern Electric Vehicle Club

Peter Cleaveland, Editor

Club Address: P.O. Box 134, Valley Forge, PA 19481-0134

email: [easternev@aol.com](mailto:easternev@aol.com). Web site: [www.eevc.info](http://www.eevc.info)

President: Oliver Perry, 5 Old Stagecoach Turn

Shamong, NJ 08088, (609) 268-0944

Copyright © 2008, Eastern Electric Vehicle Club, all rights reserved

Vol 29 No 1  
JANUARY, 2009



Now affiliated with EAA

## KEN BARBOUR, 2008 EEVC "ROOKIE" CLUB MEMBER OF THE YEAR Oliver Perry

Each January we traditionally honor an EEVC club member as our "Member of the Year" for the previous year. Usually this award goes to a distinguished long time member. However, our 2009 pick for the outstanding EEVC member of 2008 goes to a rookie, Ken

Barbour. Ken's enthusiastic contributions to our organization these past few months could not be overlooked. If our mission is to promote affordable electric car conversions, to support hobbyists who wish to attempt conversions, and to display successful EEVC conversions to the public, then Ken Barbour has more than fulfilled that mission.

Ken attended his first meeting in June of 08. In only six months of his first year in the EEVC, Ken achieved enough to become the



*Ken Barbour astride a motorcycle at his place of employment*

"Club Member of the Year, 2008"

Ken was born in Stratford, New Jersey, June 29th, 1977. His father had a truck driving career. His mother still works in the Super Fresh retail business. Ken's early childhood years were spent in Blackwood, N.J. In 1986,

his family moved to Franklinville where Ken eventually attended Delsea Regional High School. Ken was a top student earning mostly A's and B's in "Honors" college bound courses. Ken even took two years of physics. Unlike most honor students, Ken's favorite course was wood shop. His guidance counselor would not allow Ken to attend the county vocational school because Ken's SAT scores were too high, so Ken explains that "he made the best of it" even though Delsea



*Ken Barbour displays his Geo Metro electric conversion at World Usability Day, at Rutgers University Nov 13, 2008.*

had no metal or auto shop. His creative talents are as much with his hands as his mind.

As a teenager Ken was heavily involved in dirt bikes and bicycles, learning to alter, fix, and repair them. When in high school Ken acquired a job at a forklift repair shop and also pumped gasoline at an AMOCO station. At fifteen years of age he acquired a beat up truck. Father and son rebuilt every inch of it. By the time Ken acquired his license he had finished rebuilding the truck and acquired a head and heart full of auto mechanic expertise.

After graduating high school in 1995 Ken bought a brand new motorcycle at a dealership which offered him a job. After a year at the motorcycle shop he took a position in a motor cycle shop in Mount Holly, New Jersey, for four years. To add to his income when things were slow he delivered pizza. In January of 99 Ken enrolled in Gloucester County College in the Engineering Science program (which Ken has yet to finish). To be closer to school he left the Mount Holly cycle shop to take position in Deptford Honda, where Ken quickly moved up to the position of parts manager. Ken presently works as a parts manager for Power Motorsports Kawasaki Suzuki in Woodbury Heights, New Jersey. Ken is married to his wife Aimee. The couple resides in a home they purchased in Deptford, New Jersey, in April of 2005

### **Electrified!**

In November of 2007 Ken rented the movie "Who Killed the Electric Car?" Till then Ken believed, as most people, that electric cars were slow and very impractical. The movie outraged him. He forced his friends to

watch the movie over and over with him and began research related to electric cars on the internet. One month later Ken ordered the book "Convert It" by Michael Brown. Having noticed that many people were converting Geo Metro vehicles, and discovering some inexpensive components for making a Metro conversion, Ken began ordering parts on line for his own discarded Geo Metro convertible. The car was resting with a blown engine at his Dad's place where his father was anxious to have it towed away.

The electric motor for the conversion arrived in the mail on Christmas Eve 2007. Working mostly on Sundays, Ken completed most of the conversion of the Metro by the end of March 2008. The slowest part of the process involved the making of the adapter plate and coupler necessary to link the electric motor to the transmission. This critical step frequently calls for professional machine shop expertise. The measurements must be accurately determined and the parts precisely machined.

(For further information regarding parts specifications used in Ken's conversion go to the web address provided at the end of this article.)

### **Gasless**

Ken's first battery pack purchase consisted of a set of six "deep cycle" 12 volt batteries from Wal-Mart. (Do you think that someday the masses will be able to go to Wall-Mart for electric car conversion parts?) According to Ken, his first highly exciting test drive took place in his father's driveway at midnight. Although his father knew the car would work he did not expect it to exceed 25 mph or go 14 miles on a single charge. On April 1st, 2008 Ken drove a licensed and registered Geo Metro 14 miles from his father's home to his home in Deptford, 14 miles away, at an average speed of 45 mph. When his Dad received the phone call from Ken he expected it was Ken asking for a tow. He was quite surprised to learn that the maiden voyage was successful. The total price tag for parts and batteries was just under \$3000. (Very inexpensive.) The conversion was completed by Ken within three months, working about one day per week.

Since that exciting day Ken says that his

conversion, featuring a New Jersey license plate reading GASLESS, has been driven to and from work daily for a net distance of over 3000 miles. (This pattern has been interrupted somewhat with the arrival of cold weather.) The yellow convertible has been to many car shows including several representing the EEVC. The car has been treated to a new convertible top, new stereo, and new windshield. Surprisingly, the sparkling bright yellow paint job is original. I have driven the car. It is quick and provides all the power you need for around town driving. Up to 50 mph it behaves like a normal car.

Ken is not the typical environmentalist. He also loves big cars and gas guzzling engines. He tows his electric car to car shows with his Corvette, which is a rather unique tow vehicle. Ken still enjoys riding motorcycles and has raced four wheelers in his past. Now he claims he is getting in to jet skis.

### **Finding the EEVC**

While attending a car show called the "Wheels of May" in Egg Harbor, New Jersey, Ken was advised by a passer-by couple (who later e-mailed Ken the information on our 21st Century Automotive Challenge) that there was an upcoming electric and hybrid car activity planned for the month of June at BCIT, in Burlington County, New Jersey. Ken's electric car was the only one in the Egg Harbor show. Until that point Ken was totally unaware of our electric car club's existence. Ken quickly contacted me for participation information. Because of a required Saturday work schedule Ken had to forgo the competitive portion of our event. But Ken was able to display his car with the others at our Earth Fair display, Sunday June 8th, at Smithville Park. It was at Smithville that we were personally introduced to Ken and his converted Geo Metro.

Ken showed up at our monthly Wednesday evening EEVC meeting a few days later, along with his good wife Aimee, and has not missed a meeting since. He even towed his car to a fall meeting for a show and tell.

Ken participated with our group at the annual Sustainable Energy Fest in Kempton, Pa, last September. It was a three day show. His car was one of the crowd favorites. Last November of 2008 Ken joined me at an

evening transportation display at Rutgers University in New Brunswick New Jersey.

It seems as if Ken's motto is, "Have Electric Car, Will Travel" Besides driving his car to and from work every day Ken has been ready willing and able to hit the road at a minutes notice for the cause of the electric car and the EEVC. Few club members have packed so much time and commitment to our organization's activities in such a short space of time as Ken Barbour has. His enthusiasm for electric car conversions is contagious.

Future plans for Ken's conversion involve a plan to drive his convertible to club meetings under the car's own power. His current six batteries in the car are not sufficient to travel the mileage from Deptford, NJ to Plymouth Meeting, Pa. To overcome the distance barrier Ken has designed a battery trailer capable of carrying twelve 12 volt batteries which will provide two additional 72 volt packs. (The Geo Metro presently has a 72 volt system.) Ken also is thinking, as most low voltage car converters eventually do, of raising his car's voltage from 72 to 120 or 144 volts. If anyone knows of good deal on a 120-144 volt charger and controller, contact Ken.

More Info and pictures of Ken's conversion check out [www.evalbum.com/1652](http://www.evalbum.com/1652)

### **DETROIT AUTO SHOW**

The 2009 North American International Auto Show as notable for two things: the relative humility of the major car companies, which played things pretty low key, and the number of EVs and hybrids on display. It looks as if some, at least, have now got religion; or at least want us to think they have. Of course a fair number of the Detroit EVs were merely concepts, but what the heck.

A fair number of the cars (including the Volt, of course) are actually PHEVs, with some (like the Jeep Patriot) being called "range-extended EVs."

### **General Motors**

GM had its Volt on display, as expected, and announced that its battery would be built by GM in Michigan, in the first lithium-ion



*GM Chairman and CEO Rick Wagoner announced that the Volt's battery pack will be built in the U.S.*

battery pack manufacturing facility in the country operated by a major automaker; the individual lithium-ion cells will come from LG Chem. Compact Power Inc., a subsidiary of LG Chem based in Troy, Mich., will build battery packs for Volt prototype vehicles until GM's battery facility is operational. Facility preparation will begin in early 2009, with production tooling to be installed mid-year and output starting in 2010.

In addition, GM plans to open a new automotive battery lab in the U.S. to further strengthen design, development and testing capabilities, and has announced a partnership with the University of Michigan to develop a specialized curriculum for battery engineers.



range EV, being shown here by Bob Lutz, vice chairman of Global Product Development.

## Chrysler



Chrysler 200C EV Concept, another extended range EV, is shown here by Chrysler vice chairman and president Jim Press (l) and vp of product development Frank Klegon.

Most of the publicity for the car seems to be devoted to styling (sorry, design), with such features as flooring inspired by a Zen rock garden. It claims a 400 mile range using

GM also had some concept vehicles on display. Perhaps the fanciest was the Cadillac Converj concept extended

range EV, being shown here by Bob Lutz, vice chairman of Global Product Development.

Chrysler 200C EV Concept, another extended range EV, is shown here by Chrysler vice chairman and president Jim Press (l) and vp of product development Frank Klegon.

Most of the publicity for the car seems to be devoted to styling (sorry, design), with such features as flooring inspired by a Zen rock garden. It claims a 400 mile range using

the engine and 40 miles on the battery (sound familiar?), and uses the company's ENVI technology. The motor turns out 200 kW (268 hp) and 350 N\*m (258 lb.-ft.) of torque.



Also from Chrysler is a new hybrid Jeep, dubbed the Patriot (left), as well as a hybrid Wrangler.

For the sports-minded, Chrysler had the Dodge Circuit EV, which is an actual EV, with All-electric vehicle delivers sports car performance with zero gasoline consumption, zero tailpipe emissions and 150-200 mile driving range



Performance numbers are 0-60 mph in less than 5 seconds, 1/4-mile in 13 seconds and top speed of more than 120 mph using a 200 kW (268 hp) motor and an advanced lithium-ion battery system. Claimed range is 150 to 200 miles, with recharging from a 120 or 240 V outlet.

## Ford



Ford president and CEO Allen Mullaly announced that the company is planning a series of introductions, including a new hybrid and PHEVs.

First will be the North American introduction of a battery electric commercial van in 2010, followed by a battery electric small car in 2011 with a 100 miles range to be developed jointly with Magna International, and a

new generation of hybrids, including some PHEVs.

### Fisker



Fisker unveiled its Karma S concept, a four-seater hybrid hardtop convertible, which shares many elements (including Quantum Technologies drivetrain) with the Karma sedan. It claims a 50-mile all-electric range and up to 403 hp from two motors.

Fisker also showed the Karma sedan; the company has received 1000 orders for the \$87,900 (and up) car with two 201 hp motors and a 2-liter gasoline engine.

### Chinese BYD



Chinese automobile manufacturer BYD Auto Company announced that plans to enter the U.S. market in 2011 with a range of pure electric and plug-in hybrid vehicles, beginning with the F3DM PHEV sedan and the battery-powered e6 (shown), a mid-size five-passenger crossover vehicle that claims a range of up to 250 miles.

### PROJECT UPDATE Pete Gruendeman



I have been holding off on sending the attached picture because I thought it was off-topic. Upon reading the front page of the Dec. newsletter I hear that such things are discussed at the meetings.

The system in the attached picture is made of three solar hot water panels, bought used, each measuring 4'x10'. I laid out the system and did all the installation work myself. No

heat storage is included in the system. When the sun shines the system pumps heat into my building. When the sun doesn't shine I run the propane powered heater. Construction was completed on Oct. 9th and the picture taken on Oct 11th. In the second half of October I was leaving windows open as it was getting too hot in the building. The second half of November and so far in December there has been considerable cloudiness. January-March around here is known for much sunshine. We'll see. As of December 16 I still don't run the propane heater over night. The building is well insulated and there is a lot of thermal mass (machine tools, metal stocks) in there. With a cold night of 0F the building get no colder than 45-50 degrees inside. Since the set-back thermostat is set for 50 it makes more sense just to shut the heating system off. Besides energy efficiency one always has to think about fire risks.

Plans for 2009 include six new solar hot water panels, each measuring 4' x 10' for the house. If the neighbor to the south can be coerced into parting with a wee bit of land then the solar panels would be located over the edge of the hill that the house sits on. Otherwise we would be getting five panels, each 4' x 8' in size, locating them near the edge of the hill but on property we already own.

### About zinc batteries

I looked into Ag/Zn and Ni/Zn batteries at great length in 1997. Silver/zinc were the battery that put the Impact on its way to fame. Because of the expense and very short life expectancy they were never used in a production car. The problem with Zn batteries is that the VOLUME of the Zn is consumed and replated during recharge. In most other secondary battery couples, the reaction is a surface phenomena. With zinc it is the whole volume. That's why the energy/ kg is so good. And nickel/ zinc batteries run at 1.6 volts/ cell (vs 1.2 for Ni/Cd, NiMH). Dendrites form if recharging is done at too high of a rate. Non-conductive zinc foam / powder results if they are recharged at too low of a rate. Once the zinc becomes non-conductive it can not be recovered (in terms of battery capacity). Much was written at the time about getting much life out of the batteries but only

at shallow depth of discharge and recharging at precise rates. I would be willing to bet that with advancements in fiber optics and cheapo imaging technology that one could actually image the surface of the plate and control charging current as needed to get a smoother, more integral zinc plate.

An alternative form of zinc plates was based on brass screens with the zinc plated on. This changed the situation from that of a Volume to surface phenomena. It still wasn't a huge success though. Some metals just don't plate on smoothly. The Zn plate is basically electro-plated during recharge.

I'd like to have Mike Manning review the foregoing. I haven't reviewed the matter in some ten years and some parts might be off. What is spot-on is that Zn is reasonably tolerable as an environmental pollutant and that all the \_\_\_/Zn batteries have really good energy densities. I think the electrolyte is the same KOH that is used in NiCd batteries. KOH is approved as a food ingredient. It's used to reduce the acid content of frozen orange juice. (<-- double check all this.)

I would hope that Mike or someone would be in the position to speculate if the problems with dendrites/ mossy zinc deposition could be addressed by modern techniques (pulse charging, rate control...) and thus result in smooth and solid replating of the Zn on the plates.

It could be worth the effort as compared to lead-acid batteries, Ni/Zn batteries have 2 times the energy density and Ag/Zn had five times as much. AFIK the limiting factor has always been the recharge performance of the Zn plate.

## **PRESSING ON REGARDLESS** **By California Pete**



California seems determined to stick to its guns despite the economic downturn. Of course Tesla has replaced its CEO, cut staff and shelved plans for a new factory in San Jose, but it's hanging in there, and so are others. Some examples:

### **Mini E**

The San Jose *Mercury News*, voice of Silicon Valley, reported on December 26 that AC Propulsion chief executive Tom Gage has signed a deal with BMW to produce battery packs and powertrains for 450 Mini-E versions of the Mini Cooper, which are to be leased for 12 months in New York City and Los Angeles this year 2009.

### **Carbon cap and trade**

On December 11 the Air Resources Board (ARB) approved California's plan to reduce the state's greenhouse gas emissions to 1990 levels by 2020.

Development of the Scoping Plan is a central requirement of AB 32, the Global Warming Solutions Act of 2006 that requires California to reduce its greenhouse gas emissions to 1990 levels by 2020. An important component of the plan is a cap-and-trade program covering 85 percent of the state's emissions. This program will be developed in conjunction with the Western Climate Initiative, comprised of seven states and four Canadian provinces that have committed to cap their emissions and create a regional carbon market.

### **Gathering grease**

On December 28 the San Francisco *Chronicle* reported that the city of San Francisco has inaugurated a four-day grease drive, "during which residents can drop off their discarded olive oil, canola oil and other kitchen grease for eventual use in the city's fleet of biofuel vehicles."

Part of the idea is to get people to stop pouring the stuff down the drain (which clogs the sewers), and the city has moved forward with a systematic program to gather used cooking oil from restaurants and the like. The only drawback is that it seems to be leaving the amateur grease-gatherers out in the cold.

### **Enzymatic activity**

Elsewhere on the biofuel front, Solazyme, based in South San Francisco, announced on Dec 23 that it had received the *Biofuels Digest* Award for Achievement in Advanced Biofuels and Feedstocks for pioneering the production of algal-based aviation fuel and motor transport renewable diesel and biodiesel. In addition, Solazyme has been

named sixth overall on the magazine's "50 Hottest Companies in Bioenergy" list.

### **Dirty deeds thwarted?**

In recent months unknown persons have been setting fire to 14 bright-green porta-potties at construction sites around San Francisco's Russian Hill neighborhood. One enterprising builder, says the *Chronicle*, has gone so far as to conceal his worksite's facilities with plywood and a blanket to make it resemble a storage shed. This happened just a few days ago, so we may find out soon if the arsonist reads the *Chron* and figures out where it is.

## **NEWS UPDATE**

### **A bright future for lead-acid?**

A December 9 story in *Automotive Engineering* online by Paul Weissler reports that Brian Kessler, vice president/general manager of Johnson Controls' Americas Power Solutions, feels that the lead acid battery has a bright future despite the advance of lithium ion. PbA is still used for accessory batteries in most hybrids, he points out, and that microhybrids, which are gaining increasing popularity in Europe, constitute a good market for the company's Optima series of wound-plate batteries.

### **Burning hydrogen**

The December 19 edition of *Automotive Engineering* online reports that "Revolve Technologies, formerly Roush Technologies of the U.K., has developed a hydrogen bi-fuel conversion system for gasoline engines. The company recently displayed its demonstration vehicle based on a Ford Transit cargo van powered by the 2.3-L four-cylinder gasoline engine available as an option with Transit models sold in Europe. Roush selected this engine because it was designed to run on "dry fuels"—the engine could be fueled by either liquefied petroleum gas (LPG) or compressed natural gas (CNG) through existing Ford programs.

"Revolve has added a belt-driven Rotrex supercharger and charge intercooler to the engine for hydrogen-fueled operation. The

supercharger provides a boost pressure of 0.85 bar (12.3 psi) and features a bypass system to prevent operation when the engine is used while gasoline-fueled."

### **More wind in Texas**

On December 29 NRG Energy, Inc. announced that it had completed construction on its second wind farm, the 122-MW Elbow Creek Wind Project in Howard County near Big Spring, Texas. The wind farm consists of 53 Siemens wind turbine generators, each able to generate up to 2.3 MW of power.

NRG's first wind project, the 150-MW Sherbino I Wind Farm in Pecos County, Texas, came online in October of 2008.

### **Alliance formed to manufacture advanced automobile batteries in the U.S.**

On Dec 18 Argonne National Laboratory announced that it had joined with leading U.S. battery and advanced materials companies, to form the National Alliance for Advanced Transportation Battery Cell Manufacture, known as the "Alliance," to manufacture advanced lithium ion battery cells for transportation applications in the United States.

The founding members of the Alliance include 3M, ActaCell, All Cell Technologies, Altair Nanotechnologies, Dontech Global, EaglePicher Corporation, EnerSys, Envia Systems, FMC, MicroSun Technologies, Mobius Power, SiLyte, Superior Graphite, and Townsend Advanced Energy. Additional battery developers and materials suppliers are anticipated to join the Alliance. Argonne has been active in encouraging the Alliance and will continue to serve in an advisory role as the Alliance begins operations.

The Alliance seeks to develop one or more manufacturing and prototype development centers in the United States, which will be shared by Alliance members. Developing the capability to mass manufacture advanced battery cells is anticipated to require an investment of \$1 to 2 billion over five years. Most of that investment is expected to come from the federal government, because lacking current orders for advanced transportation batteries, no U.S.-based battery companies can assume the risk of making such an investment. The Alliance will permit the most effi-

cient use of available government support by having Alliance members share in the use of a large ultra-modern manufacturing facility rather than having to compete for smaller, less ambitious forms of government support.

Lithium ion battery cell manufacture is heavily subsidized in many countries. The Alliance hopes to level the playing field, and seeks to replicate the success of Sematech, a government supported collaboration of U.S. semiconductor manufacturers formed in the 1980's to address the increasing migration of semiconductor manufacturing from the United States to Asia. Between 1988 and 1993, Sematech raised \$990 million in government grants and private investment to help U.S. manufacturers recapture their lead in semiconductor technology.

### **EV test in Hawaii**

A December 10 AP story reports that Maui Electric Co. and Ontario, Calif.-based Phoenix Motorcars have signed an accord under which the utility will test the durability of new battery-powered pickup trucks using battery technologies that use a "nano titanite" system.

### **Mercedes examining potential of electric smart fortwo in the United States**

The next generation prototype of the smart fortwo electric drive is being presented in the US for the first time during the NAIAS Autoshow, says Daimler-Benz. At the End of 2009, smart will start the production of the smart fortwo electric drive with a lithium-ion battery. The company is exploring opportunities for the United States market.

The smart fortwo electric drive series will be equipped with a state-of-the-art lithium-ion battery. Lithium-ion technology has decisive advantages over other type of batteries, including its compact dimensions, high performance, shorter charging times and higher reliability.

## **COMING EVENTS**

### **EV Inaugural EVIEVents**

January 19-20, Washington DC. RSVP with suggestions to EVisionA2Z@usa.net.

### **2009 Hybrid Vehicle Technologies Sym-**

### **posium**

February 11-12, San Diego. Go to [www.sae.org/events/training/symposia/hybrid](http://www.sae.org/events/training/symposia/hybrid)

### **Battery Beach Burnout**

Feb 21-22, Jupiter, FL. Go to [www.battery-beach.com](http://www.battery-beach.com)

### **Renewable Fuels Association, 14th Annual National Ethanol Conference**

February 23-25, San Antonio, TX. Go to [www.nationalethanolconference.com](http://www.nationalethanolconference.com)

### **2009 Motor, Drive & Automation Systems Conference**

March 3-4, Orlando, FL. For info go to [www.e-driveonline.com/Conf-09/motors\\_conf09\\_index.php](http://www.e-driveonline.com/Conf-09/motors_conf09_index.php)

### **Clean Heavy Duty Vehicle Conference**

March 16-18, Long Beach, CA. For information go to [www.calstart.org/programs/chdvc](http://www.calstart.org/programs/chdvc)

### **National Hydrogen Association Conference**

March 30 - April 3, Columbia, SC. Go to [www.hydrogenconference.org](http://www.hydrogenconference.org)

### **2009 SAE World Congress**

April 20-23, 2009, Detroit. For information go to [www.sae.org/congress](http://www.sae.org/congress).

### **Challenge Bibendum 2009**

April 26-29, Rio De Janeiro. For information go to [www.challengebibendum.com](http://www.challengebibendum.com).

### **BCI 121st Convention & Power Mart**

May 3-6, Las Vegas, NV. Go to [www.battery-council.org/LinkClick.aspx?fileticket=I7sMopAJNpI%3d&tabid=68&mid=497](http://www.battery-council.org/LinkClick.aspx?fileticket=I7sMopAJNpI%3d&tabid=68&mid=497)

## **MEETING SCHEDULE**

Meetings are held in Room 49, Plymouth-Whitemarsh High School, 201 East Germantown Pike in Plymouth Meeting, PA, and begin at 7:00 p.m. As in previous years, there were no July or August meetings.

February 11

March 12

April 9

May 13

June 10

July 8