# FOX VALLEY ELECTRIC AUTO ASSOCIATION NEWSLETTER FOR JANUARY 2003

## NEXT MEETING: Friday, January 17, at 7:30 PM in the Triton INDUSTRIAL CAREER BUILDING, (East Campus), Room 108

**DISCUSSION TOPICS: 1. Affiliation status. 2. Exhibit status. 3. Show preparations**

**MEMBERSHIP INFORMATION**

**Any person interested in electric cars is welcome to join the FVEAA. The cost for a full year's dues is $ 20 which will entitle members to receive our monthly Newsletter that contains useful information about electric car conversions, construction, news, policies, and events. Membership is not required to attend our meetings. Dues for NEW members joining in January will be $ 18.**

To obtain info about the FVEAA you may contact either Past-President Ken Woods or President Shafer


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## PRESEZ

The January meeting will be used to prepare the Ranger for exhibition at the World of Wheels Event, Jan 31-Feb 2. The pickup will be in the shop for detailing. This is important for any vehicle being exhibited. We have decided to enter the competition because we believe the vehicle has a good chance of winning a trophy Appearance is a very important judging factor. Cleaning and waxing materials will be provided. Several members have volunteered. We need more. Send me an e-mail if you can be there to help.

As the conversion taught us, about a half-dozen persons can be working at any one time so there will be ample opportunity for the valuable discussions we usually have around member's cars getting an opportunity charge at the end of our regular meetings.

Ray Oviyach will take the vehicle to McCormick Place on Thursday afternoon. There are facilities in the exhibit hall to clean off any road dirt accumulated during transport.

We will also need volunteers to help man the exhibit. Show hours are 5-10:30 PM on Friday, 11AM-11PM on Saturday, and 11AM-7PM on Sunday. Admission cost is $ 10.

The February and March meetings will also be different. John Emde has invited us to hold our February meeting at his **new shop in Lemont on Saturday**, February 15th at 10AM. It will include an open house and a demonstration of motor balancing. Directions will be included in the February Newsletter. The March meeting will be a dress rehearsal for FVEAA members of our April Seminar. We don't want FVEAA members occupying paying seats in April.

BILL

# MINUTES OF THE DECEMBER 20, 2002 MEETING

The meeting at Triton College was called to order by President Shafer at 7:43pm. Thirteen members attended and one Guest, Dwight Fenderson from Carol Stream.

The November meeting minutes were approved. There was no Treasurer's report because Dale is on vacation.

Kevin Zak reported on the status of the World of Wheels Exhibit at McCormick Place. The Ranger and the Dragster are registered for the Jan 31, Feb 1 and Feb 2 event. Show hours are: Friday 5:30 – 11pm; Saturday 11am-11pm, Sunday 11am -7pm.

Bill announced the January 17th meeting would include detailing and preparing the Ranger for exhibit. Some persons have sent e-mail to Bill offering their help. Copies of our Handout will be used. A roster of members willing to man the exhibit will also be made up at the meeting.

Affiliation with EVA was the next discussion subject. Treasurer Corel's preliminary survey of responses about affiliation, included with membership renewal form, it is supported by the membership. Members Peter Hartel, John Emde, and George Kranovich have agreed to be members of the EVA. This will provide the EAA membership requirement. A motion was made, seconded, and unanimously approved that the FVEAA become an affiliated Chapter of the EAA. The Board will next make the decision effective.

The April Seminar was the next discussion subject. President Shafer noted there could be a large response to the ComEd Seminar Announcement. There will be 2 ½-million notices mailed as Customer Bill Inserts. This could be a problem. There is no way the FVEAA could handle even a 0.1% response (2,500) without using our website for registration. This will be the only way to register. The first 400 applying will be given a registration number and automatically notified by return e-mail. The excess will receive an automatic e-mail response stating the April Seminar is filled and that they will be notified (again by e-mail) when the Seminar will be repeated at a later date. Webmaster Mather has been asked to set this up.

President Shafer also stated that our March 14th meeting be a dress rehearsal for the seminar. He will ask Triton to move our meeting to the small auditorium in the IC building.

John Emde has invited the group to have our February 21st meeting in his new shop in Lemont. The meeting will feature a demonstration of motor balancing.

Member Peter Hartel has solved his problem. He located a 60-volt sold-state relay in the control circuit that probably failed when the vehicle was upgraded from 72-96 volts. He also brought articles from Mike Brown, Shari Prange, and the Chicago Tribune 3-part series "Supercar Demise".

Member Dan Wier talked about "free energy and his visit to the Tilley Foundation. The Tilley website is www.tilleyfoundation.com/about.htm

The meeting was recessed to the Auto Shop where four vehicles were receiving opportunity charges. The coming holiday was toasted with "coffee and".

Submitted by
Secretary Tim Moore

## From Other EV Newsletters and Articles about Electric Vehicles

**DEVC,** the Denver Group, in their December Newsletter, noted that dynamometer testing indicated that the Honda *Insight* used 60% of its battery capacity and the Toyota *Prius* 40%. The probable reason, extended battery life and an 8-year warranty on the NiMH batteries. They also report that South Dakota Indian Tribes expect to profit from the wind by installing up to 400 Gigawatts of wind turbines on their reservations.

The Envionyx zinc-battery with ionic-conducting solid electrolyte prevents the shorting of plates by dendritic growth of sharp zinc crystals during recharging. These "spears" caused premature failures in previous designs. Zinc costs are expected to be about 3 cents/mile (Batteries International, July 2002. P-42)

Southern Cal Edison (Suburban Los Angeles) has 275 electric vehicles that have been driven 8.5 million miles. They avoided the use of 421,000 gallons of gasoline and reduced fuel costs by $ 250,000.

**EEVC in their December Newsletter** had the second in a series of articles about Charles Steinmetz an early employee of General Electric. They also report the country's first hydrogen fueling station has been installed in Las Vegas. The gas is obtained by reforming methane. It is part of a $ 10.8 million demonstration project.

A joint venture involving Chevron, Texaco, and Energy Conversion has broken ground for a new plant to produce NiMH batteries. Capacity is expected to be enough for 50-60,000 hybrid cars annually.

**EV Circuit from the Ottawa group,** in their December Newsletter, reports that long-time member Fred Green had his converted 1988 Jetta broad-sided by a pickup truck. The body is a write-off but electrical components appear intact. Properly-designed battery boxes were important. The insurance outcome is pending.

The issue has a reprint of Bob Batson's 1998 article, Battery Essentials. It is a compendium of information gleaned from Curtis Instruments, Trojan Battery Company, Eagle Pitcher's Application Manual, and the Battery Service Manual.

**The December VEVA Newsletter from the Vancouver group** printed a proposal that an EV should have two battery packs; one active at low currents and both active for high currents. Robert Shaw would like e-mail discussion of his proposal. His e-mail is www.**vancouver@hotmnail.com**.

**The November 4th Chicago Sun-Times** had an article about the steady decline in fuel economy. The best in 2003 was the Honda Insight Coupe with a 61/68/64 rating for city driving/highway driving/combined. The Toyota *Prius* compact sedan with 52/45/48. The *Mini Cooper* was 28/37/32. The subcompact VW *Beetle* diesel with a manual transmission was 42/49/45. The Honda *Accord* (manual) was 26/34/29. The worst was the GMC *Yukon* SUV with 10/13/12.

**The Columbus (OH) *Dispatch*** (Date unknown) reports that Honda is considering offering natural gas fueling at home for its *Civic GX*. Natural gas costs the equivalent of 80 cents/gallon (mostly because it does not carry the fuel tax burden that gasoline has) The EPA mileage rating is 31 mpg (city) and 34 (highway). The US presently has 1300 CNG filling stations in the US and finding one is a problem for GX owners. The present cost for a fuel-at-home package for natural gas costs about $5,000.

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## From Other EV Newsletters and Articles about Electric Vehicles - Continued

**The Chicago Tribune** had a 3-part story about the demise of the Supercar. This was a program that originated with an EPA engineer, Charles Gray, in Ann Arbor. (Amory Lovin's Rocky Mountain Institute also advocated it.) The idea was to develop an 80- mile per gallon vehicle in 10 years. It ended up spending $350-million; half was provided by auto companies and half from federal funding. The program failed – by 10 mpg.

The first problem was bringing the participants together. Eventually three domestic auto companies (Ford, GM, and Chrysler) reluctantly agreed to share ideas. Committees were formed. That was probably the kiss of death because this form of program management is not noted for effectiveness. Five senior government officials would oversee the program from an office in the Commerce Department in Washington. A second group made up of industry representatives was established in Southfield Michigan. Foreign manufacturers, particularly Toyota and Honda were excluded.

The general requirements were well known; the vehicle had to lightweight, aerodynamic, and need improved engine technology by using improved fuel management systems. Sixty two percent of the gasoline combustion heat is dissipated by the radiator, engine, and exhaust radiation. Engine idling loses 17%, transmission losses 6%, and accessories 2%. Only 13% of the heat energy input made the car go, and half of that was lost to aerodynamic losses and friction.

Vice President Gore played an important role in setting up the program. He had to contend with John Dingell, a Congressman from Detroit and a champion of auto industry interests. It was crucial that federal funding came from diversions from other programs, a move not welcomed by agencies losing them.

Chrysler's chief engineer, Charles Castaing, played a pivotal role. At a meeting he ordered all policy analysts, lobbyists, and other corporate-types out of the meeting leaving only engineers. He challenged them to prove the feasibility of meeting the goal. He concluded the Supercar would be almost impossible to build, but worth a shot. That didn't end the controversy. Charles Poling, Ford's CEO tried to cut the goal to a 40-mpg car, but failed. Gore responded that "The number must be stretched beyond the threshold of what we can reasonable expect."

Charles Gray, the program initiator, decided to independently build his own car. He planned to use hydraulics to capture and reuse the kinetic energy of motion. The articles describe his use of pumps, hydraulic accumulators, and motors to recapture braking energy. The article describes his idea that he hoped to patent. He was counting on recapture to provide 30 mpg toward the goal.

For the first two years the program was touted as an example as a model of cooperation making solid progress. The truth was different. Mary Good, a respected chemist and the Government's Program administrator, was getting the cold shoulder from industry. Supercar did not have its own budget. Existing research programs were subject to budget annual decisions and individual congressmen frequently intervened for their own purposes. When NASA was approached, they stated it could not justify to Congress on a commercial car. The Defense Department said its research was secret.

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## From Other EV Newsletters and Articles about Electric Vehicles – Concluded

Turf wars were breaking out in the industry sector. Instead of collaborating to produce a single car, each industry participant was now building its own version. The advice coming from the National Research Council was routinely ignored. At the end of 1997 a decision to choose the most-promising technology was due. The direct-injected diesel engine hybrid was selected. It was largely an auto maker call. Diesels are notoriously hard to start, are noisy, smelly, and emit high levels of nitrogen oxides. This was not a EPA favorite. Good now tried to convince Gore

The public announcement of the choice was very low key. For the first time there was no news conference. The press release did not use the word "diesel", instead describing it as a hybrid-electric drive system. The strategy succeeded.

Meanwhile Toyota stole the spotlight by unveiling a car they had been working on, the gasoline-electric hybrid *Prius.* Many engineers in the Supercar project were stunned. The car was ready for production. Officials began to wonder if Japanese automakers would again to clobber their American competition. Argonne Labs acquired a *Prius* for dissection and evaluation. The Supercar program made a lot of progress after this study. While the Prius mileage was 52mpg, 28 mpg below Supercar goals, it would shortly be on the market.

The Program was officially terminated. Taking its place was a new Program. The *Futurecar* plans to use fuel cells, using a similar management structure as *Supercar* but a much more-difficult task.

## An Essay on Energy

### Prologue

The inspiration for this document came to me this chilly December morning, as I lay awake in bed kept warm by an electric blanket. Polly will be getting up soon and resetting the gas furnace thermostat to 70 degrees from its overnight level. I reflected that I am midway between the life my grandfathers lived and the life my grandchildren will have. I am also midway between my father's life and the life my children are living.

On winter mornings in Hampton Iowa my father would be the first one up. He would go to the basement and add several shovels of coal to the still-glowing embers in the furnace from the overnight fire. In about a half-hour the house would be warmed and I would emerge from under a comforter. My father converted the furnace to oil heat and later to natural gas. The coal bin now held an oil tank. The morning's first task was simplified to resetting the thermostat. I can only imagine what routine my grandfathers had on winter mornings on their farms. My children enjoy the convenience of natural gas to provide their home heating.

### Energy

All our activity uses energy. It comes in many forms; solar radiation, combustion, movement, and electric fields are examples. There have been two major changes in society that required exploitation of a new energy source. The Industrial Revolution used coal to power steam engines. The Age of Petroleum began a century ago with the invention of the internal combustion engine, the automobile, and aviation. A third, The Information Age, begun with the computer and extended by the Internet is different, requiring no significant energy to operate.

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## An Essay On Energy - Continued

The source of most energy consumed by my household is natural gas used for home heating. The Table below shows the energy use for my household in the last 12 months. Note – One Therm = 100,000 Btu:

| Energy Source | Units | Annual Consumption | Therms |
|---|---|---|---|
| Natural Gas | Cubic Feet | 1,048,227 | 1,065 |
| Electricity | Kilowatt hours | 1 1,263 | 3.3 |
| Gasoline | Gallons | 235 | 2.7 |
| Total | - | - | 1,071 |

My use is not typical. We live in a 1700 square foot brick ranch house built in 1951. This is smaller than new houses today that usually contain about 2,500 square feet. Our house is in a compact older suburban community, not in a new suburban subdivision. There are three regional shopping centers within 5 miles. The grocery store is two blocks away and the gas pump is 5 blocks. I am retired and consume no energy for a daily work commute. Cultural events are a 30-minute train ride on the Chicago Transit Authority. My electricity use includes 655 kWh used for my electric car for short trip driving. All these factors affect my energy use.

My house is less energy-efficient than a similar-sized house designed and built by my friend, Ken Woods, architect and owner of Energy & Environment. He has named it Casa Zeus 2. The house is sealed, has controlled entry of outside air, and a natural gas-fired boiler located outside the house. This avoids heating a million cubic feet of outside air for combustion. His annual gas consumption is about 20% of mine. His car? A Honda *Insight* Hybrid

## Hydrocarbon fuels

I was born twenty years into the petroleum age. It began with the invention of the internal-combustion engine Fuels these engines use and their energy content are listed in the following table:

| Fuel | Energy content in Watt-hours/pound |
|---|---|
| Diesel | 4990 |
| Gasoline | 4300 |
| Ethanol | 3745 |
| Methane | 3100 |

These fuels are well adapted for mobile use. All except methane are liquid at ambient temperatures and easily handled. Methane is compressed to over 2000 psi for on-board storage and is called Compressed Natural Gas.

Hydrocarbon (fossil) fuels were formed millions of years ago. The process involved the capture of solar radiation that occurred then. Plankton living in the shallow seas utilized the radiation and the carbon dioxide dissolved in the ocean to form organic matter. The organisms died and sank to the sea bottom. The residue was protected from oxidation by a layer of silt. Slow geological processes involving heat, pressure and tectonic plate movement over time converted and distributed the resulting petroleum.

A similar process took place on land where chlorophyll in the leaves of plants and trees used the same ingredients to form organic matter. The residue was later submerged and covered with what became sedimentary rock, and transported to what is now dry land. Methane (natural gas) is sometimes found with oil and coal deposits, and sometimes by itself. The same process as oil and coal procedures formed it. We see methane being generated today in landfills.

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## An Essay On Energy – Continued

We have been using petroleum for over one hundred years. In that time we have consumed half of the world's supply of petroleum. At the present rate of consumption we will use one half of the remaining supply in the next fifty years. There will be 25% remaining by 2050. I categorize fossil fuels as capital, "money in the bank. We have no way of replenishing our supply. This is a serious matter that will affect future lifestyles.

There are four energy sources that can be considered as income: 1) Solar cells directly convert solar energy into electricity. 2) Electricity generated by dams use today's rainfall, an effect driven by solar energy. 3) Wind power uses solar energy that is extracted by windmills. 4) Ethanol is obtained by distilling biomass formed by today's capture of solar radiation.

That leaves nuclear energy; the most-concentrated energy form. It results from the conversion of mass to energy, the process that causes the sun to shine. Eventually the sun's hydrogen will be consumed as it is converted into helium. Uranium for nuclear power also is limited.

Increased exploration and more drilling proposed by the Bush Administration are not the answers to depletion. They will have exactly the opposite effect. The declining supply of petroleum is a matter that my grandchildren will have to deal with.

### Consequences of oil depletion

Gasoline prices will inexorably rise as petroleum reserves decline. Homes built in the last four decades will face rising natural gas prices and will beecome ever more expensive to sustain. New homes built two decades hence will probably resemble Casa Zeus 2.

Oil depletion will cause profound changes in our living to a low-energy society ***with technology***. The life of frontier American Indians provide an example of a low-energy living ***without technology***. The developing communications technology will allow dispersed workplaces. Travel into a city for office work or professional services no longer will be necessary. Office buildings could become relics. Congested expressways will become obsolete. The need for air travel will decline.

Any measure that will increase combustion efficiency deserves support. So too should actions that eliminate ***unneeded*** fuel consumption. War requires an enormous expenditure of destructive energy. Also, consider the popular spectator sport of auto racing. It uses high-horsepower, low-mileage racing cars that circle an oval track for three hours in order to drive 3-500 miles. They end up where they started. This used to be done with horses in one circuit of a track in about four minutes.

### A future place for an electric car.

An electric car is unique because it offers the owner a ***choice of fuels***. Except for lightning and rubbing cat's fur over a glass rod, an electric car can use anything that generates electricity. You can consider a car to be *water powered* if dam supplies electricity, If it comes from a windmill it is *wind powered.* If it derived from solar panels, it is *solar powered.* If a coal-fired steam plant is the source the car is *coal powered.* If a gas turbine generated the electricity the car is *gas powered.* My Mazda is 67% nuclear, 29% coal and 2% gas powered because that is the ComEd fuel mix and the energy is available at a plug in my garage. One of our Fox Valley Electric Auto Association members has a converted Fiero that he uses for a daily work commute. He also has a solar panel installation in his back yard and an interconnection with ComEd. His car is solar-powered because when he plugs in at work, the solar panels are generating energy and feeding it to the grid.

**An Essay On Energy - Concluded**

## Electric car limitations

Electricity can be directly stored only in very small quantities by an electric or a magnetic field. There is never an inventory of electricity, only an inventory of generating capacity. Electricity is produced and consumed in the same instant

Electric cars use an indirect means to store energy. It is a reversible electrochemical reaction. It limits an electric car's range. The search has gone on for a "better battery" for over a century after Thomas Edison stated, "There must be a better way". The properties of elements possible for battery use show that a better battery is unlikely. An EV must be a heavy vehicle because lead-acid batteries are the only economical storage system

GM built the EV-1 for a California trial. It is probably the best electric car that can be achieved with lead-acid batteries. It had a range of about 60 miles, Guess what the public reaction was? "I can go five times further with a tank of gas in a regular car. Filling it up is easy at gas station." I don't want one." This doomed the experiment

What was missing in the California trial? I believe it was lack of imaginative thinking, effective marketing and commitment on the part of the auto companies. The manufacturers, skilled at producing cars, saw the electric as a threat to their business and reacted accordingly. They were dragged into the situation by California's environmental regulations

You can't buy an electric car today from an auto dealer. Ford has terminated the TH!NK vehicle they bought from the Norwegians and spent $100-million on the program. They have also ended their conversion of Ranger pickup trucks. Recently GM terminated the leases for EV-1 cars. Chrysler was never really a player. Congress recently defeated attempts to raise EPA's 20-year old mileage requirements.

Auto companies are proposing fuel cells to power future cars. They must first find the answers for three key questions before these cars become commercial: 1). Producing hydrogen will involve the expenditure of energy to break hydrogen's chemical bonds with oxygen in a water molecule. 2) The on-board storage of hydrogen as a high-pressure gas or cryogenically is unsolved. 3) A huge, expensive new fueling infrastructure will be needed.

Electric cars involve a known technology. The electric grid is in place and available everywhere. However they will always have a limited range because of their batteries.. But these cars can be used for most short-trip driving. An electric car should be thought of as ***mission-specific***. It will take a major change in public attitude about using an electric car. The advertising skill that sold the Volkswagen "Bug" in the 60's is needed. If there are two cars in your driveway, one should be an electric and used when *the driving task* is appropriate.


December 13, 2002