EEVC NEWSLETTER

Published by the Eastern Electric Vehicle Club

Peter Cleaveland, Editor **Vol 25 No 9**
Club Address: P.O. Box 134, Valley Forge, PA 19481-0134 **SEPTEMBER, 2005**
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SUBARU GETS SERIOUS ABOUT EVS

Fuji Heavy Industries and Tokyo Electric Power have announced plans to manufacture the Subaru R1e electric mini-car.

In February of 2004 we ran an item entitled "A Plan to Get Subaru to Build Highway-Capable EVs for the Rest of Us." The piece, which was written by Rev. W. Christopher Benham Skidmore and had appeared originally on EVWorld.com, advocated attempting to convince one manufacturer to begin building road-worthy EVs for all those would-be buyers frustrated by the reluctance of the major car companies to bring out such a vehicle. It suggested that the appropriate target would be Subaru.

That may or may not have happened, but Subaru seems to have gone ahead with EVs after all. On September 2 Fuji Heavy Industries, Ltd. (FHI), parent of Subaru, and Tokyo Electric Power Co.. (TEPCO) announced plans to jointly develop an electric vehicle for use as TEPCO's service vehicle. The two companies will design and build ten prototype vehicles based on the Subaru R1e EV now under development by FHI, and verify their performance and economy in a year of use for TEPCO's services.

The two companies will jointly design and build ten prototypes that meet the specifications of TEPCO's service vehicle, i.e., a light vehicle that covers 80 km a day. The prototypes will be assigned to TEPCO's branch offices, etc. and check their performance and economy through road tests, etc. in routine

service, and the appropriate quantity of batteries to be carried aboard an EV, aiming at reducing the weight and price of EVs.

TEPCO will also develop a fast charger that can recharge to about 80% of full charge in only 15 minutes.

On August 18 FHI made two other EV-related announcements: one is the Turbo Parallel Hybrid (TPH), a powertrain system to be applied to a hybrid electric vehicle that the company plans to launch experimentally in the market in 2007; the other is the lithium-ion capacitor (Li-ion), which is anticipated to broaden the possibilities for batteries in future automobiles. The TPH system places a thin 10-kW motor generator between a vehicle's engine and its automatic transmission. Compared to the SSHEV (Sequential Series Hybrid) system that FHI had previously developed, the TPH has better cost performance since it uses a relatively more compact motor and a smaller battery.

Li-ion capacitor

As for the Li-ion capacitor, its energy density has been drastically enhanced, while it retains the inherently superior capability of instantaneous charge/discharge and the high durability of regular capacitors. The Li-ion capacitor's negative electrode uses newly developed Li-ion occlusive carbon material, while its electrolyte is also made of Li-ion. The technique, called pre-doping, enables occlusion of large amount of Li-ion on the negative electrode, helping to boost the capacity of the negative electrode and increases the electrical potential difference, thereby making achievement of high voltage possible without deterioration in positive electrode performance.

Fuji buys supercapacitor technology

FHI has been making some strategic moves in preparation for this announcement. On June 27 *Nikkei Business* reported that the company had secretly purchased Kanebo Ltd.'s Electric Double Layer Capacitor (EDLC) storage device business with the aim of using it for both hybrids and EVs. FHI plans to start commercial production of the device before the end of 2010, and sell the product to other companies, in addition to using it for its own automobiles.

KATRINA
Oliver Perry

Things have a way of changing quickly. Similar to life after 9/11, suddenly our country is buzzing with change. There is enough political blame being thrown around to start another war. We will no longer be the same.

True, most of us knew that we have been riding a precarious wave of abundant oil for longer than expected. We predicted that the day would come when gasoline prices would soar and the public would be forced to trade their SUVs for more fuel efficient cars. We have known that we couldn't maintain our current energy usage without finding an alternative fuel source. We knew that our supply of oil could be limited suddenly by some type of upheaval or unexpected event. But I don't believe that we expected such a quick wakeup call to a public drunk with driving pleasure.

Have we in the EEVC been prepared to answer people that suddenly are approaching us with the question, "Where can I get an electric car?" It seems as if everybody now is interested what we have been doing. At least a few more people than normal seem to be.

A word of caution

Maybe things may become more exciting in our EEVC meetings in the wake of Katrina. Notice I said MAYBE and MAY BECOME, not WILL become. I have learned to temper my enthusiasm as well as my pessimism. Too many of us have too frequently run about the town shouting all sorts of predictions only to be blindsided with a Katrina that unexpectedly humbled us.

In the 70s reliable scientists predicted with certainty that we would be out of petroleum by now. One of these noted men later humbly apologized, stating that they the scientists were wrong. They made predictions without having all the facts. There was more oil underground than they ever expected. But at the time they were convinced that our petroleum sources would be depleted before the end of the twentieth century.

With the breaking off of huge ice chunks from the glaciers in Antarctica some scientists have recently cited proof that that global warming is shrinking our polar caps. But other scientists have claimed that when the thickness of the ice caps is measured we dis-

cover that overall the ice cap is growing!

We may have our opinions and our disagreements with others regarding government energy policies, the environmental impact of fossil fuels, and the greenhouse threat. There are many conflicting views and vocal supporters on all sides of most issues. I caution that before we solidify our conclusions and bash the Bushes or jimmy the Carters, we continue to gather information, separate fact from fiction when possible, discuss the issues at our meetings without drawing premature conclusions, and provide our members with as much factual information as we can. Too often the facts that we build our cases on have been passed on to us from somebody else. Remember Dan Rather. What he hoped was true could not be substantiated. Been there, done that. My good wife asks me to please let her proof my mouth before I hit send, especially in my new job as a long term physics substitute teacher in the local high school. With one slip of the tongue I can go from long term to no term in a hurry. We have conservatives and liberals in one prep room. I have learned to say, "According to the Wall Street Journal…"

For now let us try to maintain an unbiased view regarding the issues at hand. For as Yogi Berra is quoted as saying, "It isn't over until it's over!"

Has our time come?

The saga of New Orleans, the gasoline shortage and resulting price hikes reminds me of a joke that my father used to tell in regard to the depression that was always about to come, but never did.

A person who lived in tornado country preached that everyone should build his house underground. For years he went about town telling all his friends and neighbors that they ought to band together, apply for federal grants, and build their houses underground. Instead of following his advice they mocked him and called him a fool. Certainly the chance of a tornado coming to their town was very remote and unlikely.

Years went by and the "below ground home "advocate lost enthusiasm for his own message. Eventually the man went into depression because nobody would listen to his warnings.

Then one summer evening an unexpected storm approached the town. Ten tornadoes were spawned and the winds shrieked throughout the night. The next morning as the sun burst through the clouds, the doom and gloom prophet climbed out of his cellar and stood on top of what used to be his house. All around him was devastation. Neither a home nor a garage was left standing, including his own. Putting his hands in his pockets and standing back on his heels, he puffed out his chest and with a glow of satisfaction bellowed, "Well now, this is more like it!"

As I reached into my pocket for my credit card to pay for my gasoline last week, $3.15 per gallon for regular, I thought to myself….. "Well now, this is more like it!"

Has our time finally come?

SOCAL ED PLANS STIRLING-BASED SOLAR INSTALLATION

On August. 9, Southern California Edison (SCE), and Stirling Energy Systems announced an agreement that could result in construction of a 4500-acre solar generating station in Southern California. When completed, the proposed power station would be the world's largest solar facility, capable of producing more electricity than all other U.S. solar projects combined.

The 20-year power purchase agreement calls for development of a 500-MW solar project 70 miles northeast of Los Angeles using Stirling dish technology. The agreement includes an option to expand the project to 850 MW. Initially, Stirling would build a 1-MW test facility using 40 of the company's 37-foot-diameter dish assemblies. Subsequently, a 20,000-dish array would be constructed near Victorville, Calif., during a four-year period.

This would be the first major application of Stirling dish technology in the commercial electricity generation field. A six-dish model Stirling power project is currently operating at the Sandia National Laboratories in Albuquerque, New Mexico.

How it works

The Stirling dish technology converts thermal energy to electricity by using a mirror array to focus the sun's rays on the receiver

end of a Stirling engine, which turns a small electricity generator. The entire energy conversion process takes place within a canister the size of an oil barrel. Tests conducted by SCE and the Sandia National Laboratories have shown that the Stirling dish technology is almost twice as efficient as other solar technologies, including both parabolic troughs which use the sun's heat to create steam and photovoltaic cells.

IS GM DOOMED?
Dave Goldstein, President, EVA/DC

A little over six months ago, I had a vision — a revelation, actually — about General Motors. It was 2 a.m., and I was standing on my front porch taking a breather from a late night project. It was a beautiful starry night and the air was so quiet that you could hear the leaves of nearby trees rustling from the gentle breeze.

Then I heard it. A voice in my head, speaking slowly, firmly, deliberately. I did not recognize the voice, but at the same time, it seemed somehow very familiar. It spoke first in Hebrew, a language that I have some familiarity with, and then in English,

"In 30 months, General Motors will be no more."

There were no angels, no burning bushes, and nothing audible. Just that voice, like mental telepathy.

I am not one who normally hears voices in his head, although I often rely upon intuition in my EV consulting business. And those who know me from the past 25 years or so that I have spent in the EV and advanced battery field know that I am a capable analyst and program manager who constantly strives to grasp the "Big Picture."

But I knew that others would consider this vision to be a little strange, to say the least, and I was reluctant to share it, except with a few close friends including my fellow EVA/DC members. That was in late March and early April of this year.

Since then, GM has announced 25,000 worker layoffs, cut back on new vehicle plans, had its bonds derated to junk status, sold off future parts of its still-lucrative financing business to CitiBank, and is now on the hook for more than $1 billion of additional pension liabilities in the Delphi bankruptcy — the parts division that GM previously spun off to raise cash. (Some estimates predict that the full hit could be as much as $6-7 billion!)

It is only a matter of time — I think slightly less than two years — until GM collapses under its own weight, victim of it own poor management and lack of vision. It will be a sad day for America, and for the hundreds of thousands of workers who will be directly and indirectly affected — not to mention the taxpayers (you and me!) who will be asked to share the burden of GM's pension liabilities and to fund a bailout plan that will quickly collapse under the sheer weight of GM's incredible debt. Even the White House Chief of Staff — GM's former chief Washington lobbyist — won't be able to save it.

Don't forget that the White House was unable — or unwilling — to rescue their friends in the huge Enron disaster, and barely lifted a finger to help their friends at United Airlines either.

Yes, Toyota — and Daimler — will be there to pick over the pieces, as will Chinese and Korean manufacturers — all of which offers some hope for our workers and the US economy.

Sadly, it didn't have to happen. Now, I believe, it is already too late.

For far too long, GM management has been far too willing to sacrifice market share for short term profits in a beancounter-driven system that left little or no room for true engineering progress. Instead, they brought in "brand managers" from the food industry and when that failed, they engaged in a protracted rebate frenzy, capped by the recent "employee discount" program, which sold more cars but cut deeply into earnings.

Like gluttons at an "all you can eat" Las Vegas buffet, they filled up on high calorie, high profit trucks and SUVs, then gave away the profits and gambled that nobody would notice that they had forgotten how to build cars.

Worst of all, GM long ago stopped listening to its customers, and that's just plain bad Car-Ma!

The turning point occurred in the late 90s, when a group of visionary engineers, under

the tutelage of then CEO Robert Stempel, attempted to "reinvent the corporation." Among their achievements they built, on the relatively small shoestring budget of $350 million, the world's most advanced and efficient automobile — the EV1. The EV1 assembly line in East Lansing, Michigan established new benchmarks in low volume custom manufacturing — a key technology for the future, then and now dominated by Toyota Corporation.

But Stempel and his lieutenants were soon ousted by a corporate coup when GM's earnings took a downturn during a recession, and the beancounters took over once again.

In 1997, GM showed off a hybrid electric version of the EV1 at the Los Angeles Auto Show — just as Honda and Toyota were introducing their hybrids to the world. But the Beancounters at GM Corporate quietly tucked away their hybrid, never to be seen again, and openly derided the Japanese offerings for selling "below cost" — forgetting the painful lessons that America has had to learn in so many other electronic-related technologies.

At the same time, GM executives were trying to kill the all-electric EV1. But they had a problem. Many thousands of inquiries had come in from across the county for the EV1, a car that the beancounters hated and only marketed in California and Arizona, because by law, they had to. Early on, they had made a production decision to build no more than 1000 EV1s. But in California alone, they had more than 5000 inquiries and a three-year waiting list of eager customers — an unprecedented situation for any car in the GM lineup.

The "solution" was to launch an unprecedented negative lobbying, legal and PR campaign to convince the public that "EVs make no sense" and to convince California legislators to drop the EV requirement. They launched a lawsuit against California, claiming that the law interfered with federal legislation and they convinced the White House to join in. Eventually, they succeeded in changing the law and killed the EV1, taking them away from frantic customers and crushing the remains in the Arizona desert. A handful ended up in museums like the Smithsonian, to convince the public that Great Electric Experiment had been a failure.

But the failure was entirely of GM's making, and before it ended, GM had spent an estimated $600 million on the negative campaign — almost double what they had spent to develop the EV1 in the first place! Later, they would tell the press that they had spent "$1 Billion" on the EV1 — an incredibly jaundiced statement that no one questioned at the time.

What might have happened if GM had spent that $600 million to develop a line of hybrid EV1s to cross-market the wildly successful Japanese manufacturers? What if the EV1 had been allowed to reach a 20-30,000 annual "break even" volume — similar to the Corvette? What if instead of lavishing billions of taxpayer subsidized dollars on fuel cell vehicles that remain stubbornly 40 years in the future, GM had extended its groundbreaking electric and hybrid technology to its trucks and suvs, like the Japanese manufacturers are doing today?

Might America have had a solution at hand to its growing and worrisome Oil Crisis? Might GM's fortunes have changed for the better?

We will never know, and neither will GM. They are destined to become a part of history, a once-powerful creature that once dominated the Earth but failed to adapt to changing times — not unlike the Giant Wooly Mammoth in the Smithsonian Museum next door to the EV1.

NEW HYDROGEN STORAGE METHOD?

Scientists at the Technical University of Denmark have invented a technology which may be an important step towards the hydrogen economy: a hydrogen tablet that effectively stores hydrogen in an inexpensive and safe material.

The researchers claim that the material can be carried in a pocket without any kind of safety precaution. It consists solely of ammonia (NH_4) absorbed in sea-salt (NaCl). When hydrogen is needed, ammonia is released through a catalyst that decomposes it back to free hydrogen. When the tablet is empty it can be recharged with a "shot" of ammonia, the researchers claim.

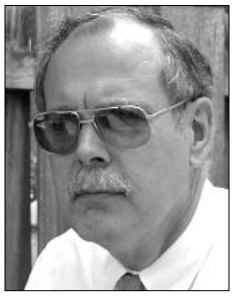
Together with DTU and SeeD Capital Denmark, the researchers have founded the company Amminex A/S, which will focus on the further development and commercialization of the technology.

More information is available from Prof. Claus Hviid Christensen, Center for Sustainable and Green Chemistry, Department of Chemistry, Building 206, Technical University of Denmark, phone: +45 45252402, and Prof. Jens K. Nørskov, Center for Atomic-scale Materials Physics, Department of Physics, Technical University of Denmark, Building 307, DK-2800 Lyngby, Denmark, phone: +45 4525 3175.

ELECTION OF OFFICERS

OK, we have no excuses. The annual election of officers was overlooked this year. It was scheduled for May and when someone remembered it ran into the summer hiatus. So here's the deal: The October meeting will consider candidates, and the election will be held in time for the results to be announced at the November meeting. Perhaps all the officers should be voted out for this (which might please their wives) but then someone else would have to step up. In any case, bring your ideas to the October meeting.

MORE SOLAR ON THE WEST COAST?
By California Pete



Florida may claim to be the sunshine state, but California is probably more ruled by the sun that any other state besides Arizona and New Mexico, so it's not surprising that people around here pay lots of attention to solar power. Of course the Enron debacle and the associated rolling blackouts of a few years ago might have something to do with that as well.

High on the governor's list of projects he'd like to get accomplished was something called the "Million Solar Roofs Initiative," a 10-year, $2.5 billion plan get solar panels installed on a million residential and commercial roofs in the state. It would entail an increase in electric rates of abut $15 annually per customer and would subsidize the purchase, installation and operation of solar panel for residential and commercial property owners. The typical residential system costs about $27,000, and purchasers would receive a rebate of about $10,000, according to the *San Francisco Chronicle*.

The plan was defeated at the end of the legislative session, having been opposed by groups including the electricians' union, which wanted solar panel installation to be done only by licensed electricians; business representatives; home builders; utility companies and consumer groups.

There have been other attempts at getting more solar installations done, and there are a fair number around the state that don't get much publicity, but more could be done except for disputes over funding, who gets to control the projects, who benefits from them, and who gets political credit (did I mention that politics are a little dysfunctional around here?).

There has been one interesting proposal that may or may not happen, but you can't fault it for being unambitious. NASA is considering a plan to put solar panels on Hangar One, a massive dirigible hanger at Moffet Field in Mountain View that dates back to the 1930s. The building is is 1140 feet long, 308 feet wide and 198 feet high. NASA has been soliciting bids to cover it with solar panels that would generate enough power to support thousands of homes.

We'll let you know if anything comes of it.

NEWS UPDATE

Huffing and puffing

The increasing price of petroleum has led to increased interest in alternate energy, and few alternate energy sources have attracted as much attention as wind power, which seems like a way to get electricity with no harm to the environment — until you actually try to put it in place. The wind farms on Altamont Pass in California have raised controversy over their purported danger to birds. The proposed wind farms off the Massachusetts coast have run into opposition from the staunchly liberal wealthy folks who don't want wind turbines spoiling their view. Now the *Los Angeles Times* reports (Sept 7) on a proposal to put a wind farm in the high desert Antelope Valley about 70 miles north-east of Los Angeles. The dispute centers on an area called the Antelope Valley California Poppy Reserve, which consists of 1800 acres of rolling hills that are covered every spring with a spectacular gold covering of blooming poppies. The *Times* quotes Milt Stark, president of the Poppy Reserve Mojave Desert Interpretive Association, which supports educational programs in five desert parks, as complaining that "it would destroy our view. It would wipe us out in the poppy reserve." Environmental groups are also concerned, according to the *Times* article, that the wind farm would block public access to the preserve and endanger birds.

In the mean time, according to *Business Week*, wind farms are starting to sprout in a somewhat more remote area than Southern California. It seems that the latest hot spot for wind is Inner Mongolia. The article describes "the Huitengxile windfarm, located 90 minutes east of the Inner Mongolian capital of Hohhot, [with] 98 wind turbines, some as high as 65 meters [and] 20-meter long blades." While wind power is more expensive than coal-generated power in China, incentives under the Kyoto treaty can make the installations economically viable.

Tougher emission laws in NW

On Aug 21 CNN reported that Oregon and Washington were getting ready to adopt California's new vehicle emission standards to reduce greenhouse gases, which would mean that California's emissions standards would be in effect along the entire West Coast from Canada to Mexico.

By 2016, all new cars, SUVs and light trucks sold in the West Coast states would have to comply with the tougher standards on emissions of greenhouse gases such as carbon dioxide, which are believed to be a leading cause of global warming. In addition, according to CNN, at least six states in the Northeast are also moving to adopt California's new tailpipe standards to reduce greenhouse gas emissions from cars.

Foot power to electric power

On September 8 the journal *Science* reported that a team of biologists at the University of Pennsylvania had developed a power-generating backpack that generates electricity from the up-and-down motion of the user's walking. Called the "Suspended-load Backpack," the device can generate up to 7.4 watts — enough to power a number of portable electronic devices at once.

Developed in response to a request from the Office of Naval Research as a way to reduce the load of batteries soldiers must carry to power all the electronic equipment they take into the field, the backpack is based on a rigid frame pack like a conventional pack, but is suspended from the frame by vertically oriented springs. The vertical movement of the backpack contents provides the mechanical energy to drive a generator mounted on the frame.

GM defers hydrogen cars

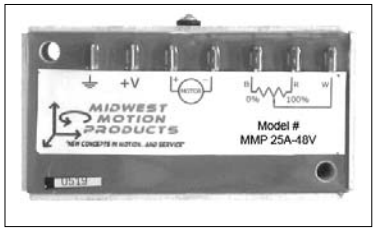
On September 9 the San Jose *Mercury News* reported that, due to financial problems, General Motors has delayed the introduction of a driveable version of its new Sequel hydrogen-fuel concept car. The car had been planned for introduction at the end of this year, but a new roll-out date has not been announced.

Under a five-year, $88 million agreement between GM and the Department of Energy the company must put 44 fuel-cell vehicles on the road in demonstration projects in California, New York, Michigan and the Washington, D.C., area by 2009, but says it won't be doing many more such projects.

Mitsubishi EV advances

On August 24 JapaneseCarFans. com reported that Mitsubishi had announced plans to enter a Lancer Evolution MIEV test vehicle in the Shikoku EV Rally 2005 to be held August 27-28 in Tokushima Prefecture on the island of Shikoku, Japan. The Lancer Evolution MIEV uses a lithium-ion battery system to power four newly developed in-wheel motors. The company is planning to bring a MIEV model to market by 2010.

NEW PRODUCTS



The MMP 25-A, 48-V motor speed control is intended for alternative energy applications, including propulsion systems in electric, hybrid electric, and fuel cell electric vehicles; 42-V under-the-hood power accessories; and other vehicular auxiliary and accessory applications. It operates on 36-60 Vdc. A battery powered or regulated dc power source is acceptable. The speed control is designed to control the output speed of a brushed PM dc motor by varying the output pulse width from 0-98% duty. It's from Midwest Motion Products Co., 952-955-2626, www.midwestmotion.com.

COMING EVENTS

2005 Fuel Cell Seminar Nov 14-18, Palm Springs, CA. For information call 202-973-8671, fuelcell@courtesyassoc.com, www.fuelcellseminar.com.

Hybrid Truck Users Forum
October 19th- 21st, Near Toledo, OH. Con Bill Van Amburg, bvanamburg@calstart or Monica Alcaraz, malcaraz@weststart.org, 626-744-5655.

ITS America 12th World Congress on Intelligent Transportation Systems
Nov. 6-10, San Francisco, CA. Call 202-484-4847, www.itsa.org.

California's Transportation Energy Future
Dec. 1, Los Angeles, CA. Contact Matt Peak, 626-744-5601, mpeak@weststart.org.

Electric Drive Transportation Association Conference & Exposition 2005
Dec 6-8, Vancouver, BC. Call Pam Turner, EDTA Conference Manager, 408-395-0059, pturner@firstoptionevents.com.

Hybrid Vehicle Technologies 2006 Symposium
February 1-2, San Diego, CA. Contact Nancy Eiben, SAE International, 724-772-8525, naneiben@sae.org.

Clean Heavy Duty Vehicle 2006
Feb 22-24, San Diego, CA. Contact: Susan Romeo or Monica Alcaraz, 626-744-5600, Srromeo@weststart.org or Malcaraz@weststart.org, www.weststart.org.

2006 SAE World Congress
April 3-7, 2006, Detroit, MI. Contact Nancy Lewis or Shawn Andreassi, both of SAE International at 724-772-4068 or pr@sae.org.

Michelin Challenge Bibendum 2006
June 9-12, Paris. Contact at http://www.challengebibendum.com/challenge/front/affich.jsp?codeRubrique=45&lang=EN, or go to www.www.challengebibendum.com.

Convergence 2006
October 16-18, 20, Detroit, MI. Check www.sae.org.

MEETING SCHEDULE

Meetings are held in Room 35, Plymouth-Whitemarsh High School, 201 East Germantown Pike in Plymouth Meeting, PA, and begin at 7:00 p.m.

October 12
Nominations for club officers

November 9

December 14

January 11

February 14