

EEVC NEWSLETTER

Published by the Eastern Electric Vehicle Club

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Vol 35 No 5

MAY, 2015



Affiliated with EAA

21ST CAC AT PENN STATE Oliver Perry

The 21st Century Automotive Challenge (The Spirit of the Tour de Sol) at Penn State rolled on again this April 30th-May 3rd, 2015 under the direction of Dr. Joel Anstrom and Theresa Maher, his right hand.

Our first few days were spent at Central Pennsylvania Tech, operating out of the automotive shop doing tech inspection, setting up the diesel powered generator, and charging the electric cars that needed rejuvenation after long trips to the event. After the range event Friday the show moved on down the road to the Penn State Test Track Facilities for prep for the Saturday public display in the shadow of Beaver Stadium, and charging for the competitive loops around campus. The weather was damp and rainy Friday but turned golden for Saturday and Sunday. We couldn't have asked for better weekend weather.

Penn State is home for a lot of activities. Friday and Saturday evenings saw thousands of people pour in for live concerts. We had to deal with jammed roads and highways for the



Left to right:: 21st CAC director Dr. Joel Anstrom, Theresa Maher his assistant, and her oldest son Stephen

latter part of Saturday afternoon and evening. It was a reminder that Penn State is a people place in the middle of cow, bear, and trout country. A new competitive route took our cars on tour of a great trout fishing stream. It included a steep incline. Denny Stichter, with his wife navigating, discovered that allowing his convert-

ed S-10 pickup truck to freewheel down a hill can lead to disaster. His transmission positioned in low gear was spun by the gravity driven wheels, which in turn revved his DC motor faster than its top speed. It spun fast enough to allow one segment of its commutator to lift slightly out of place. The sound of a brush clicking against the raised segment caused Denny to call it quits for the day and call for a tow.

The next day, Sunday, Denny did some filing and resetting of the segment. The truck seemed to be back to normal later in the day, but not in time for the Autocross. (The epoxy needed too much time to dry.) Denny is this



Paul Kydd checks out his charging system while on display with Beaver Stadium in the background.



Helmets for the "Top Guns" wait in line for the Autocross to begin.



Auto Tech Instructors Dave Paterno (son of the late Joe Paterno.. foreground) and Ron Garner Phd (wearing cap) pose with their Penn College team in front of their converted Fiero. The car is powered by an AC motor with a voltage of well over 200 volts produced by lead acid gel cell batteries.

year's bad luck hero, taking it all in stride with a smile.

The results of the competition will be forthcoming. The complexities of the scoring and the need for cross examining take time. If the 21st CAC was the only activity that Joel had on his plate it might be different. We traditionally wait until our June edition to post the final results.



Denys Kelly, rookie EEVC 2015 competitor, poses in front of her Prius. It was great to have her in the event.



Sunday afternoon, after lunch, a selection of participants review and comment on the scoring. The final scores will be posted later. Awards night will take place at our June 9th Wed evening meeting at Plymouth Whitmarsh High school.

Saturday evening we gathered around a campfire at the Penn State Solar House and held a fireside chat discussing the future of our event. This discussion will be continued as time continues. One of the students from Methacton High School remarked that she felt that the great benefit of our event was giving students exposure to the technology that we use in the 21st CAC.

Jim Natale's final comments



Jim Natale (far right) with other EEVC members

Here are my final numbers. I'm not sure the gas station was open Sunday night when I

returned —all I wanted to do was get home. The tanks for the entire trip which included some local errands Wednesday and today covered 916 miles with 17.164 gallons for a bit under 53.4mpg. My only toll was the \$2.00 bridge into Philadelphia. Regular unleaded is as low as \$2.379 around here. It's an Amica (never heard of them) station that used to be a Shell in Delran. Same price cash or credit.

I got a real late start because I helped Ollie pack up the camper at the track and got home after 10:00, about 4 1/4 hours later. I pulled into a church parking lot and removed the pipe insulation from the upper grill as I was seeing inverter coolant temps in the 130s, the highest all weekend. They fell to OAT +20F fairly quickly.

I don't get much of a chance to do anything beside commute to State College as when I'm on the road almost everything is closed. I do like running in the mountains — as long as it isn't the winter.

I want to chime in with the other guys and thank everyone for making a fun weekend happen and it was great to see everyone once again.

You can have my Prius when you can pry it out of my cold dead hands.

I returned around 10:00 or 10:15. It was a pleasure driving east with the sun on my back. Someone westbound on 322 in Hershey (and maybe it really wasn't Hershey) wasn't so fortunate. I believe a motorcycle rider was hit and sustained serious injury. I don't think he was dead. Westbound traffic was stopped and a number of vehicles were sitting on the shoulders of the road. It must have just happened as there was no sign of the police or fire departments.

I was able to hold 60 mpg most of the way. There were a few spots where I had to get myself out of trouble due to poor judgement from being hot, tired, and dehydrated. I also had a headache. Maybe the sunburn had something to do with it. In a few days I too will be peeling.

If I had left right away I would have been home by the time we got on the road. Taking an alternate route may be faster because of the shorter distance, not the higher average speed. I figure an average speed of 50 mph cross country.

Half of winning is knowing when to quit.

If you're a long haul trucker at the terminal you have to drop the trailer in any conditions. You aren't. It doesn't matter. It will be more efficient to wait for daylight and your wife to do the spotting.

NOTE: JUNE 10 MEETING CANCELLED

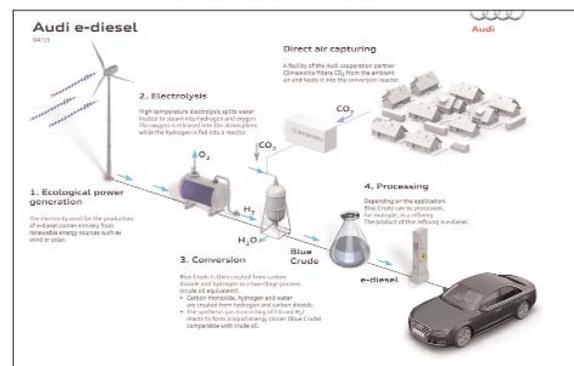
A replacement meeting is in the works; watch the chat line.

REQUEST FOR VEHICLES TO EXHIBIT AT BORDENTOWN CITY GREEN FAIR
Pat Skelly

Due to my long association with electric vehicles (TdS, Mike Skelly, etc), I'm trying to arrange a small display of electric vehicles at our 6th Annual Bordentown City Green Fair on June 13, 2015. I'd especially like to get a conversion or two to show folks options beyond the dealerships. We draw about 7,000 people from the region each year. The location, at Carslake Community Center, Farnsworth Ave. Bordentown City, is within 5 miles of I-295, I-195, NJ Turnpike, Routes 130 and 206, and the PA Turnpike bridge. Exhibitors would need to be on site by 8:30 and stay until 4, but we have shade, real bathrooms, and several options for real food from local places at normal people prices! Plus lots of exhibits, entertainment, and a real old-fashioned festival atmosphere! I'd love to hear from someone at your earliest convenience, at least about the general possibility, as others on the Team are allocating space now for different parts of the event.

If interested, please contact me at pat@patskelly.com

MAKING DIESEL FUEL FROM AIR?



Researchers at sunfire GmbH and Audi have

found a way to make hydrocarbon fuels using as inputs only carbon dioxide, water and renewable energy, and have built a pilot plant in Dresden to prove the commercial viability of the concept.

The process starts with high-temperature electrolysis of steam into hydrogen and oxygen, using what is essentially a solid oxide fuel cell running in reverse. The hydrogen is then reacted at high temperature and pressure with CO₂ (from whatever source, including, potentially, the air) in a reverse water-gas shift reaction to create carbon monoxide (CO). That CO is then combined with additional hydrogen (in the Fischer-Tropsch process, for you chemists) to produce gasoline, diesel, kerosene and other base products for the chemicals industry. The feeding of the heat released during synthesis back into the process ensures a high degree of system efficiency (70 percent).

To demonstrate its suitability for everyday use, Federal Minister of Education and Research Prof. Dr. Johanna Wanka put the first five liters of what Audi calls e-diesel into her official car, an Audi A8 3.0 TDI clean diesel quattro. It ran well, and was quieter than usual, she reported.

If this can be expanded it could create a market for alternate energy that would not involve the electrical grid, and eventually reduce demand for drilling, although we're not holding our breath.

NEWS UPDATE

Costa Rica runs 75 days on renewable energy

If you want to be encouraged by what's going on in Latin America, take a look at Costa Rica. Forget Venezuela, Brazil and other countries with strong-man (or woman, in the case of Brazil) governments and collapsing economies. Costa Rica maintains a functioning democracy, and its biggest government expenditure is (and has been for years) education, at more than 24 percent of the total budget. The country has also preserved its environment, and instead of destroying its world-famous rain forests, carefully maintains them and charges tourists to see them. So it probably should not come

as too much of a surprise to learn that the nation's entire electric grid was able to run for 75 days entirely on renewable sources, according to a March 21 article by Kate Valentine on *ClimateProgress*. Much of the reason was that heavy rains had provided an abundance of hydroelectric power; they have also allowed electric rates to drop by 12 percent. Under normal conditions the country gets about 88 percent of its power from renewable sources, but the recent rains increased the availability of hydropower.

Tesla's battery announcement

Elon Musk's recent announcement that Tesla would be selling a range of stationary batteries for what would be essentially distributed load leveling marks the company's move into a market that could soon equal or exceed its car business — and have a significant impact on the utility business. It's useful to note that Musk also announced plans for a larger, industrial-scale battery and a much larger utility scale battery. The battery, he said, has been the missing piece of the electrical puzzle.

The new batteries will accelerate the move from fossil fuels, because it will level the output of solar and wind generators at whatever size they are implemented. Homes will be able to use a Tesla Powerwall battery to store output from their rooftop or other solar panels and, in some cases, even allow homeowners to disconnect from the grid, in places where that is permitted.

This scenario can lead to some fundamental changes in how utilities and the grid operate financially, as we said in a posting on the EEVC chat line: "Utilities pay for grid maintenance and energy, but charge for only energy delivery, so solar users are a loss for them. Increasing electric rates only drives more people off the grid, and they won't be allowed to increase rates too much to compensate because it would make electricity too expensive for those of modest means. Greatly reducing the feed-in tariff won't help, because it will just increase the incentive to get off the grid -- unless it is decided that connection to the grid (like connection to water and sewer services) is required to render a house legally habitable.

"It would appear that billing separately for

energy and grid upkeep would be the way to go, but one wonders if that would be allowed by legislatures and regulators.

“Utility-owned solar plants may help save money on fuel especially if they pair it with increasingly-available energy storage, but it won’t solve the grid problem.”

That said, it is easy to see how industry will use their batteries: Not only will they make it easier to integrate whatever alternate-energy equipment a factory may have, but they will also essentially eliminate demand charges. The rate per kilowatt hour paid by an industrial or commercial facility depends on a number of things, but one that can really affect the electric bill happens if the user’s demand exceeds a set level. This triggers a higher rate for the entire month — even if the heavy draw lasts for only a few minutes. There are commercially-available systems that help companies manage their peak loads to avoid these demand charges, but having a battery to pick up periods of heavy demand rather neatly solves the problem.

Utilities, for their part, have multiple reasons for wanting really big batteries. If they operate solar installations or wind farms they can use the batteries to smooth out their load over the course of 24 hours, and even if they have no alternate energy they can use the batteries to shift loads from peak times during the day to night-time base load.

As an aside, an October 31, 2013 piece by Jeffrey Wishart at <http://chargedevs.com> mentions that demand charges can be a particular problem for businesses hosting high-level EV chargers, and mentions battery storage as one of several ways to solve this problem.

That’s one big EV



Another use of big Li-ion batteries is in

both running and recharging electrically-powered ferries in Norway. The ferries run between the villages of Lavik and Oppedal in the Sognefjord. The ferries, each 80 meters long and 20 meters wide, transport up to 120 cars and 360 passengers 6 km across the fjord 34 times per day, with each trip requiring around 20 minutes. Each ship carries a ten-ton, 1000 kWh battery that can provide enough energy for about two trips. Recharging in the ten minutes the ship spends at the dock at each end would overtax the local electrical grid, so each ferry terminal has a 260-kWh battery that provides a quick boost and is itself recharged while the ferry is under way. The ship’s batteries are fully recharged directly from the grid at night after the ferry stops operating.

EVs really do save money

In a March 16 press release Nissan Motors Europe reported that C&C Taxi, in rural South West England purchased a Nissan Leaf a year and a half ago. The cost savings have been so dramatic — more than 11,000 per car — that the company has purchased five more Nissan Leafs (Leaves?) and has just taken delivery of its first Nissan e-NV200 Combi, an electric people carrier.

Small businesses benefit from EV charging

An April 27 article by Gina Coplon-Newfield in the Sierra Club’s publication *Compass* highlights the increasing attractiveness of EV charging stations for small businesses — not as civic-minded gestures, but as ways to build trade. The article points out that the revenues for electricity alone do not cover the cost of the charging equipment, but EV drivers using apps like PlugShare can find out about restaurants and other businesses of which they would otherwise not be aware. And, says the article, once they have stopped at a charger-equipped establishment they tend to spend significantly more time there than they otherwise would — 50 minutes more, according to figures from ChargePoint — and are likely to spend money during that time.

The EVC has been advocating this for some time (thank you, Ed Kreibick); it’s nice to see it becoming more generally known.

CALIFORNIA HAS WORLD'S SECOND GREENEST ECONOMY

By California Pete



California seems to be living up to its own hype. According to a report from the public policy group Next 10, the state, which has an economy that would place it tenth in the world if it were a country (using 2012 figures),

has the world's second least carbon-intensive economy. "For every dollar of goods and services, California emits less carbon than any nation except France." In addition, it produced nearly 64 percent more GDP for every unit of energy consumed than the U.S. as a whole (2012). For every unit of energy, the state produced \$268 billion GDP, compared to U.S. \$164 billion GDP." And 23 percent of the state's electricity came from renewable sources as of the first half of 2014. Fourth among large emitters for total share of electricity renewables. It also, the report says, reduced its electricity use per capita by four percent and total energy use per capita by 19.5 percent (1990—2012).

Now if we could figure out where to get some water...

COMING EVENTS

The WAVE – World Advanced Vehicle Expedition electric vehicle rally

June 12-21, from eastern Germany into the Alps. Go to http://www.wavetrophy.com/en/EV_Fest_2015

June 14, Flamborough (Hamilton), Ontario. Go to www.evfest.ca

E Rider Electric Car Show Ohio

June 21, Clayton, OH. Go to <http://ohio-evshow.weebly.com/>

EVs and the Grid Summit

July 8-9, Los Angeles. Go to www.info-castinc.com/events/ev-grid/agenda

Formula Sun Grand Prix

July 26-31, Austin, TX. <http://americansolar-challenge.org/the-competition/fsgp-2015>

SAE 2015 New Energy Vehicle Forum

Sept 3-4, Shanghai, China. Go to <http://www.sae.org/events/nev/>

2015 Electric & Hybrid Vehicle Technology Expo

Sept 15-17, Novi, MI. www.evtechexpo.com/
The Battery Show (colocated with the event above).

Go to www.thebatteryshow.com/exhibition/about-the-battery-show

ALTCAR Expo

Sept 18-19, Santa Monica, CA. Go to www.altcarexpo.com

2015 World Solar Challenge

October 6-13, Australia. Go to www.world-solarchallenge.org

Engine Expo 2015 (with an electric and hybrid pavilion).

Oct. 20-22, Novi, MI. Go to www.engine-expo.com/usa/pavilion.php

SAE 2015 Electric Powertrain Technologies Symposium

Nov 17, Stuttgart, Germany. Go to <http://www.sae.org/events/epts/>

SAE International Vehicle Electric Powertrain Forum

Dec 3-4, Shanghai, China. Go to <https://www.sae.org/events/vept/>

NOTICE ON DUES

Annual EEVC dues are \$20 with electronic delivery of the Newsletter, or \$25 for a printed copy. Mail checks payable to EEVC to James Natale, 3307 Concord Dr, Cinnaminson NJ 08077, or pay via PayPal to jnatalemicro@comcast.net.

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. Note there are no meetings in June, July or August.

Sept 9

Oct 14

Nov 11

Dec 9