EEVC NEWSLETTER

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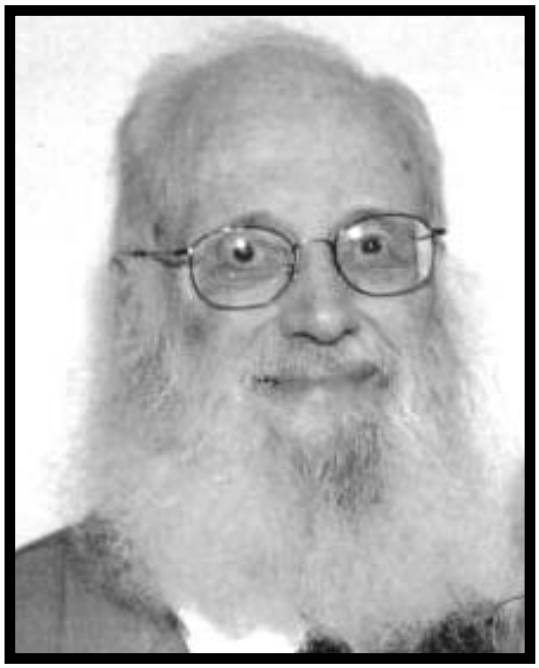
TOM MOORE DIES AT 84

Thomas William Moore, born April 16, 1924 in Mt. Clemens, Mich., son of Joseph Howard and Edna (Honey) Ullrich Moore, died June 6, 2008 at Barclay Friends in West Chester Pa.

His family moved to Berkeley Calif. in 1935; he graduated from the University of California, Class of 1949. He was a leader in Stiles Hall, the Student YMCA, and Regional and National Student YMCAs. Three years in the Army Air Force in the Pacific were followed by three teaching Jr. High in northern California. Needing to reregister prior to the Korean War, he did so as a conscientious objector. He joined the Religious Society of Friends in Berkeley which led to a lifetime of Quaker involvement. Tom worked at the Community Y in Lansdowne, PA, co-directed the International Student House in DC, and for 10 years was Director of the Student YMCA-YWCA at the University of Kansas.



Tom Moore has died at the age of 84.

Tom was a candidate for the Kansas Legislature in 1970. He was Education Specialist for the Kansas Commission for Civil Rights, 1971-78 and worked for the Kansas Office of Equal Opportunity 1978-80. He organized a 1982 vote on a Nuclear Freeze in Lawrence KA, was on the Lawrence Human Relations Commission, and active in the Lawrence Coalition for Peace & Justice. In 1983 he and his wife, Anne, moved to Wayne Pa. He worked part time with the Philadelphia Yearly Meeting of Friends, officiated rowing regattas, and owned two custom-made electric cars. West Chester became their home in 1998 when they moved to The Hickman.

Tom Moore is survived by his wife of 53 years, Anne H. T. Moore, his son Charles of Lawrence, KA and his son Howard and his wife Stephanie of Northampton MA. and their children, Anna, Leon, Cobie, Trevont'e.

He was predeceased by their daughter, Lydia Moore, MD in 1994. He is also survived by his brother, James F. Moore of San Rafael Calif., his sister, Marjorie M. Gasser of Stuart Fla., his mother-in-law, Lydia H. Thomas, his sister-in-law, Amy Hoopes and her husband, Rae Hoopes, and nine nieces and nephews

A memorial service will be held at Valley Friends Meeting, 1121 Old Eagle School Road, Wayne, PA at 3:30 pm Saturday, June 28. Contributions in his memory may be sent to Stiles Hall, 2400 Bancroft Way, Berkeley CA 94704, The Hickman, 400 N. Walnut Street, West Chester PA 19380 or Nonviolent Peaceforce, 425 Oak Grove Street, Minneapolis, MN 55403.

TRIBUTE TO TOM MOORE
Oliver Perry

Dear EEVC members who were friends with Tom Moore: According to his wife Anne, June 6, 2008 Tom died quietly and peacefully at 1:15 pm. He was 84.

After two weeks of battling an infection and peculiar blood disease Tom was placed in rehab to see if could regain strength. During this time he received good care from the staff at Barclay Friends and hospice, and he was visited by friends and family. On May 30th Tom calmly stated twice that he was content and that he would stop eating.

I not sure when Tom and Anne Moore first joined the EEVC. It was a long time ago that I remember first meeting this engaging couple at one of our meetings. At the time Tom and Anne were exploring the acquisition of a novel three wheeled electric car manufactured in Florida. It was called the Zzipper. They actually traveled to Florida, toured the manufacturing plant, and got a first hand glimpse of how it was made. If I remember correctly I was surprised that the car had not been constructed for them on time as planned and that they had to wait a few weeks before it was completed. It seemed to me from Tom's report that the company was a floundering start-up that was destined for trouble.

Tom was a perfect gentleman for a car called The Zzipper. The Zzipper and Tom seemed matched for each other. It was an adventure in the making, fun to be had, an exercise in environmental solutions, a roller coaster ride with important lessons to be learned. I never forgot Tom's laughing discovery that a three wheeled vehicle cannot easily avoid hitting pot holes.

Tom always displayed a light hearted disposition when dealing with all things, even those which were not always bright and beautiful. I remember listening to his account of broken bones resulting from a fall experienced when helping deliver food for a homeless outreach. He could always provide a cheerful remark for any given situation, including this unfortunate accident when he remarked philosophically, "Such is Life!"

Tom told us one night that he was related to a famous scientist. He had recently encountered a visit with him, one in which the scientist shared the need to be creative and think outside of the traditional box. Anne and Tom decided to apply this rule to a problem that they had run into in re-designing their kitchen. They forced themselves to break the traditional bonds and explore new ways of looking at their dilemma.

It was decided that the refrigerator was the main culprit limiting their options. So how did they solve a problem of convention in an unconventional way? They put a decorative backing on the refrigerator and moved it away from the wall and treated it more like a walk around counter. After the move everything else suddenly fell into place.

An electrified Dodge Colt (shown here in 2002) replaced the Zzipper, but not the adventure. Electric vehicle difficulties — battery and motor problems in particular — were the subject of several EEVC meetings. But through it all Tom kept smiling and learning, eventually passing the vehicle on to a family member. Last fall we saw the car at the Kempton Renewable Energy Fest on display with other electrics from our club. It now belongs to a very happy Jenny Isiacs who is actively promoting electric vehicle conversions.

It wasn't long after joining that Tom and Anne became officers of our organization, assuming the role of mailing out newsletters to everyone on our mailing list. They have faithfully fulfilled that mission even in these later years when Tom's health has limited his mobility. They were selected as club members of the year in 2002. They humbly deferred the customary plaque, saying it might appear too ostentatious for them with their limited wall space.

The following is a quote from our January 2002 EEVC newsletter. Referring to Tom and Anne, "Their Quaker background adds a pleasant mix to our meeting discussions. Tom and Anne add a human quality to our technical gatherings. Their caring and friendly smiles make everyone feel a little more comfortable."

I believe that Tom would tell us, "Yes there is a Creator in control of the universe, and He is good! So let's behave the same."

Tom Moore was a gentleman, friend, and fellow traveler through life. His gentle ways served as an inspiration and example for many of us. About eight years or so ago I called Pete Cleaveland, our EEVC Newsletter editor, to ask if he had received my particularly stinging message for the Newsletter, and whether or not he was going to publish it. Pete responded. "It sounds very bitter. Too bitter. I think you need to take some lessons from Tom Moore. We won't print this."

Tom Moore, you will be greatly missed. Thanks for being our friend and guide.

21ST. CENTURY AUTOMOTIVE CHALLENGE COMPETITION RESULTS

Paul Kydd

The Tour-to-the-Shore

The course this year was almost the same as last year, a circuit running east from BCIT in Westampton, NJ, to Lakehurst, south to Oyster Creek and northwest back to the start. This year instead of backtracking from Batsto and going up through the heart of the pines at Chatsworth we continued west and went up Routes. 206 and 541. It shortened the course to 143 miles and gave us a look at blueberries instead of cranberries.

The results are summarized below

Again the grand winner is a Honda Insight with the phenomenal mileage of 124.62 miles per gallon, or 1.21 gallons of fuel for the 143 mile trip plus a 2 mile allowance for fueling, comfortably beating last year's astonishing 75 mpg. I could not believe this, but I personally witnessed the fillup, and the fuel was indeed up to the top of the filler neck. Both

21ST CENTURY AUTOMOTIVE CHALLENGE 200 6/19/2008 16:47 **Efficiency Event**

Index	Car #	Car Name	DeltaT Hours	DeltaT Minutes	Odo Start	Odo End	Odo Miles	Value Used	Vav	Iav
1	14	Lorax	0.29	17.6	3395.0	3401.0	6.0	5.5	152.80	27.00
2	56	StMarks	0.45	27.0	45908.9	45914.9	6.0	5.5	131.40	19.50
3	"007"	RabbitPickup	0.24	14.5	168205.1	168210.5	5.4	5.5	117.50	37.10
4	16	ElecTecs/Cinn	0.28	16.6	47809.5	47815.2	5.7	5.5	144.80	40.70

Efficiency

Index	Car #	Car Name	Pav	Energy kWh	Effic Mi/kWh	Effic Wh/Mile	Effic Score	Rank	Vmax	Vmin
1	14	Lorax	4.13	1.21	**4.54**	**220.2**	**71.2**	**3**	163.60	147.20
2	56	StMarks	2.56	1.15	**4.77**	**209.6**	**78.1**	**2**	155.60	-31.20
3	"007"	RabbitPickup	4.36	1.05	**5.22**	**191.5**	**91.6**	**1**	124.00	106.00
4	16	ElecTecs/Cinn	5.89	1.63	**3.38**	**296.2**	**36.3**	**4**	152.00	133.20

Efficiency

Index	Car #	Car Name	Payload Lbs	Calc MPH	Pay. Ind. All25MPH	Payload Index Mi-Lb-MPH/Wh	Payload Score	Rank		Imax	Imin
1	14	Lorax	195	18.7	22.1	**16.6**	**36.0**	**3**	50# extra	137.20	0.00
2	56	StMarks	705	12.2	84.1	**41.1**	**76.8**	**2**		125.20	-310.40
3	"007"	RabbitPickup	435	22.8	56.8	**51.7**	**94.5**	**1**	178# extra	160.40	-136.80
4	16	ElecTecs/Cinn	235	19.9	19.8	**15.8**	**34.7**	**4**		173.60	0.40

Higher is better"			**Higher is better"**		
EfficBest	5.5	**Mi/kWh**	**PayloadBest**	55.0	**Index**
EfficWorst	3.0	**Mi/kWh**	**PayloadWorst**	10.0	**Index**
EfficValRange	2.5	**Mi/kWh**	**PayloadValRange**	45.0	**Index**
EfficMaxScore	100.0	**Points**	**PayloadMaxScore**	100.0	**Points**
EfficMinScore	25.0	**Points**	**PayloadMinScore**	25.0	**Points**
EfficPointRange	75.0	**Points**	**PayloadPointRang**	75.0	**Points**

the odometer and Nancy Hazard confirmed that Jack Martin, a new entrant from Appalachian College, did in fact make the trip, so I guess it is true. There is no question that Jack was the overall winner, and no question that we have again proved our point that vehicles that you can buy today can solve our petroleum dependence and make a major contribution to reducing greenhouse gas emissions.

Again, even the lowest mileage vehicle, a 32 year old Mercedes 300D, got far better mileage than the US average of 19 mpg and won the diesel division for Ed Kreibick.

The biodiesel division was won by Simon Hauger of West Philadelphia in a VW Jetta with the remarkable mileage of 66.83 mpg. Again I found this hard to credit, but I saw the fuel in the filler neck with my own eyes, and in fact the station spilled a half pint or so on the ground, so the true mileage is understated.

Among the Priuses (Priae?), Al Walker, the Hobbit took the prize at 68.97 mpg, with Kathleen Urban second and Nancy Hazard third. The adherence to the target time was not sensational overall, but Nancy Hazard and her driver Barbara took the prize with a total variance of 6 minutes, all accumulated on the new last leg. Up to that point they were perfect on each leg, a significant accomplishment in precision motoring.

The Run-to-the-River

This event for the newly popular concept of plug-in hybrids consisted of a morning run clockwise around the 24 mile course to Riverside, Delran and Beverly, followed by charging and an afternoon run counterclockwise around the same course simulating a 24 mile commute to work.

We had two entrants, yours truly with our modified (and almost antique) Chevy S-10, and EV Jerry Asher with a brand new plug-in conversion of a 2005 Prius. Jerry took the prize with a phenomenal 73.8 MPG and an estimated 8.1 miles on electric power only.

The S-10 did about ten miles of each leg on electric power, but only achieved 21.5 mpg overall. Part of this disappointing result was due to the fueling pump not shutting off automatically and spilling about a quart of gas on the ground. Correcting for this would give us about 24 mpg. At any rate it was better than the mileage on the same course without electric assist of 18.71 mpg. To get really accurate results we will need to use a fuel burette rather than filling the tank to measure fuel consumption. Nevertheless, it is a start at demonstrating what this new technology can contribute.

THE PHILADELPHIA SOLAR ENERGY ASSOCIATION'S ANNUAL JR. SOLAR SPRINT IN PHILADELPHIA ANOTHER GREAT SUCCESS

Oliver Perry

We (the EEVC) have assisted PSEA for the past ten years in judging the Jr. Solar Sprint vehicles for technical merit. We also present our "Over-all Best Jr. Solar Sprint Car" award to the individual or team, who in our judgment, has designed and constructed the best car in terms of creativity, craftsmanship, design, and performance.

Alan Arrison and I represented the EEVC and served as judges for the technical merit side of the event at this year's annual event.

The Jr. Solar Sprint event was shifted from its original site, the Franklin Institute, to its new location, The Wissahickon Charter School, 4700 Wissahickon Ave, Philadelphia. Lisa Rose Bryant, the former director of the Jr. Solar Sprint, assisted the new director Joe Bruno in the transition. Lisa was honored for her many years of outstanding service and commitment to the Junior Solar Sprint at a luncheon for the PSEA volunteers which followed the event. Her son, Tyler Bryant, was present and also assisted us in setting up tables, providing refreshments, and doing the hands-on work necessary for the competition. Lisa will be greatly missed. We hope that she will remain involved.

For Joe Bruno, the new director responsible for making weather postponement calls when needed, the day, Saturday, May 31st, had a questionable forecast. The morning dawned partly sunny. Some of the races actually occurred in sunlight with solar panels providing their motors the energy that the special built cars needed. But as we approached 12:00 noon the clouds rolled in and the competitors were forced to switch from solar power to backup battery power. Each car in order to be legal must have both

Alan, Joe and Ollie — drenched

sources of energy.

As we have clearly discussed before, these cars are designed to run on a flat rubber track along guide wires that are stretched a few inches above the ground. The guide wires keep the cars traveling in a straight line. Bob Nape, a former resident from the Philadelphia area who operates a solar installation business and who now resides in the Finger Lakes region of New York State, returned to Philly for a few days to help set up the track and direct the actual racing of the cars. He remains forever the "Man on the Mic" calling cars to the line and saying, "Ready, get set, go!"

We were fortunate to finish the last race in a drizzle. The awards were presented in a steady rain. But thankfully for Joe, his first event was able to be completed as scheduled and was very successful.

Quote from Joe: "Thank you for making the Philadelphia Junior Solar Sprint a part of your life. The students, teachers, parents, and I are extremely grateful."

There were 80 teams that raced against the storm. Here are the award winners.


Jeremy Wright, second time winner of the EEVC Over All Best Sprint Car, with family friend Joe Krajewski and Jeremy's mother Ellen Wright

Best Over All Car (presented by the EEVC) Jeremy Wright from the Philadelphia School.

Most Creative - Ila Kumar - The Philadelphia School

1st speed - Emily Shanley, Leila Gresh - The Montgomery School

2nd speed - Raksa Lim, Danny Lo - Finletter Elementary School

3rd speed - Harry Crapps - Cedarbrook Middle School

1st technical - Ben Steimling - Danville Middle School

2nd technical - Laura Calvin - St Catherine of Siena School

3rd technical - Isa Knapp, Andrew Wilson. United Friends School (Quakertown)

Open Division - Brendan Kittredge

Five of the above teams traveled to the Northeast Regional Junior Solar Sprint in Springfield, Massachusetts. Our winner of the EEVC award, Jeremy Wright, won 2nd Technical Merit and 3rd Innovation.

More on Jeremy Wright

Jeremy Wright was the winner of our award last year. At the national competition in Springfield MA he won first place in technical merit. Presently Jeremy is a seventh grader attending The Philadelphia School on Lombard Street in Philadelphia. His mother Ellen Wright accompanied Jeremy to this year's event and introduced me to a family friend Joe Krajewksi who she said had also provided some inspiration, help, and guidance in the project. Ellen Wright has a private practice as a clinical psychologist. Her husband is a mechanical engineer for Chemtex Instrumentation. He was unable to be present at the event but was obviously pleased to


Winning car next to EEVC plaque

hear the results when phoned.

Good parenting which provides a stable home environment and plenty of encouragement continually seems to be one of the major components for producing winning students with winning projects.

The car body was composed of carbon fiber graphite. The axles were made of aluminum. One of the neat design features was a floating hinged motor assembly with a gear on it which rested on the drive axle gear. To change a gear ratio all one had to do was release the hinge assembly and swing the motor up for easy access to the motor gear. A larger or smaller gear could then be placed on the motor output shaft in a matter of seconds.

Most solar sprint cars that score high in technical merit have solar panels mounted on a single infinite point swivel that enables the panel to be positioned anywhere relative to the sun's rays. The idea is to catch the rays at a perpendicular angle. Jeremy had mounted a single vertical wire pointer on his solar panel so that its shadow could be used to find the maximum power angle. When there is no shadow the panel is perpendicular to the suns rays at that particular moment. It is a simple but clever way to position the solar panel for maximum results.

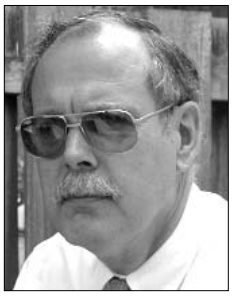
As for Jeremy's infinite point swivel, he used one of the ears of a rabbit ears TV antenna. Again, very practical and simple solution to what could be a complex mechanical system.

The project provided Jeremy opportunity to learn how to use three different types of lathes, do compound angle drilling, and use a little trig in the design.

Jeremy Wright thinks he might be interested in becoming an electrical or mechanical engineer like his father some day. For now he obviously enjoys his math and science classes and shared with me that he also likes participating in track and field.

The EEVC is proud to present to Jeremy and his family our annual Junior Solar Sprint Best Car award. Ron Groening, who recently passed away, and who, with his wife Peg, also helped us out for many years in the judging of these cars, would also proudly approve of our selection.

STAYING AT THE FRONT OF THE NEWS
By California Pete



Gay marriage — maybe

California's supreme court made all the papers on May 15 when it overturned a state law restricting marriage to opposite-sex couples. This was greeted by outpourings of joy in parts of San Francisco, followed immediately by the beginning of a campaign by same-sex marriage opponents to amend the state constitution by referendum, submitting petitions with more than 1.1 million signatures.

Gay marriages become legal after June 14, and a growing number of marriage ceremonies were scheduled for that day or shortly thereafter. San Francisco officials are looking forward to an economic windfall from all the marriage ceremonies (and gifts and catering and wedding cakes) they expect to be purchased.

Fire season starts early

The 2008 fire season started off with a roar. Ater the driest spring on record, the forests of the Santa Cruz mountains south of Silicon Valley ignited. Far from the scrublands that burn so often, these are dense stands of redwood, and they had not burned in about 40 years, so there was plenty of fuel. Firefighters managed to extinguish the blaze after it had consumed more than 4000 acres.

More than 800 additional fires have broken out at scattered locations around northern California, and the damage they do is exacerbated by the failure (or refusal) of many of those with houses in fire-prone areas to establish the mandatory defensible space — 100 feet cleared of brush and trees — around their houses, thus allowing wildfire to burn right up the the structure.

The basic problem is that much of California is a series of fire ecosystems that depend on fire coming every so many years to clear away the underbrush and allow dominant species to thrive — rather like the Jersey Pine Barrens, which will gradually disappear if not allowed to burn.

But California has the same problem as New Jersey in that people insist on building houses in these fire ecosystems, and then expect the government to defend them against naturally-occurring fire for all time and regardless of the cost in dollars, lives and long-term damage to the environment.

A step back in the Emerald Triangle

Medocino County, north of San Francisco, has long been considered the heart of California's Emerald Triangle marijuana-growing region, with the $1.5 billion annual crop accounting for two thirds of the county's economy. But things may become a little less free-wheeling (and a bit less skunky, as growing marijuana plants can be pretty rank) as the county has adopted a referendum that repeals a 2000 ballot measure that permitted individuals to grow as many as 25 pot plants for "personal use." The limit now returns to six plants.

Not to worry, however; the other two members of the Triangle — Humboldt and Trinity Counties — are not affected, and other parts of the state have moved away from the hippy-dippy Mendocino folks to see pot growing as the lucrative industry that it is, mostly under the control of heavily-armed Mexican gangs.

Coalinga sees the light

Last month we mentioned the Central Valley town of Coalinga, where the manure from 70,000 to 100,000 cattle spread out over 800 acres sits baking (and stinking) in the sun. We had also commented earlier that the area along I-5 was a natural for solar power, with lots of sunlight, open space and a major power line running through it. Well, it looks like someone has figured out how to take advantage of that. A June 12 article by *San Francisco Chronicle* writer David R. Baker reports that Martifer Renewables, a U.S. subsidiary of the Portuguese company Martifer SGPS, has signed an agreement with local utility PG&E under which it will build a combined solar thermal and biomass power plant in the area, using sunlight during the day and burning orchard waste and manure at night.

Maximum solar output will be 107 MW, using mirrors spread over 640 acres. Plant opening could come by 2011. PG&E, like other California power utilities, is under state mandate to obtain 20 percent of its power from renewable sources by 2010, and the company already has signed contracts with solar-plant developers to buy as much as 1736 megawatts.

Beware the grease rustlers

Restaurants from San Francisco to Kansas are plagued with people sneaking in and stealing the waste grease from their cooking operations, according to an AP story on May 21. As the cost of regular diesel has soared biodiesel has gained in popularity, and the grease used to make it has become a target of theft. And just a few years ago restaurants were paying to have the stuff hauled away.

NEWS UPDATE

GM adjusts to reality?

At General Motors' annual meeting on June 3 chairman and CEO Rick Wagoner announced plans to close plants producing no-longer-popular SUVs and trucks, increasing emphasis on passenger vehicles, and funding approval for the Chevy Volt.

Plans call for a next-generation compact Chevy for the U.S. and global markets, a next generation of the Chevy Aveo, and a U.S. production module of the company's 1.4-liter turbocharged four-cylinder engine.

Production of the new Chevy compact, which is expected to achieve a 9 mpg improvement over Chevy's current entry in this segment, will begin in mid-2010.

More significant from an EV point of view was formal approval by the GM board of funding for production of the Chevy Volt, which includes funding for production development and tooling. "The Chevy Volt is a go," said Wagoner. "We believe this is the biggest step yet in our industry's move away from our historic, virtually complete reliance on petroleum to power vehicles."

Toyota announces new fuel cell vehicle

On June 6 Toyota Motor Corp. announced that it had developed a fuel cell hybrid vehicle equipped with the newly designed high-performance Toyota FC Stack. The "TOYOTA FCHV-adv" acquired vehicle-type certification from Japan's Ministry of Land,

Infrastructure and Transport on June 3.

The company has been working on this for quite a while, and running tests around the world, with an eye towards improving vehicle range and cold weather performance.

As a result, the TOYOTA FCHV-adv can start and operate at temperatures as low as minus 30°C, meaning the vehicle can be used in a wider variety of conditions and climates.

In addition, fuel efficiency was improved by 25% through improving fuel cell unit performance, enhancing the regenerative brake system and reducing energy consumed by the auxiliary system. Further changes include incorporating degradation control for the electrode catalyst and improving fuel cell durability. Furthermore, equipping the vehicle with TMC-developed 70 Mpa high-pressure hydrogen tanks makes it possible to travel approximately 830 km on a single fueling — more than double that of the Toyota FCHV-adv's predecessor, the Toyota FCHV.

Toyota plans plug-in hybrid by 2010

A June 11 story by AP Business writer Yuri Kageyama reports that Toyota plans "to introduce a plug-in hybrid with next-generation lithium-ion batteries in Japan, the U.S. and Europe by 2010."

Batteries are to come from a joint venture with Matsushita Electric Industrial Co., with full-scale production slated for 2010.

Advancement in hydrogen storage

Salvador Aceves (left) and Tim Ross check out the on-board hydrogen storage tank. Photo by Jacqueline McBride/LLNL

Hydrogen has several drawbacks as a transportation fuel. Its energy density — particularly as a compressed gas — is very low, and storing it as a liquid requires super-strong and very well-insulated tanks. On top of that, a tank designed for gaseous hydrogen isn't well suited for liquid, and vice versa. That prevents a car from being able to fill up with whatever form may be available at a particular place and time.

Researchers at Lawrence Livermore National Laboratory say they have solved the latter two problems, and to prove it have displayed a Toyota Prius converted to run on hydrogen and fitted with the new tank system

The cryogenic pressure vessel can hold liquid hydrogen for six days without venting any of the fuel. This is a significant increase in the amount of time it takes to start releasing hydrogen during periods of long-term parking, compared to today's tanks, which can hold hydrogen for just two to four days, even when using the best thermal insulation available.

The secret is that the new tank can operate at up to 350 atmospheres (similar to scuba tanks), holding the hydrogen even as the pressure increases due to heat transfer from the environment. This also means that a vehicle's thermal endurance improves as the tank is emptied, and is able to hold hydrogen indefinitely when it is about one-third full.

In the Prius the new tank showed a thermal endurance of six days and the potential for as much as 15 days.

Yet even with high-tech (but still bulky) tanks the range of a hydrogen car is similar to that of an EV, which isn't handicapped by a lack of infrastructure. And the poor energy balance of hydrogen remains even if the infrastructure does develop, and EV batteries will just keep getting better.

Auto and battery makers working together on HEV battery systems

As evidence of that last thought, a number of agreements have been announced recently between automobile and battery makers for developing better EV and HEV batteries.

Sanyo Electric Co.and Volkswagen Group have agreed to start co-development of next generation lithium-ion (Li-ion) battery systems for hybrid electric vehicles.

Sanyo has already provided Ni-MH HEV batteries for Ford and Honda, and in 2006 Sanyo and Volkswagen agreed to co-develop next generation Ni-MH systems. Those efforts are still continuing today.

An AP story dated May 18 reports that Nissan's joint venture with electronics maker NEC Corp. will invest ¥12 billion ($115 million) to start mass-producing lithium-ion batteries, with batteries for Nissan forklifts in 2009 and for EVs in 2010.

A June 3 posting by Jeremy Korzeniewski on *Autoblog Green* reports that Hitachi Maxell is working on a new lithium-based battery that uses no cobalt and is claimed to have twenty times the capacity of earlier versions.

Switch grass a danger, says researcher

A May 20 article by by Elisabeth Rosenthal in the *International Herald Tribune* on line edition reports that the move to switch biofuel production from food crops to such plants as switch grass may invoke the law of unintended consequences.

So-called second-generation biofuel plants as jatropha, switch grass and giant reed are, by nature, invasive weeds, with "high potential to escape plantations, overrun adjacent farms and natural land, and create economic and ecological havoc." There have certainly been enough examples of introduced plants escaping to cause damage.

Biofuel advocates dispute or dismiss such concerns, says the article, insisting that the plants can be kept under control.

Arctic may add greenhouse gases

Researchers at the University of California Riverside have released a study (published in the May 29 issue of *Nature*) that says that a huge release of methane about 635 million years ago from beneath ice sheets led to an abrupt increase in global temperatures. This led at the time, the report says, to the end of what was then the "snowball Earth." While this allowed life to flourish on the planet, a repeat of the effect would not be so beneficial. There is still a great deal of methane trapped in arctic permafrost and below sea level at the continental margins of the ocean in the form of clathrates; release of that methane, says geology professor Martin Kennedy, "could potentially warm the Earth tens of degrees, and the mechanism could be geologically very rapid."

Just how long that might take in human terms isn't mentioned, but it's not encouraging.

Spanish utility to invest $8 billion in U.S.

Alternate energy seems to be gaining steadily on the business front. A few weeks ago the Spanish utility firm Iberdrola announced plans to invest $8 billion in the U.S. over the next three years in renewable energy such as wind power, marking the company's latest effort to increase its presence in the American market.

The company has been expanding aggressively in alternative energies and sees the U.S., with its huge appetite for power and big swaths of flat, windy terrain, as one of the most promising markets.

Iberdrola is the world's largest developer of wind farms and it already owns wind farms in New York state, California and Oregon, with construction under way in several other states in the Plains and Great Lakes.

The company said it wants to obtain about a 15% share of the U.S. market for wind power by 2010.

T. Boone Pickens invests in wind power

The preceding story follows a May 19 CNN report that billionaire oilman T. Boone pickens is investing billions in a wind farm in Texas, starting with 600 GE turbines to generate 1 GW, with plans to increase that to 4 GW. The economics can be compelling for the person who owns the land; Pickens is quoted as saying that a single turbine can yield royalties of $20,000 per year, and ten turbines can be put on 640 acres. As long as the landowner doesn't have to pay for the turbines, it's probably a good deal, although one wonders how much income could come from 64 acres doing something else. On the other hand, the turbines don't get in the way of other things; you can farm underneath them.

DOE pushing wind power

On June 2 the Department of Energy announced a memorandum of understanding (MOU) with six leading wind industry turbine manufacturers: GE Energy, Siemens Power Generation, Vestas Wind Systems,

Clipper Turbine Works, Suzlon Energy and Gamesa Corporation. The two-year collaboration is designed to promote wind energy in the U.S. through advanced technology research and development, and siting strategies aimed to advance industrial wind power manufacturing capabilities.

Under the MOU, DOE and the six turbine manufacturers will collaborate to gather and exchange information to define specific needs for achieving 20 percent wind energy by 2030.

In 2007, U.S. cumulative wind energy capacity reached 16.8 GW, with more than 5 GW installed in 2007. Wind contributed to more than 30 percent of the new U.S. electricity generation capacity in 2007, making it the second largest source of new power generation in the nation — surpassed only by natural gas. The U.S. wind energy industry invested approximately $9 billion in new generating capacity in 2007, and has experienced a 30 percent annual growth rate in the last five years.

Biogas set back in Sweden

A May 27 story by James Kanter in the *International Herald Tribune* reports that Swedish efforts to popularize biogas — methane derived from municipal sewage — as a vehicle fuel were not going very well. While eco-minded Swedes applauded the idea of producing fuel from sewage, they complained that there were too few filling stations, a fillup lasted for only a few hours of driving, and that the tanks took up to much space. Two years ago, the article goes on, Volvo announced that it was dropping biogas-fueled cars in favor of models that would run on ethanol.

Lotus wins two green car projects

Lotus Engineering is part of winning project consortia announced by the UK Government Technology Strategy Board.

These will be part of a total £23 million for 16 low carbon vehicle development programs.

Lotus is working on two projects: Zero Emission London Taxi Commercialisation and Limo-Green. The taxi project involves the introduction of commercial fleets of zero-emission fuel cell hybrid taxis primarily for London by 2012, and other cities by 2014. Lotus Engineering will integrate the fuel cell engine with the electric drive train and hydrogen storage system, firstly bench testing, then integrating them back into a 'buck' vehicle and finally packaging the assembly into two taxis for full vehicle testing.

The Limo-Green project takes a Jaguar as a basis for the development proving out the concept of a large luxury hybrid executive saloon, utilizing an advanced drive motor, small battery pack and a small auxiliary power unit (APU) for sustained cruising.

COMING EVENTS

Battery Power 2008
Sept. 4-5, New Orleans, LA. Go to www.batterypoweronline.com/bp08_index.htm

Convergence 2008
October 20-22, 2008, Detroit, MI. Go to www.sae.org/events/convergence/ or call 626-744-5600.

Electric Drive Transportation Association Conference & Exposition
Dec 2-4, Washington, DC. Go to http://edta.orchidsuites.net/sites/conf2008/

2009 SAE World Congress
April 20-23, 2009, Detroit. For information go to www.sae.org/congress.

Challenge Bibendum 2009
April 26-29, Rio De Janeiro. For information go to www.challengebibendum.com.

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 will be no July or August meetings.

September 10

October 8

November 12

December 10