EEVC NEWSLETTER

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OHIO CAR SETS NEW ELECTRIC LAND SPEED RECORD

The Ohio State Land Speed Racing Team poses with the Buckeye Bullet, which set the World's Land Speed Record for electric cars with a speed of almost 315 mph.

On Friday, October 15 Ohio State University's Buckeye Bullet electric racer set a new land speed record for the E-III class At Bonneville Salt Flats, Utah with a speed of 314.958 mph. and an exit speed in excess of 318 mph.

The international LSR is set by running a set 1-km course in opposite directions within the span of sixty minutes. Run-up to the "flying kilometer" section consists of a three-mile stretch of the salt flats. After a forward run, the vehicle must complete the flying kilometer in the reverse direction within 60 minutes.

The Bullet already held the U.S. LSR at around 257 mph, set October 18, 2003.

There is also a possibility that the Buckeye Bullet may now hold the record for the fastest measured speed of any electric vehicle, having reached a speed of 321.8 mph on Oct 14, while the previous record holder, the French TGV-A Bullet Train, ran 513.3 (320.2 mph) on May 18, 1990.

The Buckeye Bullet was driven by Roger Schroer, a test/development performance driver at the Transportation Research Center (TRC) in East Liberty, OH and the only non-student member of the Ohio State Land Speed Racing Team.

Following the run Schroer was inducted into both the exclusive Bonneville 200 MPH and 300 MPH Clubs. Roger becomes only the 60th person in the 56 year history of Bonneville Salt Flats International Speedway to set a land speed record above 300 MPH. He joins such other famous racers on the exclusive short list as Craig Breedlove, Donald & Malcolm Campbell, Gary Gabelich and Mickey Thompson.

The vehicle

The Buckeye Bullet was built by students of Ohio State's Center for Automotive Research. It weighs 4000 lb and is 31 feet long, 30 inches wide, and only 24 inches

high, with a carbon-fiber polymer composite body and a 4130 chromoly tubular chassis designed around the (small) driver, who sits behind the rear axle as in a slingshot dragster. The suspension is fully independent with coil over shocks and springs.

Power comes from a 12,000 rpm Saminco 400+ hp AC induction motor driving the rear axle through a five-speed manual transmission and differential. It's fed by a Saminco water-cooled vector-controlled inverter with a maximum synchronous speed of 400 Hz.

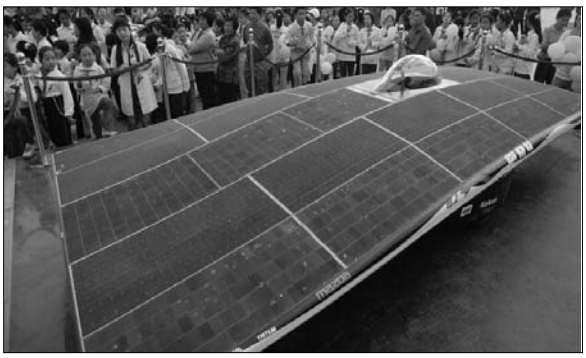
Energy comes from a 12,000-cell 900-V volt nickel metal hydride battery system divided into 22 packs and weighing 2000 lb. Each run consumed 20 kW-hr.

During the run the driver used a GPS navigation system hooked to a computer controller to help keep the car on the track; braking at the end came from two parachutes.

CHALLENGE BIBENDUM RALLY RESULTS POSTED

This hydrogen fuel cell Audi A2 was the overall winner.

Results have been posted for the Michelin Challenge Bibendum 2004, which ran from Oct. 12-14 in Shanghai, China. Entrants were scored on acceleration, braking, slalom performance, emissions, fuel efficiency and CO_2 emissions. The top finisher was an Audi A2 converted to fuel cell power, while the next two were an Audi A2 and an A8, respectively, each running on sunfuel diesel (the A8 also came in second in the Rally portion (see below). The fourth place winner was a solar-powered EV, while the fifth was a Chinese-built battery EV minibus.



Fourth place overall was won by the Aurora solar car.

It is worth noting that range was not the deciding factor, with the first-place hydrogen vehicle having less than 250 km (156 mile) range and the sunfuel diesel-powered third-place Audi A8 having a range of 900 km (562 miles).

Out of 150 vehicles presented 74 competed, more than 50% of them electric vehicles (battery- or fuel cell-powered), plus a significant number with internal combustion engines using biofuels: 38 cars, 20 two-wheel vehicles, one truck and 15 buses.

Average energy consumption was less than 5 liters per 100 km (47 mpg) (or equivalent) for cars, with some vehicles achieving 3 liters/100 km (78 mpg). Diesels and diesel hybrids were highly competitive, while very good results were also recorded for gasoline-powered hybrids.

EVs continue to post remarkable progress, mostly because of increasing use of lithium-ion batteries that deliver range in excess of 300 km.

When taking a closer view at CO_2 emissions, overall performance data based on the well-to-tire cycle (that takes into account the CO_2 emissions resulting from the production of the energy used), show that biofuels score particularly well. Turning to hydrogen and electricity, performance levels depend on the mode of energy production.

Results for the rally portion differed significantly from the overall standings. Participant cars in this event were tested under "real world" conditions while maintaining a 70 kph 43 mph) average speed over an 88 km (55 mile) course. The rally, organized with the cooperation of the FIA (Fédération Internationale de l'Automobile), has always been a cornerstone of Challenge Bibendum. The

rally was preceded by slalom and speed consistency tests which were taken into account for the results. The winning cars were those that best respected the pre-defined route without missing any checkpoints and received the least number of penalty points.

The winning cars in the rally were:

1. Kunihiko Takemoto/Wang Hui (Toyota Prius No. 143, below)

2. Stefan Eichhorner/Grace Yang (Audi A8 TDI No 160)
3. Rosario Beretta/Motzett (Mercedes A Class Fuel Cell No. 101)
4. Robert Windisch/Winfried Piontke (Mercedes A Class Fuel Cell No. 102)
5. Pierre-Alain Magne/Gino Paganelli (Michelin PSI Hy-Light No. 104)

The last of the above cars bears special mention. While not usually thought of as a car maker, Michelin showed its new Hy-Light, which uses a combination of a fuel cells rated for 30 kW and supercapacitors that can provide another 32-45 kW for 14 to 20 seconds during acceleration. Claimed range is 400 km (248 mi) at 80 km/h (50 mph) cruising speed, acceleration from 0 - 100 km/h (62 mph) in 12 seconds and top speed of 130 kph (80 mph). Weight is 850 kg (1870 lb).

Michelin's fuel cell powered Hy-Lightt

The motors are hub-mounted, and the vehicle can switch between two-wheel and four-wheel drive. The car was built in association with Swiss research center Institut Paul Scherrer (PSI)

PRESIDENT'S MESSAGE
Oliver Perry

The much discussed election for President of the United States is now history. Our October meeting in Plymouth Whitemarsh High School took place on the evening of the last debate. Several members stayed home from the meeting in order to watch President Bush and Senator Kerry face each other in verbal combat. Meanwhile the teacher who presides over room 35, where we have regularly met for the past several years, made his first personal showing at one of our meetings in order to catch up on some work. He quietly went about his business as we went about ours.

Side note: Several EEVC members waited for our meeting last month in the wrong room. They were on the other side of the building in the room assigned for us last August, which was announced in our September newsletter. They had missed the meeting at which we looked at the new assigned room for the first time and decided the former room was more convenient. It became apparent that our original room 35 had a more suitable location. Therefore I asked if we could keep room 35 and was given permission I forgot to go through the newsletters and change the new room number before they were mailed out. Because I had my cell phone with me the members in the wrong room were able to make a call to me to find out why I was not at their meeting. Remember to carry my phone numbers with you: 609-922-7275 cell, 609-2680944 home.

We terminated our October meeting promptly in favor of the Presidential Debate. The PW history teacher turned on the TV in his room to watch the debate and I decided to remain there to watch with him. His quick opener to me was, "From overhearing your discussions I assume that environmentalists like you are in favor of Kerry"

One of our members who left promptly to watch the debate was in fact wearing a Kerry supporter button.

There were many reasons for voting for either candidate. According to the news media pollsters, 22% of the American voters placed moral values ahead of all other issues. I didn't see any percentage given for those who placed the environment as their number one priority. To be quite honest with all of you even I didn't feel that environmental issues were the most important concerns in this year's election.

When it came to the matters of importance, not that I have the best political insight, I found that couldn't fully agree with either candidate on all issues. Each had points I agreed with, and each had points that I disagreed with. And in debates with individuals concerning these issues I found that most were strongly in favor of their candidate regardless of the truth or falsity of their candidates claims When I attended the Dick Cheney rally in Burlington County, a few miles from where I live, I found both sides on the rope lines yelling slogans more than engaging in reasonable debate. They pushed signs in each other's faces and just shouted at each other. One of the Republican supporters finally reminded everyone near her that we should be COMPASSIONATE Conservatives and not Angry Conservatives I believe issues relating to God, freedom of choice, abortion, marriage and the war played major roles among most voters. And I did note that voters who were union members also tended to shout more than reason.

As I listened to both liberal and conservative media present their views I did agree with a conservative talk show host that people who didn't take the time to gain an understanding of the issues shouldn't vote. It is scary to think of politicians grabbing people and bussing them to the polls to pull the lever for them. But, then again history says that old Sam Adams scared the dickens out of the British by rallying the bums and hoodlums of Boston around his causes. He had a gift for stirring up the ignorant mobs and gained political power by so doing. If we favor our independence Sam Adams is our hero. But I would not have wanted to be a well-off British subject living in Boston during Sam Adam's time.

Anyway, with all of the excitement and talk about the issues surrounding the presidential election this year, the environment seemed to be of lesser concern to all of us than in former times. Probably the candidate most concerned with our environment was the one who got the least votes, Ralph Nader.

I listened briefly to an interview with Mr. Nader on NPR. If I heard him correctly he indicated that neither party can be trusted to act in the best interests of the average citizen Big business is the controlling factor in politics today. What is best for big business sets the agenda. And what is best for big business may not always be best for us. But since we all benefit in some way from lower cost items that big business can provide the consumer we can't unite everyone in an effort to limit it. We tend to overeat even though we know that it is not good for us. If we can't regulate ourselves how can we regulate big business?

We all know that raising gas prices will be best for the environment. But no candidate can win an election advocating we raise the price of gasoline. Even Kerry was attacked by the environmentalists for trying to tell them he didn't own or drive SUVs when in fact he had recently bragged to union workers in Detroit that he proudly owned a number of gas hog vehicles. When pressed by the environmentalists he tried to get off the hook by telling them he didn't really own them, his family did.

As I told the group gathered at our last monthly meeting, when it comes to the political party who best helped New Jersey sponsor alternative fueled vehicles, it was the Republican, Christy Whitman administration. I had first hand experience in the New Jersey Adventurer program, the one that provided money and assets to develop two hydrogen fuel celled vehicles and the one that helped the Cinnaminson High School electric car program more than any other. It may have been a blip on the otherwise dead alternative vehicle screen, but at least something was done and it happened under a Republican governor. The NJ Venturer program is now dead under Democratic leadership. (The Democrats didn't kill the program but neither have they attempted to duplicate or better it.) So personally I don't feel that we can state with certainty that one party or the other is better for environmental concerns, even though traditionally the Democrats have been favored.

I am not sure that the development of electric cars was in any way harmed by the outcome of the presidential election. One can argue that Bush is definitely on the side of big oil when it comes to energy issues. However, I am not sure that just because he was elected president that electric car advancement will be lessened. Hybrid technology is rapidly advancing within the auto industry all across the globe. I think that we are going to have cleaner running vehicles because we are learning, as we did with second hand cigarette smoke, that poisonous emissions harm life. And, regardless of party affiliation most people do want cleaner air. When the facts become irrefutable, honest politicians on both sides will vote for regulations that will protect the citizens. We have gas guzzlers on both political sides and we have environmentalists on both sides. All want to live longer healthier lives.

Maybe a larger concern that we should have is the in-fighting going on among ourselves over issues regarding energy saving technology vs. ecology. Wind farms and the construction of dams, which both are oil independent energy sources, interfere with plant and animal life. Windmills have been prevented from being erected in some parts of the county by environmentalists because they kill birds. And the construction of dams have been held back because they affect the natural habitats of certain animal and plant species. So strange as it may seem our greater enemy now may be our ecological "Toyota Prius driving" brother, not president Bush.

I happen to believe that president Bush is an honest good person. (At least from the sources of information that I trust. But I also thought at one time that President Nixon didn't lie.) I do not I agree with several of the Bush policies and I question others. But in terms of environmental advancement I don't think Kerry could have done us much better. Big business sets the energy agenda. And until the majority of our citizens want to voluntarily give up their SUVs in favor of using less oil, presidential choices won't make a difference

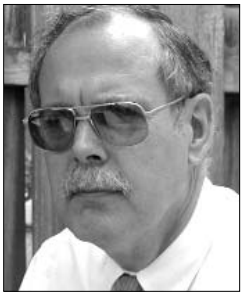
I read somewhere that Martin Luther once stated that he would rather be ruled by an intelligent Moslem Turk than an inept Christian Leader. So with that statement in mind let me say that I would rather have an honest moral president than an electric vehicle driving opportunist for my president. (Not that Senator Kerry was an electric vehicle driving opportunist, he was not. He was a duck hunter.) The most important factor in choosing political leaders cannot always be their position on energy policies. Honesty and integrity will be more important characteristics for our president to have in the long run than a commitment to oil independence. Bush never promised that he would make us free from oil dependence. What you see in him is what you get, but even though he did not promise to free us from the oil magistrates it would not surprise me if more advancement might occur under his administration than from Kerry's. Were there realistic high hopes for a different energy economy under Kerry? I don't think so. (Someone more with more political experience and knowledge might disagree with me on this. NESEA might disagree.) I tend to think that energy policy in reality would end up about the same under either candidate. I really felt that toward the end of the campaign Kerry was promising anything and everything that would get more votes, to the point that all of his offerings did not seem achievable. I am not so sure that he could have delivered all that he promised. Ralph Nader would definitely have tried to make real advancement for our cause but with our current population and entrenched two party system he stood zero chance of being elected.

At least we are still living in a decent economy with relative political stability and have the opportunity to advance the cause of electric vehicles. In some countries we might be fighting for our lives just to survive.

November 18th my wife and I board an airplane for China. My son-in-law is hoping to link me up with some alternative fueled vehicle enthusiasts over there. As we have heard via the news media China is ready for an explosion in personal transportation vehicles. In China the populace does not have the power to decide what route to take in terms of an energy source for these vehicles. The government can decide the energy path that they think is best and the people will have to accept it. I am looking forward to seeing first hand what seems to be happening in personal

transportation. However, since I can't speak a word of Chinese maybe I won't be able to learn anything except how to find the restrooms.

(ELECTRIC) MOTORCYCLE MANIA
By California Pete



The San Francisco Bay area, with its famously good weather, is a magnet for motorcycles —so much so that *Motorcyclist* magazine in October proclaimed San Francisco the best place for motorcycling in the country.

According to the *San Francisco Chronicle*, "San Francisco has nearly twice as many registered motorbikes per capita as the average for California, according to the state Department of Motor Vehicles, and more than twice as many as that hotbed of hot rodding, Los Angeles County." Take one drive in the area and you'll know it's true: they're everywhere. Unlike other places, California allows motorcycles to ride *between lanes* on the highway, so while stuck in traffic you may be passed simultaneously on both sides by motorcycles. It's a little unnerving, to say the least. And it's all *perfectly legal.*

Choppers are very popular, but you also see electric bikes, at least in local neighborhoods. And electric scooters and bikes are sold everywhere, from Pep Boys to the local sporting goods store. The picture shows part of an ad wrapped around the Sunday comics in this week's *Chronicle.*

NEWS UPDATE

A different kind of hybrid

There's a company in the Netherlands that has developed a vehicle that not only gets mileage, but can go where others can't. Called the PALV (personal air and land vehicle), it's the brain child of Dutch entrepreneur John Bakker and Rotterdam-based Spark Design Engineering (www.sparkdesign.nl), and it does what generations of tinkerers have been trying to accomplish: it drives on the road and flies in the air.

Powered by a 213 hp rotary gasoline engine and equipped with a tilting mechanism, it rides on the ground like a motorcycle, banking into turns despite having three wheels, and reaches speeds of 125 mph. Claimed fuel mileage is 70 mpg at 60 mph, and cruising range is 375 miles.

The idea is to drive it to the airport or a helipad, unfold the rotor blades and rear propeller, then take off as an autogyro (an autogyro is driven forward by a propeller while the unpowered rotor provides lift). Claimed performance in the air includes 120 mph max/18 mph min airspeed, 165 ft takeoff distance, 16 ft min landing distance, and 340 mile range. Operating altitude is under 4000 feet, so a flight plan is not required, according to Spark Design.

Autogyros have been around since the 1920s and they're been featured in movies ranging from *International House* (W.C. Fields, 1933) to *You Only Live Twice* (Sean Connery, 1967) to *The Road Warrior* (Mel Gibson, 1981). Will this one take off commercially? Is it safe to fly? Who knows, but you have to admit it looks pretty good.

VW, Chinese university to explore hydrogen vehicles

Worldsources, Inc. and AP report that Volkswagen, Tongji University and German engineering company IAV GmbH have embarked on a a joint research project, aim-

ing to develop a fuel cell car. The car, to be based on VW's Touran EV, will try to use Chinese fuel cells and batteries.

Making zinc-air work with cheaper zinc

Arotech Corporation announced on November 1 that it had successfully tested an electric hybrid bus using commercially available zinc instead of the proprietary dendritic zinc used to date, achieving a range of 133 miles on a simulated city-cycle drive, similar to the range achieved a year ago in a similar test with the proprietary zinc. This is expected to boost commercialization plans for the zinc-air hybrid bus, which until now required heavy investments in zinc producing infrastructure.

The electric bus is powered by Arotech's Electric Fuel zinc air technology with a pack of ultracapacitors and an energy management system. In recent tests the bus traveled 130-145 miles under typical city bus driving conditions, including stop and go, acceleration and constant speed. The average normal full day cycle for New York City buses is less than 90 miles. The Company believes that all-electric buses utilizing Electric Fuel's Zinc-Air technology have sufficient range to offer a practical alternative to diesel-powered buses.

Prius tax rebate safe for now

Dow Jones reports that the IRS has certified the Toyota Prius 2005 model for buyers to claim a clean-burning fuel tax deduction of up to $2000. This extends the tax break for certified vehicles first put in service in 2004 or 2005, with the deduction limit dropping to $500 in 2006 and ending in 2007.

Mazda jumps on the hybrid bandwagon

Mazda Motor has recently announced plans to introduce a hybrid version of its Tribute SUV, using technology from the Ford Escape (Ford owns 33% of Mazda). The Tribute actually shares a platform with the Escape, and is built in a Ford factory in Missouri.

Mazda has also announced that it is experimenting with a hydrogen-fueled version of its rotary-engined RX-8 sports car.

Wind energy growth: slow, then fast

The American Wind Energy Association's quarterly U.S. market outlook predicts that the extension of the federal wind energy production tax credit in September will lead to record-breaking capacity installations in 2005, following a falloff in 2004 due to the the expiration of the production tax credit (PTC). There are predictions that 2005 installations may exceed 2500 MW, compared to the previous record of 1696 MW in 2001.

Because the tax credit was extended relatively late in the year, AWEA expects the U.S. to install approximately 480 MW of new capacity in 2004, well above its previous estimate of 350 MW but far below previous strong years such as 2001 (1,696 MW) and 2003 (1,687 MW).

Reasons suggested for the 2005 increase include rising prices for natural gas and coal, and the backlog of projects held up by the expiration of the tax credit. According to the Energy Information Administration, in the best wind resource areas such as the plains states and the upper Midwest, wind energy is the lowest-cost new electricity resource (with the PTC in place) when natural gas prices rise above about $3.50 per thousand cubic feet. On the New York Mercantile Exchange, natural gas prices topped $7 per thousand cubic feet in October, and most experts expect it to continue in the range of $5 for the foreseeable future.

Inexorable increase in energy demand

The International Energy Association has released its *World Energy Outlook 2004*, with energy projections to 2030. Executive director Claude Mandil said that while there are sufficient energy resources available, using them may have unacceptable consequences unless governments take more vigorous action to "steer the global energy system onto a more sustainable path." He described the inexorable increase in global energy demand from now till 2030 that the WEO predicts – as well as our continuing heavy reliance on carbon-emitting fossil fuels – as "deeply troubling."

The report predicts that world primary energy demand will rise by 59% from now till 2030, and 85% of that increase will be in the form of carbon-emitting fossil fuels: coal, oil and natural gas. Two-thirds of the new demand will come from the developing world, especially China and India.

Demand for oil will expand at 1.6% a year, from 82 Mbbl/d today to 121 Mbbl/d in 2030. More and more oil will come from fewer and fewer countries, primarily OPEC.

Gas use is projected to double by 2030, largely because it will be the fuel of choice for electric power generation. Coal will continue to supply a fifth of world energy needs, mostly in power generation and increasingly concentrated in China and India.

Nuclear power will grow very slightly, decreasing in Europe while advancing in Asia. Use of other non-carbon-emitting renewable energy sources will triple, but still will account for only 6% of world electricity production in 2030.

Vigorous alternate energy policies could reduce world energy demand by 10% and carbon-dioxide emissions by 16%. "Yet," said Mandil, "even in this alternative scenario, energy imports and emissions would still be higher in 2030 than today and would still be growing."

California leading in solar installations

The Department of Energy reports that California continues to lead the way in terms of large solar installations. WorldWater & Power Corporation recently marked the completion of a 1-MW installation at Cerro Coso Community College in Ridgecrest and a 268-kW water-pumping system on a citrus ranch in San Diego County. Projects currently planned for the Golden State include a 900-kW system atop the FedEx Corporation's hub at the Oakland International Airport, a 269-kilowatt system to be installed in Cathedral City by Honeywell, and a 225-kW installation at a wastewater treatment facility in San Francisco. And on November 3 the El Dorado Irrigation District (EID), located east of Sacramento, will issue a request for proposals for a 900-kW system at one of its wastewater treatment facilities. Even the state's schools are getting in on the act, as the California Energy Commission (CEC) is providing $4.5 million in grants to 30 schools to install a total of 700 kW of solar power.

California doesn't have a monopoly on solar power projects: the Las Vegas Valley Water District in Nevada announced plans in October to build a 3.1-MW solar power system, and in Vermont NRG Systems, Inc. has installed a 67-kW solar power system on its new energy-efficient manufacturing facility and office building.

COMING EVENTS

H2PS: The 2004 Hydrogen Production and Storage Forum

December 6-8, Washington, DC. Contact Brian Santos, 207-781-9800, bsantos @intertechusa.com.

SAE seminar: Hybrid Vehicle Technologies—Today & Tomorrow

February 9-10, 2005, Costa Mesa, CA. Contact Nancy Eiben, 724-772-8525.

2005 Clean Heavy Duty Conference

Feb 22-24, Palms Springs, CA. Contact Susan Romeo, 626-744-5686 or visit www.weststart.org

NHA Hydrogen Conference 2005

March 29-April 1, Washington, DC. Contact the National Hydrogen Association, 202-223-5547, or e-mail info@hydrogenassociation.org

POWER-GEN Renewable Energy

March 1-3, 2005, Las Vegas, NV. Contact Donna Welch, 918-835-3161, http://pgre05 .events.pennnet.com.

EVS-21: The 21st Worldwide Battery, Hybrid and Fuel Cell Electric Vehicle Symposium & Exhibition

April 2-6, 2005, Monte Carlo, Monaco. Contact the EVS-21 Monaco Organization, +377 97 77 54 21/+377 97 77 54 22.

11th National Clean Cities Conference

May 1-4, 2005, Palm Springs, CA. Contact Annalloyd Thomason, 702-254-4180 x23 or 702-294-2333, or e-mail Info@afvi.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.

December 8

January 12

February 9

March 9