EEVC NEWSLETTER

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Affiliated with EAA

2016 EEVC RON GROENING ENGINEERING AWARD
Oliver Perry

On Saturday, February 12th the Southeastern Pennsylvania Physics Olympic League held its final meet of the year at Henderson High School in West Chester, Pennsylvania. Each year the EEVC attends this meet and presents an award to the student or students who, according to our standards, build and compete with the best overall electric device in the electric vehicle competition.

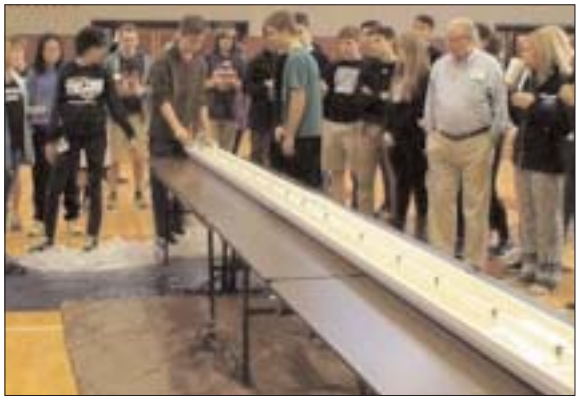
Corey Baer, a senior from Henderson High School in West Chester Pa. is the 2016 winner of the EEVC "Overall Best Boat" outstanding engineering award, presented in honor of former EEVC member and officer Ron Groening. Corey also won the as well as the Gold Medal with a time of 5.29 seconds.

Overview

As mentioned yearly in our Newsletter coverage of the event, the Southeastern Pennsylvania Physics Olympics League consists of about nine to ten high schools in the Delaware Valley that provide both team and individual physics related competition for their students through three annual Saturday morning meets. On average there are several hundred students participating in each meet as well as a few dozen parents serving as judges for various events. To compete in a meet teams must bring several "hands on" projects built by students at home. They must prepare for a number of team lab oriented-engineering type events as well as traditional textbook physics problem solving questions. Scores for performance in every event are

Winners of the Bronze and Silver Medals: Misha Tyryshkin (l), eleventh grade, Pennsbury High School, time 10.5 seconds; Mike Shaw, senior, Phoenixville High School, time 8.99 seconds

totaled. Team and individual awards are presented. In addition to the traditional school-sponsored awards presented at the last meet of the year the EEVC offers a special "Best EV" plaque for outstanding engineering, commemorating former EEVC member and officer Ron Groening.



Two house gutters clipped side by side provided two water filled tracks for the pontoons of the catamaran to travel in. Doug Macauley from Pennsbury High School, (left) supervised the event.

The event that the EEVC helps to coordinate and run each year is generally referred to as the electric car event. However, several times electric boats have been required for the competition instead of model cars on wheels. This year students were asked to construct a pontoon electric catamaran that raced down a water-filled home gutter that served as a race track. The water track consisted of two gutters clipped together to make side-by-side canals of water for the pontoons of the catamaran to travel along.

Winner of the PSE&G "Team Cup" for electric power racing – Penncrest High School. (Left to right back row) Melissa Callahan, Liam Forsythe, Sean Walsh, Ryan Shah; (Left to right front row) Gabrielle Dunn, Samiv Jambhekav, Jay Fein, Drew Jacobs. The team that raced the most different catamarans (four boats that earned times) and averaged the lowest team time of 13.15 seconds. The runner up was Interboro High School with a team average of 16.7 seconds for their four boats.

The instructions for the electric catamaran boat competition (see below) were presented to the students at their respective schools earlier in the year. A designated official electric DC motor attached to a two bladed plastic fan was required for power. Students could use one or two motor fan assemblies. The question quickly came up, if students chose to use two motors, (which experimentation answered), was whether or not to connect them in parallel or series with the required conventional nine volt battery.

Details

This year the EEVC members making the trip to West Chester were Ken Barbour, Aimee Barbour, Carl Grunwald and president Oliver Perry. Doug Macauley, physics instructor from Pennsbury High School, was the supervisor of this year's electric catamaran event. Doug provided the rules and ran a very trouble-free successful competition. Carl Grunwald helped out with timing the runs of the catamarans, while Ken, Aimee, and I took photos and video of the event. After the racing was completed and the times of all the cars provided, Ken and Carl set about the task of selecting the overall best boat for our award.

The boats eligible for the EEVC award required an attached EEVC logo decal. The eligible boats were lined up on a table (see picture) and then shuffled around so that the

Aimee Barbour helps line up the boats for judging.

"best" appeared at one end and the "not the best" at the opposite. We considered the competitive speeds of each boat. Our rules required that our choice of overall best boat have a performance in the upper half of the competitive results. Closer inspection of the boats with better times considered each boat in terms of engineering design and overall construction.

The overriding premise we have each year when we select our engineering award winner is that the student should use design features that give that vehicle the chance to win the event. Elaborate features that may show impressive engineering but are not conducive to winning the event are superfluous and should not count toward our final choice of best vehicle. Overall construction, strength of the project, and neatness are considered.

Carl Grunwald (left) and Ken Barbour (right) evaluate the boats.

Physics teachers Scott Delone (center), Dave Macauley (top center), and Marian Venturini (back end of table) discuss some event rules while EEVC member Oliver Perry (right) listens in.

When the boats raced down the troughs some tipped over because their centers of gravity or the masts of their propellers were too high. Some became lodged at spots along the raceway where clips held the gutters together. The pontoons were critical for straight tracking through the narrow channels and for slipping over the slight obstacles resulting from the track construction.

Some students from schools that chose not to construct the required race tracks for testing, but instead used their own modified bodies of water, evidently were unaware of the critical dimensions needed for the pontoons. Several boats were actually unable to fit their pontoons into the troughs. Their boats were too wide or too narrow. And in some cases where the pontoons fit into the troughs they rubbed against the trough walls, creating unnecessary drag.

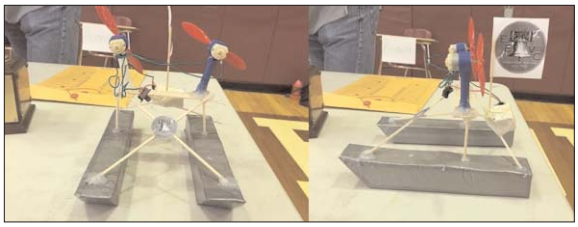
Surprising some students only used one motor propeller assembly. One motor instead of two resulted in longer battery life, less weight, and less drag. But in most cases, twin props proved be superior for producing speed.

Another question facing the students was how to best utilize two power units. Assuming two motor propellers would provide more thrust than one, should one be positioned to

pull like an airplane and the other push like the Florida Glades hovercrafts? Or should both props pull or both push? Should they have opposite rotation?

There were plenty of unanswered questions for the students to find answers for through experimentation. Unfortunately, as usual, many began their projects too late, and were forced to compete with their first concepts and first construction attempts, only to find out that they had not correctly chosen the maximizing features.

Our winner



The EEVC "Best Catamaran" Boat with twin props

The student winning the EEVC award began his project a number of weeks in advance of the competition. He ran many actual trials on a qualified racing trough with a number of designs before figuring out the best design. Most boats took more than 10 seconds to run the length of the tracks. In fact the third best time was 10.5 seconds. The best team average was about 14 seconds. Our winner posted the best single time (not required for our award) of 5.29 seconds!

Critical for winning was the design of the pontoons. Our winner, Corey Baer, a senior from Henderson High School, actually toed in (cambered) his pontoons in order for them to track straight. The pontoons were made of styrofoam carefully wrapped with duct tape. The duct tape seemed to be resistance free compared to many pontoons made out of plastic water bottles and unwrapped styrofoam. The supporting platform for the motor, battery, masts, and propellers was attached to the pontoons with simple strong lightweight struts, positioned for strength.

Corey kept a low center of gravity by keeping the battery and the motor fan assemblies reasonably low. He tried both parallel and series motor wiring, and discovered that placing the motors in parallel and giving them each 9 volts produced more power than did a series setup which limited each motor to 4.5 volts. The batteries lasted longer if wired in series but since this event was not a long-range event, battery life was not a factor. Higher dual prop speeds resulted from parallel wiring and produced more thrust and shorter times.

Corey's entry boat, after building four or five previous models, was well balanced, lightweight, and thoroughly tested before he arrived at the competition. Through his early planning and extensive rebuilding process Corey clearly found the way to win.

Our selection for the "Over-all Best Boat" entry carried an EEVC paper flag as well as an EEVC boat insignia. We were proud and pleased to present the 2016 award to Corey, who well deserved winning it.

A little more about Corey the student

Corey Baer and his mother Julie

Corey comes from a family of four. He lives with his father Greg and his mother Julie. He has a sister who is in eleventh grade, one year behind him in school. Corey's father is a stonemason and his mom is an interior designer.

Corey's physics teachers Mr. Dan Hartwell (l), and Physics Olympics Coach, Mr. Scott Delone (r)

Corey's mother, Julie Baer, informed me

that his physics teacher Mr. Dan Hartwell made a tremendous impact on Cory. He turned him on academically and focused Corey's talent on engineering. She is very grateful to Mr. Hartwell for his influence. Teachers can and do make a difference. Not all education is best served on-line.

Corey not only is interested in engineering, electronic media, and astro-physics but also coaches a basketball team for younger kids, plays lacrosse, goes camping, hikes in the outdoors, and loves music and computers.

Corey has applied to the Penn State, Altoona branch, for engineering. His options for a career remain open.

Rules and Regulations for The Electric Fan Catamaran

Electric Fan Catamaran 2015-2016 Doug Macauley, Pennsbury High School

Objective

Build the fastest electric catamaran that can travel along a given distance.

Number of Boats:

Each school may enter up to four boats in this event.

Requirements:

- The boat must use ONE or TWO official motors and up to two propellers from this kit(Edmund Scientific #3081713 Motor, DC, High Speed, Pkg/3) and ONE standard 9-volt battery.
- The boat must be activated by a switch. Your hand may touch the switch and boat at the same time but the boat may not be pushed. (If a judge decides that a push is involved, the run will be disqualified)
- The boat must be student-built and not from a kit.
- The boat must be powered only by a 9 volt battery.
- The boat must have a legible flag securely affixed on the stern (back) of the boat, located 3-5 cm above the hull. This flag must have the school name, student's name and numbered boat. (#1-4 for each boat entered). The flag may extend beyond the end of the track.
- The boat must not fall apart or capsize in any way from when it starts to when it crosses the starting line.
- The boat must operate autonomously once the switch is pressed, with no remote control of any kind.

Restrictions

- The hull of the boat may be made of any household or common product. It must be constructed by students and a noticeably hand-made hull. (3-D printing may not be used). The hull must be a catamaran style vessel that offers part of the boat in each track.
- The track may not be used to offer leverage to the hull or to keep it afloat in the starting box.
- The boat may not have any type of guide rail that touches the side of the track in the starting box.
- The boat must fit in the starting box area, however, it may extend beyond the width of the two tracks to a maximum 30 cm total width, but must remain afloat. The boat must fit into a 40.0 x 40.0 x 40.0 cm^3 volume.
- Part of the boat must be in contact with the water in both gutters at all times. The clearance for the middle portion of the track must be taken into account. This means that when the boat is afloat in the water, in may not touch the side or middle of the track. The track will have clamps in this space and will impede the boat from moving along.

The Race:

The track will consist of four total gutters (K style) side by side, two running parallel to each other and two connected to make the track longer. The flat parts of the track will be connected by butterfly clips in the middle. Two parallel and two end to end consist of the track. Each track will be 9 cm wide and 6 meters long. The depth will be set to a 2 cm line below the top of the middle portion of the track. There will be a starting line at the "starting end" of the track 40 cm from the end. This is defined as the starting box. Each boat must start anywhere behind the starting line. Competitors will have 30 seconds to start the boat and remove their hands. Once the bow (front) of the boat crosses the line, the time will begin to start.

Each run will be timed by 3 timers using stopwatches and an average time (t) will be recorded. If a boat stops for 3 seconds before crossing the finish line, the trial has concluded and will be called. The distance achieved (?x) will be measured and used in the calculation.

Schools may have up to four boats, and each school will have a total of four runs. School names will be drawn randomly to determine the race order.

Scoring

Individual score will be calculated by distance divided by the time if the car finishes the entire length of the track. It must hit the end of the track with any part of the boat to count. The fastest boat to complete the track will be the winner.

Team Score = Sum of the best 2 runs

Tier 1: Schools with at least 3 runs completing the track

Tier 2: Schools with 2 runs completing the track

Tier 3: Schools with 1 run completing the track.

Tier 4: Schools with 0 runs completing the track. In this tier, distance will be considered as the defining factor. The longest distance will win in this tier.

The school with the highest score will get 200 points, the school with the second highest score will get 190 points, etc. Any school with no boats will have zero points.

The EEVC Prize:

EEVC members will award a prize to the boat that (a) exemplifies high standards of engineering and craftsmanship and (b) is entered in the EEVC competition and (c) completes the competition in the fastest half of the qualifying runs.

To enter the EEVC competition, the EEVC logo must be visible on the body of the boat AND on the flag.

AN INTERESTING SOURCE OF ENERGY

Friday, 26 February 2016. Professor Scott Banta of the Department of Chemical Engineering, Columbia University, gave a presentation on "Making Biofuels from the Wind or Rocks" to the New York City association of physics teachers.

According to Banta, "there is a great need to create liquid transportation fuels from resources other than geological carbon. The use of photosynthetic organisms is attractive but there are many challenges with this approach, including land and water usage as well as competition with food agriculture. Chemolithoautotrophic bacteria are attractive as they obtain energy from the oxidation of inorganic materials and they can fix CO_2 into reduced carbon compounds. We have been working to genetically modify the acidophilic bacterium Acidithiobacillus ferrooxidans which oxidizes iron and sulfur compounds and is found in mining environments. The engineered cells can produce chemicals and fuels from CO_2 and they can be powered by renewable energy (such as wind or solar) by reducing the iron that they need to grow in a coupled reactor configuration. The cells are also employed in mining environments where they facilitate copper bioleaching operations. Therefore we are also exploring the use of the cells to co-produce fuels and chemicals during copper mining operations. This would result in the exploitation of a previously unexplored terrestrial energy resource – the oxidation of reduced metals in the Earth's crust."

APPRECIATION FOR OUR CHAT LINE HOST
Oliver Perry

Let's not forget the person who is our chat line host, Gregg! He does a great job, as do all of you. And, I have to answer my wife Dottie's critical question, "Why do I now have that red thing on the desk in front of Gregg?" She asked me what it is. I told her something that should not be thrown out. In reality, it's a torque converter from an automatic transmission.

STICKING IT TO DRIVERS IN SF
By California Pete

There is a movement/policy in much of California called Transit First. First adopted in San Francisco in 1973, it stated that public transit, along with bicyclists and pedestrians, would be the city's top transportation priorities. This led eventually to the realization that, if drivers were viewed as a despised class by local government, then it was perfectly legitimate — praiseworthy, in fact — to stick it to them in every way possible. This has led to some of the highest parking meter rates in the nation. "[O]nly Chicago and Los Angeles charge more to park at a downtown meter, and ... San Francisco charges the highest rate outside of the downtown core. In addition, San Francisco matched only New York City in the highest meter violation fine," according to the *San Francisco Chronicle*. "San Francisco charges $2 to $3.50 an hour to park at a meter, with downtown costing the most and neighborhood commercial districts the least. The fine for parking at an expired meter is $55 in neighborhood commercial districts and $65 downtown."

Of late, however, there has been increasing noise about the towing racket in SF. If your car were towed in the City by the Bay, you could expect to pay the ticket, at $68, plus a towing fee, and, if you didn't show up within four hours to reclaim you car, a rapidly-escalating storage fee. And on top of that the Municipal Transportation Authority (which operates the city's public transportation system and is no friend of the automobile) tacked on a $491.25 "administrative charge," which went to pay not just for the costs of the paperwork, but for everything including a portion of the MTA director's paycheck. The total could easily reach $600 or $700. If you were a tourist and your car got stolen, abandoned and towed, you were effectively screwed. If you were poor, and needed the car for work, you had to choose between that and paying your rent, but MTA didn't care.

In November, when it was finally realized that the charge for getting a stolen car back might discourage tourism (which is the largest industry on the region and generates $6.73 billion in revenue), the towing fee was dropped for stolen cars, and a 48-hour grace period was instituted before storage charges began.

But the administrative fee still rankled on residents, and, following an investigation by the *Chronicle*, the MTA agreed to reduce the fee to $380.

Not a fix, but a small improvement. Just remember: the rapacity of bureaucracies is eternal.

By the way, long-time residents of the Philadelphia region will remember a guy called Smashy DiStephani, who ran a towing operation headquartered under the Platt Memorial Bridge back in the '70s. Smashy towed a lot of cars, many of which were not abandoned or parked illegally; he just stole them. Despite having multiple convictions for auto theft and tax evasion, as well as suspected ties to organized crime, he had a no-bid contract from the city. The word was that he paid a good chunk to Mayor Frank Rizzo, who protected him — until he started stealing unmarked police cars. Big Frank loved the police more than he did Smashy, and that was the end of it.

Real estate goes mad — again

Back around 2006 or so there were radio commercials around here that sounded like "no job, no income, no problem. We'll write you an interest-only mortgage." We all know how well that turned out. Housing prices collapsed, lots of people went bust, and things became normal — for while. But the problem remains: more people are moving here than there is housing available, and building (severely constrained by San Francisco's famous resistance to any change) can't keep up (SF has been called "49 square miles surrounded by reality"). The Zillow Home Value Index for San Francisco is currently $1,115,700, up 11.2% from a year ago, and I recently saw an ad for a nice place in the exclusive Pacific Heights neighborhood (some people call it "Pacific Whites") with a price of $28,000,000.

The situation in Silicon Valley is worse, with a median price of $2,503,600, so is it any surprise that there's a proposal before the Palo Alto city council that would provide a

housing subsidy to families making up to $250,000 a year.

As Scrooge said, "I'll retire to Bedlam."

NEWS UPDATE

Whither Faraday?

Nevada may be having second thoughts about this whole electric vehicle/alternate energy thing. Last month we reported ("Nevada turning against solar?" Feb, 2016, p 5) that the state had increased fees for rooftop solar and plans to eliminate net metering altogether by 2019. Now Faraday Future, which was given "up to $335 million in incentives to build a factory in Nevada," according to a March 7 article by the AP's Michelle Rindels. In response to some questioning from the state government, at the beginning of March the company announced that "it will put up a $75 million bond so taxpayers aren't on the hook if its planned car factory goes belly-up."

But the news about Faraday, and the Chinese company backing it, has not been good of late, so who knows what will happen?

Don't count Nevada out

Yet despite Nevada's apparently increasing reluctance to fund Faraday (which looks pretty shaky), that doesn't mean the state is unwilling to put money into future transportation projects, if they promise economic development and jobs. On March 23 an article by Richard N. Velotta in the *Las Vegas Review-Journal* reported that Hyperloop Technologies, "which late last year announced plans to build an outdoor test track at Apex," looks good to get a a package of $9.2 million in state incentives to build a transportation system that will move passengers and freight at supersonic speed through low-pressure tubes (as envisioned by Elon Musk). The Apex installation would involve the building a two-mile test track, plus supporting facilities. Apex is the same location that Faraday Future plans to build its plant.

Will EVs kill the oil industry?

A Feb. 25 opinion piece by Tom Randall in *Bloomberg News* puts forth the argument that as battery prices decline EVs will become so numerous — reaching 35 percent of new cars worldwide by 2040 — that they will cause an oil crisis. As Randall sees it, "on the first episode of Bloomberg's new animated series Sooner Than You Think, we calculated the effect of continued 60 percent growth. We found that electric vehicles could displace oil demand of 2 million barrels a day as early as 2023. That would create a glut of oil equivalent to what triggered the 2014 oil crisis." A 60 percent annual growth rate cannot be sustained. Randall admits, and there are many things that could prevent that from happening, but he maintains that it will happen some time in to '20s. You can read the article at www.bloomberg.com/features/2016-ev-oil-crisis.

The EEVC Chat Room wasn't silent on that. Here's what Jim Natale had to say: "EVs are not going to penetrate every market. How many countries in Asia can take 24/7 electricity for granted? In India some companies run their own power plants because electricity service is so unreliable. The 5 star hotels (behind barbed wire to keep the locals away) that cater to the American business people checking up on their subcontractors don't have clean stable electricity (from personal experience). Those people will transition from bicycles to gasoline; first with scooters then transitioning to cars.

"In the cities the grid is a mess. It's as bad as the old photos of NYC. NYC is just as bad today but we don't notice because the problem is buried. There are untold miles of conduit under the streets and nobody knows where the wires lead.

"In this country people aren't going to change. When prices spike small cars and hybrids become popular. When the situation normalizes that small car or that Prius is traded in for a SUV or a pickup.

"My prediction: The USA will reduce overall gasoline consumption because fewer people will be commuting. Some won't be working at all. Some will be working closer to home. Some will be "telecommuting". Another personal example: Why does an employee have to commute to an office building to log into a computer to process a digitized document, use a database? The Indian subcontractor in India is looking at the same image. Here's a company issued com-

puter. Find your own connection. Log on to our secure site. Use Instant Messaging, email, or skype. Place "your" files on the provided shared drive on the network.

"Why do we "need" to cross a bridge and drive 30(+) miles for a meeting? The only things we can't do online are eat & exchange stuff.

"I'm long on oil, natural gas, and public utilities (electricity & water). The reason they exist is because people can't or won't generate their own heat or light and not everyone has their own water."

New record in world renewable energy investments

There's bad news for fossil fuel proponents from a new UN-backed report. Coal and gas-fired electricity generation last year drew less than half the record investment made in solar, wind and other renewables capacity, according to "Global Trends in Renewable Energy Investment 2016," the 10th edition of UNEP's annual report, launched today by the Frankfurt School-UNEP (United Nations Environment Programme) Collaborating Centre for Climate & Sustainable Energy Finance and Bloomberg New Energy Finance (BNEF). The annual global investment in new renewables capacity, at $266 billion, was more than double the estimated $130 billion invested in coal and gas power stations in 2015.

All investments in renewables, including early-stage technology and R&D as well as spending on new capacity, totalled $286 billion in 2015, some 3% higher than the previous record in 2011. Since 2004, the world has invested $2.3 trillion in renewable energy (unadjusted for inflation). (All figures for renewables in this release include wind, solar, biomass and waste-to-energy, biofuels, geothermal, marine and small hydro, but exclude large hydro-electric projects of more than 50 megawatts).

Just as significantly, developing world investments in renewables topped those of developed nations for the first time in 2015.

Helped by further falls in generating costs per megawatt-hour, particularly in solar photovoltaics, renewables excluding large hydro made up 54% of added gigawatt capacity of all technologies last year. It marks the first time new installed renewables have topped the capacity added from all conventional technologies.

The 134 gigawatts of renewable power added worldwide in 2015 compares to 106 GW in 2014 and 87GW in 2013.

Were it not for renewables excluding large hydro, annual global CO_2 emissions would have been an estimated 1.5 gigatonnes higher in 2015.

And more so going forward

A March 10 article by Katie Mohr of *Manufacturing.Net* says that "[a] new report projects that the U.S. solar market will more than double this year, with an expected 119 percent growth, largely due to utilities increasing solar capacity.

"Released by GTM Research and the Solar Industries Energy Association, the U.S. Solar Market Insight report forecasts that 16 gigawatts of solar will be installed in 2016, which breaks the record 2015 held at 7.3 gigawatts installed.

"About 74 percent of the 2016 installations, the report notes, are due to utility-scale installations. That equates to about 12 gigawatts. Just five years ago, utility installations added just below .3 gigawatts, but utilities began adopting solar more readily, jumping to 2.9 gigawatts in 2013. Last year, utilities contributed about 4 gigawatts of new solar installations."

More solar benefits

The above follows a Feb. 24 piece by Ms. Mohr in which she cited another study under the headline, "Clean Power Could Actually Save US Billions Of Dollars Each Year." The study showed that increasing use of clean power would not only save lives (less illness and death from asthma. for example), but also money:

"Concerns abound that implementing measures to reduce harmful fossil fuel emissions would create more cost than benefit. A new study, however, found that it could actually save the U.S. money and lives.

"The study published by *Nature Climate Change* found that sticking to the emissions target determined in the Paris climate talks could save the U.S. trillions within the next 15 years — significantly more than expected implementation costs.

"Based on current carbon emission reduction goals of about 80 percent by 2050, this study assumes a reduction of about 2.7 percent each year between 2015 and 2050. For 2030, that would be in the ballpark of a 40 percent reduction relative to current emissions.

"The proposed Clean Power Plan rules — which would account for about half of the required emissions cuts — are expected to cost up to $9 billion. It might sound steep, but the measures could save about $250 billion annually in terms of about 15 million prevented sick days and 29,000 child asthma-related trips to the hospital.

"Taking into account increased worker productivity and reduced medical spending due to lower levels of pollutants and harmful particulates, the study estimates the economic impact could be even higher.

"By 2030, the study estimates, energy policy changes could prevent about 175,000 premature deaths. Clean transportation could prevent an additional 120,000 premature deaths."

Are cars becoming too complex?

Long-time club member Dan Carlin once told a car company representative, "your cars are over-priced crap." His complaint was that it had become impossible for anyone without tens of thousands of dollars worth of computer equipment to do anything to a car but put gas in it, and to a large extent he was correct. It was possible to set the timing on a Model A Ford in about a minute, using a pair of pliers and a screwdriver, but those days are long gone, for better or worse.

Granted, the technical advances make for more efficient cars that pollute less than the old one, and the new cars routinely last more than 200,000 miles, where a car from the late '40s or early '50s would need significant engine work at 20,000 miles. Let's not think too much about the fact that in the '90s the engine in a Class 8 tractor (18-wheeler) would have its first significant engine work at 500,000 miles.

But much of the technology in today's cars has nothing to do with the operation of the car per se, but as a means to distract the driver (when it works) and add to maintenance costs (when it doesn't). A Feb 25 *New York Times* article by Cheryl Jensen. "Problems related to cars' rapidly advancing technology are now at the top of the list of consumer complaints, according to the 2016 J. D. Power Vehicle Dependability Study.

"The biggest issues are balky voice recognition systems and problems with Bluetooth pairing, accounting for 20 percent of all customer complaints. Over all, the discontent drove a 3 percent decline in vehicle dependability in the study."

COMING EVENTS

Upper Bucks Sustainable Living Expo
April 23rd, Palisades High School, in Kintnersville, PA. Contact Arianne Elinich, aaarianne@hotmail.com

SAE 2016 World Congress & Exhibition
April 12-14, Detroit. www.sae.org/congress/

WAVE TROPHY 2016 ++ 11 - 19 JUNE 2016
June 11-16, from the North Sea to the Alps. www.wavetrophy.com/en/

2016 American Solar Challenge
July 22 - Aug 6, traveling through seven states from Brecksville, OH to Hot Springs, SD. http://americansolarchallenge.org/the-competition/ascfsgp-2016/

SAE 1016 Convergence; Theme: Personal Mobility – Creating a Smart and Autonomous Journey
Sept 19-22. Detroit. https://www.sae.org/events/convergence/

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

Apr 13

May 11

June 8

July 13