

# EEVC NEWSLETTER

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## MOUSETRAP-ELECTRIC HYBRID CARS COMPETE AT THE PHYSICS OLYMPICS COMPETITION HOSTED BY HARRITON HIGH SCHOOL, FEBRUARY 26TH, 2011 Oliver Perry

Again this year the EEVC helped to organize and supervise the annual “hand sized” electric car competitive event featured at the third and final meet of the Southeastern Pennsylvania Physics Olympic League. Nine high school teams competed in the league this past season, each partici-



EEVC President Oliver Perry congratulates winner Ron Tyson III.

pating in three Saturday meets held over a five month period. Penncrest High School won both the final meet of the season and over-all first place for total points scored for the season. Harriton High School placed second, only a few points behind Penncrest.

The Physics Olympics program provides various competitive team and individual

physics events for the students at each Saturday event. Points scored count for team and individual placement in these events. Medals and trophies are awarded to individuals and teams based upon the points scored.

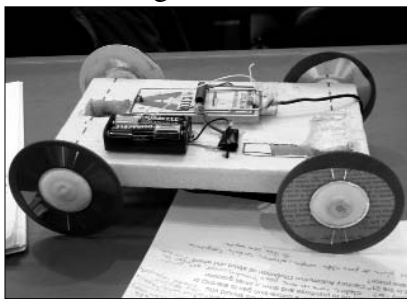
Each of the three Saturday meets consists of two “build it before you come” events,

three “practice before you come” rotational events, and a physics problem solving event consisting of six traditional text book type physics problems. The rules and regulations for each event and all of the problems are prepared and agreed upon by the physics teachers who represent each high school team. Each instructor is expected to help supervise at least

one of the events at each meet.

As a former physics teacher who participated for many years as a coach of a team in the league I am quite familiar with the other coaches, teams, and the procedures. Our Physics Olympics League has always partnered with the EEVC at the last meet of the year in providing the students with a competitive model electric car event. The EEVC has also provided an additional annual special engineering award to the student who the EEVC feels engineers, designs, and constructs the best overall car. This award is evaluated and determined by an EEVC set of judges separately from the Physics Olympics scoring system.

Having retired from teaching and presently presiding over the EEVC I am still able to assist the league in developing and supervising the toy sized electric car event. Knowing that hybrid technology has entered the mainstream of the auto industry I felt it might be beneficial to the students to come up with an event that would help familiarize them with the challenges incorporating mechanical and electric power systems in a vehicle. Since the students usually build mousetrap cars for competition in the first meet of the season and electric vehicles for the last meet, asking them to build a hybrid system utilizing both concepts seemed to me to be a workable idea. The physics teacher committee agreed and requested that I write up the rules and regulations.



The students were given the model and make of the required electric motor, the specifications of the particular legal Victor mousetrap, the legal limit of electric power (two double A batteries), and the legal number of wheels and gears that could be used to make the car. The rules and guidelines of the competition required a legal car to race half a basketball court distance with the first meter of travel on mousetrap power alone and the electric motor power kicking in at some point between the first

The students were given the model and make of the required electric motor, the specifications of the

meter meter and the finish line. Since fastest time would determine the winner of the event we did not place weight or size restrictions on the vehicles.

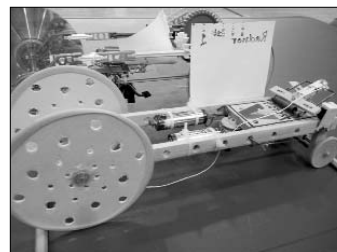
### The competition



The parents of both Harrington and Penncrest High School students volunteered to assist the EEVC in running the event.

Parents provided stopwatch times, measured distances, and called the competitors to the line. Alan Arrison, Ken Barbour, and Dan Monroe were the EEVC judges who checked for the legality of the cars and who eventually decided the winning entry for the EEVC Ron Groening Engineering Best Car Award.

The three fastest times of the meet were 4.12 seconds, 4.35 seconds and 5.10 seconds.



*This car, an entry from Radnor High School, was one of the better designed entries. It was the only car that had the electric motor mounted vertically with a belt drive to the front axle.*

### Physics Olympics Winners

The Physics Olympics meet coordinators award points to each team based upon the team's particular placement in each event. Individual medals are awarded for first, second and third place, separate from the team placement score. Three individual team members (all from one team) could win all of the medals but the team as a whole can only earn a single placement score for over-all Olympic points. Two Penncrest students and one Harrington student won the medals.

### PSE&G Team Racing Cup, presented by PSE&G Electric and Gas Power Company of NJ

Each year the high school team that submits the highest number of different car entries which complete the race is awarded

the team racing cup. The Cup is held by the winning team for a year and then passed on to the next season's winner. This year Penncrest and Harriton tied, both teams having 4 different cars cross the finish line. Since the times of Penncrest's cars were the better of the two schools the cup passed from last year's winner Harriton High School to this year's winner Penncrest High School.

### The Cars



*Ron Tyson III From Penncrest High School, winner of 2011 EEVC Ron Groening Engineering Award For the Over-all Best Mousetrap Electric Hybrid Car in the 2011 Physics Olympics Competi-*

*tion held at Harriton High School. The bronze medal winner from Penncrest was Tom Rosenberger.*

Ron Tyson is the first two time winner of the EEVC Ron Groening Engineering Award. Check out last year's March issue of this Newsletter for the full story of last year's event. As with last year's competition Ron, again this year, built two competitive cars.

In competition Ron's first entry set the over-all best time of the event with 4.1 sec. However our EEVC panel of judges felt that Ron's second smaller car deserved to the over-all best designed and built car of the event. It was more compact.

Ron's cars utilized the metal mousetrap spring and the attached "mouse head crushing bar" as an electric switch. As soon as the mousetrap closed, the head smacking bar contacted the second contact and completed the electric circuit to the motor. In Ron's own words, "I never even liked the idea of an entire switch to begin with. The bail of the mousetrap looked like it was copper plated metal, so I instantly knew I wanted the bail to be part of my circuit, just to insure that the motor would run ONLY when the mousetrap was finished its job." In his case the electric motor came on just after the required one meter of mousetrap only distance. Other cars traveled further on mousetrap power and less on electric power.

Ron Tyson continued, "When it came to

my hybrid car, the trick was to keep it as simple as possible. My school ordered all of the parts for the car in one bulk, so there were not too many options. The motors seemed to have considerable power so I knew a higher gear ratio could be used. I originally tried a 1:2 ratio but after traveling 47 feet or so I realized that the car needed more of a kick. So I ended up using a 1:1 ratio. All in all it was all about making a reliable, straight running, and lightweight car that would get off the line quickly and keep accelerating. Thankfully I was able to come up with a setup that did just that."

### Ron Tyson III: The student

Ron is currently a senior attending Penncrest High School located in Media, Pennsylvania. He says he will miss participating in Physics Olympics competition next year. Although he has done well in the building challenges of the physics competition Ron says he was never really a tinkerer. He is talented in mathematics and in some areas of science but seldom played with toys and gadgets that much. He did watch his father help his sister with Physics Olympics projects in his younger years and thought that the projects were really cool. He says he could hardly wait until he entered 11th grade and his chance to take physics came so that he could assume similar challenges.

When it comes to cars Ron favors American Classics but respects them all. "I've always thought automobiles were some of the most majestic creations of man."

Students who participate in the Physics Olympics can choose to specialize in a number of projects. Ron says that his teammates often asked him why he didn't choose to build bridges for the bridge competition instead of making the more difficult competitive electric and hybrid cars. To Ron the answer was simple, he liked to make things that moved... and preferably moved fast.

In addition to participating on the Physics Olympics team Ron participates on the nationally ranked Penncrest Science Olympiad Team, plays violin in the school orchestra, and keeps pace with the demands of a senior year.

### Future hopes...In Ron's own words

“When it comes to college, I am currently leaning toward the University of Illinois at Champaign-Urbana. This decision is heavily influenced by the fact that I have been awarded a full four-year tuition scholarship from the college from my winning first place in an event called Experimental Design at the Science Olympiad National Tournament held at the college last spring (May). I am also very excited because the school is ranked seventh in the nation for my engineering division of choice (so far, anyway), which is Aerospace Engineering. I currently do not work during the school year, but I am employed by the Rose Tree Media School District Maintenance and Facilities Management crew. I mostly work on the schools’ grounds and landscaping, but my jobs do range to painting, moving equipment and supplies, cleaning, etc. My father, Ron Tyson Jr., is currently an electrical field engineer for Giovanetti & Shulman Associates (engineering firm). My mother, Debra Tyson, is the Food Service Coordinator for Rose Tree Media School District. Someday I hope to be a part of an engineering team for a major NASA project, such as for the invention of a long-term inhabitable space station, where people could possibly go to live their lives! If that idea is too wild for NASA, or Boeing, or Lockheed Martin, I’ll just do as I’m told, and be happy with that.”

### **Conclusion**

Repeated winners don’t just luckily win. Good students have great parents who model, advise, encourage, and set standards for their kids to follow. Winners usually come from programs that are well established and directed by equally dedicated and committed instructors and educators. Ron Tyson has wisely followed the leadership, guidance, and counsel surrounding him. Congratulations to Ron Tyson, his parents, the Rose Tree Media School District, and Mr. Robert Malcovsky the director of Penncrest High School’s Physics Olympics program, for a job well done.

### **MINUTES OF FEB 9 MEETING Don Zimmerman**

#### **Electrical Display of Induction Concepts**

Ollie Perry demonstrated magnetic induction and resistance characteristics of coils.

He briefly introduced the premier thinker of alternating current characteristics and the brains behind the growth of general Electric Co., Charley Steinmetz. This man developed the algorithms and equations for the basis of a/c current. The demonstrations were about measuring battery loads.

#### **High school Junior Physics Olympics**

To be held at Harriton HS, February 28 600 North Ithan Avenue, Rosemont, PA 19085. Ollie proposed a “hybrid” car competition for the eight high schools that participate. The Olympics competition consisting of a mouse-trap, an electric motor and battery with CDs as wheels. Thus the hybrid provides two sources of energy. He made a prototype and the participating school agreed. Last year’s judges were EV members Alan Arrison, Ken Barbour and Dan Monroe plus Ollie, so any more help would be appreciated.

Ollie began a discussion of ethanol and its effect on dislocations and consequences to the world food supply. So far there has been a run-up in the price of corn and is this a political or economic decision for its use in our vehicles? The extreme use of ethanol. E-85 has serious corrosive effects on automotive metal and rubber that significantly reduces the lives of these products. The next product may be sugar cellulose to substitute for ethanol in the future.

#### **State of the EV Industry and EVA Newsletter**

Norman Flojo introduced several articles. There will soon be eleven or twelve companies producing EVs in the US market. He and Ken Barbour discussed federal tax credits for the purchase of evs and hybrids. There is also tax credits for conversions and parts purchases so be aware of tax forms 8910 and 8911 even for use with prior year purchases.

#### **Chevy Volt and tax credits**

Todd Daugherty leased one recently and the leasing company gets the tax credit. He pays \$350 per month on the lease. Members were invited to check out the Volt after the meeting. The Volt has a sticker price of \$44,000 which includes the premium package. The dealer has 10 on order for delivery. Todd gets 30 miles on a charge and it takes 11 hours to

charge on 110 AC.

**Greg Witmar...**

brought up his quest for a better battery propulsion for his Saturn. He made the front cover of the January issue and has an extensive web site, [www.zuglet.com](http://www.zuglet.com). Because the size and weight of the lead acid battery he uses, he researched lithium ion and made a purchase from a west coast company, China Lithium ion Battery Company. He will save 500 pounds, add 68 volts to 210 volts and extend the range to 65 miles. His ranking of batteries:

- |                   |                |
|-------------------|----------------|
| Sealed lead acid  | Worst          |
| Flooded lead acid | Best           |
| Lithium ion       | Most expensive |

This brought up the need for battery management. Greg's answer is no, and Paul Kydd's answer is no.

**Paul Kydd...**

has made modifications to an F120 Ford pickup. He is converting to lithium ion w/o battery management. Now one electric motor is used instead of two as auxiliary(?) power on the drive shaft and is designed for travel of 20 to 30 miles radius per day. ICE is also used. The complete kit to convert to hybrid may be priced at \$7000 plus batteries.

**A TOUR OF A COAL-FIRED POWER PLANT**

**Pete Gruendeman**



On March 17 I took a tour of the Dairyland Power Cooperative's coal-fired Genoa electric generating plant with a small group of people from the Society of Manufacturing Engineers. Lots of interesting questions were asked and our

tour guide, Brian Treadway, was pleased to be challenged by us. Treadway also provided

information after the tour which has helped me in writing this article. The conclusion is 100% my thoughts.

The Genoa facility, located along the banks of the Mississippi in Genoa, WI, about 30 miles south of La Crosse, is rated at 350 megawatts (MW), which is about mid-sized for a coal-fired electric generating plant. The historic peak output of the plant is 379 MW when burning high energy coal like that mined in Illinois. The plant is switching to Powder River Basin coal from Wyoming, which has less energy per pound but also less sulfur and mercury and less ash in general. It produces more CO<sub>2</sub> per kWh of output, though.

The power plant rating of 350 MW depends a lot on river water temperature and installed environmental equipment. This equipment, plus regular needs at the plant, generally uses 4.5-5.0% of gross output. What they would be putting on the grid (net generation) would be in the ballpark of 332-334 MW.

How much is 334 MW? A home that uses 1000 kWh/month uses about 1.4 kW continuously. Since the electric company has no means to store electricity, they need to plan for our peak needs. That would include those with electric water heaters running during the daytime and EV chargers running overnight. It's probably reasonable to figure that 100,000 homes could be powered by the Genoa facility. If the plant shown above was sliced up into 100,000 units, one for each home, each slice would measure about 5 feet x 6 feet. This is not very big, especially considering the large space that off-gridders devote to their solar panels, batteries, inverter, generator, etc. Installed coal-fired capacity today (2011) is in the range of \$2000-2500/kW. (source: Dairyland Power administration.) This is not a lot of money compared to an off-grid installation.

This plant was built in the 1960s and was very technologically advanced at the time. The boiler type is "super-critical with double re-heat". The coal is pulverized to dust in "mills," then blown with combustion air into the boiler and burned. The boiler is really an unpressurized housing with many, many miles of tubing, and is also called a "water-tube" boiler. It is about the opposite of old

railroad locomotives which have water tank boilers. Steam is generated at 1000°F and 3850 PSI. It flows through the turbine, where it drops in pressure and temperature as it generates shaft power to drive the alternator. The steam is cycled through three sections of turbine, with two re-heat passes in between which re-heat the steam to the same 1000°F but at pressure levels that are lower through each stage. At the final turbine stage, the gas (steam) is expanded to below atmospheric pressure and sent to a condenser that reclaims the water. The condenser is cooled with river water and actually pulls the steam out of the last turbine stage. The condenser system puts as much heat energy into the river water as the generator puts in electric energy into the grid. The condensate water is then checked for purity and then pumped back into the boiler as liquid water. Physics does not allow pumping steam back into the boiler. The steam/water circuit is closed-loop. No river water enters the boiler. At maximum power, 2,300,000 pounds of water are boiled and processed at this plant each hour. That's 4800 gallons of water per minute.

The barges shown in the picture measure 35 feet x 195 feet and carry a maximum load of 3.2 million pounds. It takes up to 850 of these to fuel the plant during a year in which there is high energy demand. That's 5200 pounds of coal per minute. There is also a lot of energy required to bring the coal from WY to WI. Cost of delivered coal is by far the largest expense at this facility.

The boiler operates with a low-NOx concentric firing system with over-fire air port that was installed in 1993. This reduced NOx emissions with little increase in operating costs. Now combustion takes place initially in a reducing (oxygen-deficient) atmosphere to minimize NOx and is completed in the area of the over-fire air registers. Other emission controls have significant costs for supplies and power to operate them. A slake made from lime is sprayed into the exhaust gas stream to trap SO<sub>2</sub> and to a lesser extent mercury. These particles plus normal fly ash are filtered out with a bag type filter system. Note that by the time the exhaust gas reaches the filter house much of the heat has been drawn off of it as there are many places in the process where heat is reclaimed. Both the

feed water for the boiler and combustion air are pre-heated. Many of the controls on the system reduce emissions and save money. In particular, the fuel-air ratio is closely controlled so that the exhaust air contains between 1.4% and 4% O<sub>2</sub>. This helps minimize the considerable amount of energy used in running the plant and also produces ash with very little remaining carbon. This minimizes fuel waste and also increases the value of the ash. The ash cannot be used in ready-mix applications if there is more than 0.75% carbon left in it. The ash (independent of carbon content) has historically been used as an additive in the manufacturing process of concrete in northern Iowa; however the present primary method of beneficial re-use is as an additive in ready-mix.

The sharp-eyed reader will notice the round containment dome at the top center of the picture. The federal government set up a demonstration nuclear reactor on this site in the 1960s and eventually sold it to Dairyland for \$1. At its peak, the nuclear steam generator produced about 50 MW. That operation was ended in 1987. Costs for maintaining the plant and used fuel continue to this day with expenses related to that \$1 "gift" totaling \$6,000,000 for 2010 alone. The south end of the picture shows a large open area which will be used for dry cask storage for the spent fuel rods later in 2011.

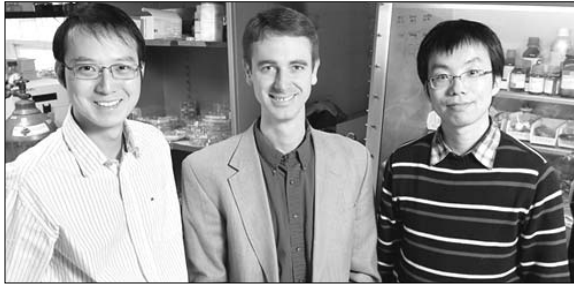
What does all this have to do with me and my EV? Electricity to power our EVs comes from somewhere. There is an environmental cost to this electricity, regardless of whether it comes from coal or nuclear sources or even from wind or solar sources. We really do drive "elsewhere emission" EVs, but I think it's correct to say that this is better than our "here, there and everywhere emission" gas vehicles. No matter how much we try to reduce emissions and energy use, we'll not do better than the people who use their vehicles wisely by combining errands into one trip and choosing to live close to where they work. How much do we really need to travel is a question that too few people think about.

The Genoa plant burns 5200 Lb. of coal each minute at full rated power, which is 332-334 MW. That's 312,000 Lb./hour to make ~333 MW, or 312,000/333,000 kWh of electricity, 0.94 Lb. of coal to make 1 kWh of

electricity. This is pretty close to the figure frequently quoted by the industry, 1 Lb. coal = 1 kWh sent to the grid.

This figure is useful because one can then figure out if going 30 miles on 10 kWh electricity/10 Lbs. coal is a better deal than going the same distance on 7 Lbs. of gasoline.

### **BATTERY CHARGES IN SECONDS**



Researchers at the University of Illinois led by Professor Paul Braun (center, with graduate student Xindi Yu, left, and postdoctoral researcher Huigang Zhang), son of EEVC member and Burlington County College professor Jack Braun, have found a way to, in his own words in a BBC interview, “change the internal structure of a battery so that we could charge and discharge it much more rapidly.” By using a three-dimensional nanoscale honeycomb structure, he went on, “we can make a battery that you can charge in seconds instead of minutes to hours.”

The work so far has been on cell phone size batteries, but down the road it could be scaled up to EV size. “If you had the ability to charge rapidly, instead of taking hours to charge the vehicle you could potentially have vehicles that would charge in similar times as needed to refuel a car with gasoline,” Braun said. “If you had five-minute charge capability, you would think of this the same way you do an internal combustion engine. You would just pull up to a charging station and fill up.”

For more information go to [http://news.illinois.edu/news/11/0321batteries\\_PaulBraun.html](http://news.illinois.edu/news/11/0321batteries_PaulBraun.html).

### **MUSEUM LOOKING FOR CARS**

Oliver Perry recently received a call from a person living in Flint Michigan who is trying to help locate a few hard to get electric cars for a museum in Saginaw.

Evidently in the years 1914 to 1918 there were several electric cars made by a Saginaw manufacturing company which were called Argo, Broc and/or Borland Grannis. A museum is looking for one of these very rare cars. Anyone with information should contact Ollie at [perrydap@aol.com](mailto:perrydap@aol.com).

### **U.S. FALLS BEHIND CHINA IN WIND**

A Reuters report dated April 11 says that wind power installation in the United States fell to 5116 MW in 2010, about half that of 2009, and that the U.S. is now behind China in installed capacity. China now has nearly 45,000 MW installed, while the U.S has about 40,000 MW.

Natural gas, the report continues, accounted for the largest share of new U.S. power capacity, although wind accounted for 35 percent of power plant additions since 2007.

### **REGISTRATION OPEN FOR 21ST CENTURY AUTOMOTIVE CHALLENGE**

Entrants are invited to register and compete in this year’s 21st CAC. This year’s event has a number of changes:

- Extra Day of Registration and Technical Inspection opens Thursday May 19
- Early Range Event on Friday Morning May 19 for Local Category with range calibration for all
- Saturday Local Errands Route will include scenic Rock Road, Spring Creek, and the “Hill”
- Highway Category will do significantly more track laps during Saturday Morning Local Errands
- Saturday Lunch and Tailgating Competition
- Highway Category Saturday afternoon lap of Tour de Thor will have new errands
- Highway Sunday Range Event will visit Cresson Wind Farm (Tentative)
- Preliminary Awards and Press Ride and Drive Event Sunday May 22 at Penn State Test Track
- Final Awards and Press Event Ceremony Friday May 27 at Penn State Abington (Tentative)

## Agenda

Thursday, May 19 – Tech/Dynamic Events  
8:00-Sunset: Optional early arrival, Tech Inspection, Dynamic Events, Range Calibration

12:00-1:00: Lunch at LTI Test Track  
4:00-6:00: Dinner out in State College  
8:30-10:00: Pit work and charging setup at LTI Test Track

Friday, May 20 – Tech/Dynamic Events  
8:00-12:00: Arrival, Tech Inspection, Dynamic Events, Range Calibration continue  
8:00-12:30: On Track Local Range Event #1 followed by recharging for Autocross

2:00-1:00: Lunch – 21st CAC Opening and Strategy Discussions at MorningStar Solar Home

2:00-4:00: 21st CAC Tech Inspection and Dynamic Events

4:00-5:00: Clems BBQ Dinner at LTI Test Track

5:00~8:30: Autocross as daylight allows  
8:30-10:00: Pit Work and charging setup at LTI Test Track

Saturday, May 21 – “Errands Day”  
6:00 a.m.: Sunrise – Charger Readings and Liquid Fueling

7:00-9:00: Breakfast at Wegmans, Errand and Rules-Drivers Meeting

9:00-12:00: Local Errands around Penn State, laps at LTI Test Track, Display, Charging, Cargo, and V2G Events at Larson Transportation Institute

12:00-2:00: Tailgating Competition and Lunch Event at Larson Institute

2:00-7:00: Local Errands around Penn State, Highway Tour de Thor Laps, Charging, Cargo and V2G Events at Larson Transportation Institute

7:00-8:00: Dinner Out in State College

8:00-9:00: Scoring Meeting at Larson Transportation Institute

9:00: Pit Work and charging at LTI Test Track

Sunday, May 22 – Range Events  
5:50 a.m.: Sunrise, Continental Breakfast  
6:00-12:00: On Track Local Range Event #2

6:00-1:00: Highway Vehicle Eco Tour to Cresson Wind Farm (Tentative)

1:00-3:00: BBQ Lunch, Press Ride and Drive, and Preliminary Awards Event at Larson Test Track

Friday, May 27 – Final Awards Press Event

10:00 a.m.: Final Awards and Press Event at Penn State Abington (Tentative)

## Registration

Early Registration Fees:

\$80: Each 21st CAC competition vehicle — includes one competitor registration

\$50: Each additional 21st CAC team member

\$25: Each Tour de Thor Rally (May 22 only) competition vehicle — includes one competitor registration

\$10: Each additional Tour de Thor team member

\$5: Per night tent camping fee at LTI Test Track

\$25: Per night RV fee at Test Track

After April 20th all vehicle and competitor registration fees increase \$30.

Registration will be completed by mail and email this year instead of online. Early registration ends by Wednesday, April 20th to allow time for ordering T-shirts and making catering reservations. After April 20th registration prices increase and T-shirts may not be reserved in your size. Registration also requires submitting the necessary waivers for competitors, volunteers, and anyone under 18 along with submitting the attached spreadsheet form with vehicle, charging, and team information. Please mail your check or money order payable to “Penn State University” along with signed waivers to the following address:

21st Century Automotive Challenge  
Attn: Joel Anstrom  
201 Transportation Research Building  
University Park, PA 16802

All necessary forms are available on the EEVC Web site, [www.eevc.info](http://www.eevc.info).

Alternatively, registration spreadsheet forms and scanned waivers can be emailed to [jra2@psu.edu](mailto:jra2@psu.edu).

For registration questions email [jra2@psu.edu](mailto:jra2@psu.edu) or call 814 863-8904.



	3 <sup>rd</sup> annual <b>EV-ent in Macungie</b>
	Saturday April 30, 2011 10 am - 4 pm
<b>Cars of the Future on the Road Today:          Electric Vehicles on Display</b>	
<ul style="list-style-type: none"> <li>• Great for students, families, EV enthusiasts and inquirers</li> <li>• Panel discussion at 2 p.m. Meet the drivers of converted &amp; production EV's</li> </ul>	
	
Macungie Memorial Park Macungie PA 18062	
Rain date May 1	
for more information email <a href="mailto:macungieevent@gmail.com">macungieevent@gmail.com</a>	

## WAVES, BIG AND SMALL By California Pete



Since moving to the Bay Area I've complained often that there's no weather here (a typical forecast is "cloudy in the morning, sunny in the afternoon") and that the four seasons are a little strange: rain, fire, mudslide and earthquake (which lasts all year). I've pined for snow, for fog, for even a good thumping thunderstorm. Well this year we didn't get any snow or thunderstorms of any significance, but we did get rain. And rain. And rain. More about that in a moment, but first let's talk about waves.



One of the big annual events for the surfing community is the annual Mavericks international surf contest, held at a spot called Mavericks just north of the town of Half Moon Bay, where huge waves are common during the winter. My wife and I drove over in late February, during the supposed height of the season, and her photo shows the type of

waves we saw: maybe three feet, with a few disappointed folks on boards looking for action that never came. The contest was eventually scrapped for the year.

Then the waves came. On March 16 famed Hawaiian surfer Sion Milosky died trying to ride one. The big contest crowds were absent, but his death reverberated around the surfing world.

And on March 11 the great earthquake struck Japan, spawning a tsunami that caused immense destruction in that country. So what was the reaction here? The governor issued an alert warning people to get away from low-lying areas along the coast, and many residents did just that, heading from areas like Half Moon Bay up into the hills to the east. But at the same time several hundred people rushed the other way to see the big event. Sort of reminds me of the scene in the film *Independence Day* where the alien warship is hovering over New York City and people crowd the tops of buildings calling out "Welcome," and "Take Me," just before the death ray hits.

Well there was no death ray, and the watchers were disappointed, although the tsunami did cause about \$40 million in damage to boats and docks in Santa Cruz and Crescent City. Some of the tsunami did make it through the Golden Gate into San Francisco Bay, causing no harm; there's an interesting video at [www.youtube.com/watch?v=jdMDCLwblkY&feature=fvwrel/](http://www.youtube.com/watch?v=jdMDCLwblkY&feature=fvwrel/)

### Came the rain



The winter rains, which had been holding off, also arrived — a whole season's worth in about two or three weeks — and began saturating the ground. A hundred feet of the Pacific Coast Highway north of Big Sur fell into the sea, and a week later a mudslide covered the road to the south, cutting the place off from the world except for emergency supplies brought in by helicopter. Hillsides all over began to ooze and slither, taking houses with them and sometimes landing atop other

houses. Yep, it's that time of year.

### Gas prices and EVs



As oil prices have increased gasoline has followed, only more so here. The prices shown are far from the highest in the area. But we can hope it helps EV makers. Tesla motors recently announced that revenues for the fourth quarter of 2010 were \$36.3 million, 16 percent greater than the previous quarter, although the company is still running a substantial loss: \$41. million for the quarter as compared to \$34.9 for the prior quarter.

The company also announced that the Roadster will henceforth be marketed as a collector's car, with production limited to 2500 units. The company is instead tying its future to the Model S, for which it so far has received 3700 reservations.

Along the same lines, a March 7 AP story reported that Tesla plans to offer a limited-edition Model S with 300 mile range. The Signature Series would go on sale starting in mid 2012, while 160-mile and 230-mile Model S versions will be on sale later that year.

Fisker is also going with high prices. On Feb 22 Greentech Media reported that the company had raised \$150 million in new venture capital funding. The company plans to bring out its long-delayed Karma extended-range EV shortly at about \$95,000, with the Nina, a mid-range sedan, at about \$40,000.

### More alternate energy

The California state legislature has passed, and the governor has signed, a law mandating that the state's utilities get one third of their power from renewable sources by 2020, up from the previous 20 percent.

### SF Silliness

The San Francisco Board of Supervisors, perhaps swayed by a blizzard of complaints, recently decided to delay a vote on a proposal that would have banned distribution of the Yellow Pages except where residents specifically request them.

In an effort to conserve water San Francis-

co has been encouraging the use of low-flow toilets, and has discovered the law of unintended consequences. It seems that, with so little water used per flush, the sewer lines in some areas are filling up with solid material that it not being washed through, leading to some nasty odors. The suggested remedy — high doses of sodium hypochlorite (bleach) — has generated a backlash from those who think all that bleach will have a bad effect on the Bay (which is where all the treated sewage goes in the end).

### Don't forget Berkeley

In late February a group of local merchants got together to try to keep Goodwill Industries from opening a thrift store on Berkeley's toney Solano Avenue, claiming it would attract the homeless, delivery trucks, and, according to the *San Francisco Chronicle*, "bargain-hungry shoppers not likely to patronize the area's boutique baby stores and Persian Rug shops." This despite the fact that many stores on the street are vacant. Considering the People's Republic's reputation as a friend of the downtrodden, it seems a little hypocritical.

## NEWS UPDATE

### Offshore wind a priority?

A March 10 AP story reports that Maine Sen. Susan Collins was told by Interior Secretary Ken Salazar that offshore, deep-water wind technology is a high priority for the federal government. This was echoed by Deputy Secretary David Hayes, who added that the department is committed to helping to find federal funding for the development of a deep-water wind turbine prototype off the coast of Maine.

How much of this is political posturing, and how much would survive current and future rounds of budget cutting remain to be seen.

Yet perhaps private enterprise can step in. On April 4 Greentech Media reported that "Atlantic Grid Development (AGD) has filed for a right-of-way to build its Atlantic Wind Connection (AWC), an offshore transmission backbone that would streamline ocean wind power delivery."

The system is envisioned as "a 300-mile, high voltage, direct current transmission line

in the seabed beneath federal waters from the northern New Jersey/New York City metropolitan area to Virginia, with nine above-sea platforms along the way. At these hubs, offshore wind farms can plug in and power converters can intermix multiple wind sources, as well as traditional generation sources. Plans now call for seven onshore transmission system interconnections.”

This would open up the East Coast to large-scale offshore wind development — if the rest of the system actually happens. There are some powerful interests behind this, but nobody, one suspects, as powerful as those who would oppose it, so we’ll have to see what happens.

### **But there’s a hitch**

Greentech Media reported on February 21 that there’s a big obstacle in the way of adding more offshore wind turbines, and it has to do with national defense, not politics.

It seems that to doppler radar, spinning wind turbine blades look just like a moving airborne object — which could be an airliner, an enemy bomber, or a cruise missile. As a result, the article says, 4.7 GW are on hold in the U.K. and 9 GW in the U.S.

Raytheon Corp has won a \$22 million contract from the Department of Homeland Security to try to come up with a modification to the radars that will get around the interference problem.

### **Making EV batteries in North Carolina**

An AP story dated April 8 reports that EcoVolt Power Corp. has announced that “it is hiring 61 workers and investing \$20 million in East Bend to produce environmentally-friendly automotive batteries.” They’re automotive starter batteries, not EV batteries, but any news of activity in the U.S. battery business is welcome.

### **BMW sets up EV marketing arm**

*The New York Times* reported on February 21 that German car maker BMW has announced that it will create a new brand, called BMW i, to market its line of EVs starting in 2013. Models planned, according to *The Times*, include a four-seat urban-area car to be called the i3 and a two-seat sports car called the i8, with a 0-to-60 mph time of 5 s.

### **Texas cities to get EV charging networks**

An AP story dated April 8 reported that NRG Energy Inc. has announced plans to install a network of 70 EV charging stations in the Dallas-Fort Worth metro area and another 50 in the Houston area by the end of next year. The privately-funded project, says NRG, should be in place by Labor Day, and the first charging station should have already been opened by the time you read this. Plans call for stations along the Interstate 45 corridor in Texas next year.

“The first ‘Freedom Station’ recharger will have a 480-volt direct current fast charger that can add 30 miles of range to an electric car in as little as 10 minutes, and a 240-volt charger that can add up to 25 miles in an hour, the company said in a statement. Freedom Stations will be available 24 hours a day and include a tower with a camera that gives users access to customer service.”

“The network also will include “Convenience Stations” that have 240-volt chargers that will be available during the host retail business’ operating hours, NRG said.”

“NRG said it will charge users a flat monthly fee for charging plans. The company’s complete plan costs \$89 per month and covers the home charger, unlimited access to the charging network for free, and the cost of electricity to charge the car at home during off-peak hours. It also will offer a 240-volt home charger for \$49 per month.”

### **Retrofitting electric trucks with fuel cells**

An article by Jon Knox in *Automotive Industries* reports that “The Port of Los Angeles has awarded Vision Motor Corp of El Segundo, California, a leading developer and manufacturer of advanced zero emission hydrogen fuel cell hybrid electric commercial heavy-duty trucks, a contract in an amount not to exceed \$1,400,000 to retrofit a total of fifteen (15) Port owned electric trucks. The retrofits would upgrade the Port’s electric truck’s battery only system with Vision’s range extending, hydrogen fuel cell electric hybrid system. The Port will initially issue a purchase order for six (6) retrofits. The remaining retrofit orders are contingent on the availability of other grant funding.”

### **Google invests \$168 million in solar energy**

Brightsource Energy has announced that it has completed financing for the Ivanpah Solar Electric Generating System, a solar thermal plant in the Mojave that is expected to produce 392 MW from three solar thermal plants. Money for the projects comes from a combination of \$1.6 billion in loans guaranteed by the Department of Energy's Loan Programs Office, \$160 million from Google, Inc. and \$300 million from NRG Solar LLC.

In other DoE matters, on April 12 Energy Secretary Steven Chu announced the offer of a conditional commitment for a \$1.187 billion loan guarantee to support the California Valley Solar Ranch project, sponsored by SunPower Corporation. The project, which is being built in San Luis Obispo County, CA, includes the construction of a 250 megawatt alternating current photovoltaic solar generating facility and associated infrastructure.

#### **Li iron phosphate replaces lead-acid**

*Battery Power* reports that Micro Power has released a lithium iron phosphate battery that it says can serve as a drop-in replacement for sealed lead-acid batteries for mobile equipment. Claimed advantages include lighter weight, longer runtime, faster charging and longer cycle life.

#### **Nissan confirms Leaf restart problem**

On April the Environmental News Network reported that Nissan Motors "is investigating customer complaints that its new all-electric LEAF will not restart after being turned off.

"Without saying how many complaints have come in, Nissan acknowledges that drivers in both Japan and the United States have reported the problem.

"Nissan Americas in a statement on Monday, 'We are actively investigating to determine the root cause and what action is necessary to address the issue.'"

#### **COMING EVENTS**

**EDTA 2011 Conference & Annual Meeting**  
April 19-21, Washington, DC. Go to [www.edtaconference.org](http://www.edtaconference.org).

#### **EVs in Macungie**

April 30, Macungie (PA) Memorial Park. Con-

tact [jisaacs@buckscountyrenewables.com](mailto:jisaacs@buckscountyrenewables.com).

#### **Solar 2011**

May 16-21, Raleigh, NC. For info go to [www.ases.org/index.php?option=com\\_content&view=article&id=18&Itemid=147](http://www.ases.org/index.php?option=com_content&view=article&id=18&Itemid=147)

#### **21st Century Automotive Challenge**

May 21-23, State College, PA. Contact Joel Anstrom, 814-863-8904, [jra2@psu.edu](mailto:jra2@psu.edu) or go to [www.vss.psu.edu/HHVRL](http://www.vss.psu.edu/HHVRL)

#### **1st International Electric Vehicle Technology Conference 2011**

May 17-19, Yokohama. For info go to [www.evtec.jp](http://www.evtec.jp).

#### **11th Challenge Bibendum**

May 18-22, 2011, Berlin, Germany. Go to [www.challengebibendum/en](http://www.challengebibendum/en)

#### **The History and Advantages of EV's**

June 8, 6:30 pm at Lehigh Valley Green Drinks at the Allentown Brew Works. Free, plus there are \$1.00 drink specials available 5:30 - 6:30

#### **Hands-on EV Conversion Workshop**

July 25-30, at the Middle Bucks Institute of Technology, Jamison PA. For info go to <http://sites.google.com/site/wwwbuckscountyrenewables/newhome/ev-conversion-workshops-2011/July>. For registration info email [info@buckscountyrenewables.com](mailto:info@buckscountyrenewables.com)

#### **DoE Solar Decathlon 2011**

Sept 23-Oct 2, Washington, DC. Go to [www.solardecathlon.gov/](http://www.solardecathlon.gov/)

#### **MEETING SCHEDULE**

Meetings are held in Room 49, Plymouth-Whitmarsh High School, 201 East Germantown Pike in Plymouth Meeting, PA, and begin at 7:00 p.m. There will be no meetings in July or August.

May 11

June 8

September 14

October 12

November 9

December 14