

**Fox Valley Electric Auto Association
1522 Clinton Place
River Forest, IL 60305-1208**

Address Correction Requested

NEXT MEETING: Friday, March 20 at 7:30 PM in Room K-161 at The College of Dupage SW Corner of 22nd Street & Lambert Road in Glen Ellen.

DISCUSSION TOPICS - 1. Earth Day participation? 2. Open Topics.

MEMBERSHIP INFORMATION

Any person interested in electric cars is welcome to join the FVEAA. The cost for a full year's dues is \$20 that will entitle the member to receive our monthly Newsletter that contains useful information about electric car components, construction, policies and events.

To obtain information about the FVEAA, you may contact either President Woods or Vice President Shafer:

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MARCH, 1998 PRESSEZ

We have been invited to participate in two earth day events:

1. Bolingbrook Park District on Saturday April 25, 1998 is sponsoring Earthfest III at the Annerino Community Center.
2. Glenview Park District on Sunday April 19, 1998 is sponsoring their annual Earthday celebration to take place at The Grove National Historic Landmark and Nature Preserve from 11:00AM to 5:00PM.

These events give us an opportunity to display our cars and inform persons about the FVEAA. Does the Club wish to participate?

Ken

FEB. 98 MEETING MINUTES

The February 20th meeting at the College of DuPage was called to order by President Woods at 7:45 PM. Nineteen members and three guests attended. It was the first meeting for new member Rob Griffin of Matteson.

The minutes of the previous meeting were approved as published.

Treasurer Corel reported \$ 2744.78 in the checking account and no change in the savings account. There are 32 unredeemed Participation Shares. His report was approved.

President Woods and others commented on electric cars at the Chicago Auto Show. Several members commented on Toyota's Prius hybrid as the most innovative car. It is claimed to achieve a 600 mile range on a tankful of gas and battery full charge. Several thought the GM exhibit was pitifully manned by incompetent representatives unable to answer questions.

Member Ken Meyer described his approach to converting a Ford Festiva. The car is operative with an odometer reading showing 125,000 miles. This will enable Ken to run a series of baseline performance tests before conversion. The engine runs at 3500 rpm @ 55 mph. Member Ed Meyers offered to do a pre conversion weight measurement.

Ken intends to use a 300-amp aircraft type motor previously used in a FIAT conversion. He believes this will provide the range, acceleration and 50 mph top speed performance he wishes. The motor has a short, non splined output shaft that will present a coupling problem. Member Emde recommended use of keyway. Ken also has several other motors that may be suitable.

There was a discussion about retaining the clutch. Members who have conversions that kept the clutch were strongly in favor of this practice. It may require several seconds for synchronizers to operate to allow clutchless shifting. This may result in an unacceptable delay that compromises the car's usefulness.

The question of batteries was discussed. The consensus was to use 12-volt sealed lead-acid batteries similar to the ones used for the Nissan project. These would make the best use of available space in the car and to stay within weight limits of the original vehicle. Two paralleled 60-volt strings is one possibility. Ken will make measurements and calculations after removing the engine-related components.

Ken will build his own controller using Field Effect Transistors (FET) or recycle an old 400-cycle controller he has.

Member Ed Meyer reported on his speed test with a reduced system voltage using the 3200-pound Nissan. The 120-volt system was reduced to 96 volts by disconnecting two 12-volt battery in each paralleled string. He found the top speed @ 120 volts was 81 mph. At 96 volts, it was 64 mph.

Member Frank Delmonico donated ac electric meters to two members with projects' underway. He also has a current meter that can be used to measuring charging current required.

The meeting was adjourned at 10:PM.

Submitted by:
Secretary Dave Aarvold

RECENT ARTICLES ABOUT ELECTRIC VEHICLES

EV Watch, IEEE Spectrum, March 1998, Page 22. This article is devoted to Toyota's Prius. It notes that Japanese sales of the hybrid car have exceeded expectations and production has been doubled to 2000 per month. The parallel hybrid has the engine and electric motor coupled by a complex planetary gear system. The car weighs 2728 lbs. including a battery pack that weighs only 68 lbs. (2.5% of the total). (Editors' note - compare the 2.5% with the usual 30% of total vehicle weight for a typical converted vehicle.) The range is 272 miles on a full tank of gas and full charge. Top speed is 100 mph.

The 30 kW permanent magnet motor is operated until car speed reaches 12 mph. The engine is then started and used with the motor to deliver a constant 67 kW to the wheels. A computer-controlled charging system uses an engine-generator for battery recharging during driving. There is no need to plug the car in to the electric power system. A regenerative braking system recaptures up to 20% of the drive energy.

The 288-volt NiMH battery is unusual. It stores only 1.9kWh and is made up of 7.2 volt modules with six "D" sized cells connected in series as they would be in a flashlight. Battery specific energy is 27 watts/lb.

Cleaner, leaner, greener cars. The Columbus Dispatch, January 17, 1998. The Tokyo Auto Show started a trend of exhibits of environmentally-friendly vehicles that was continued at the Detroit and Chicago events. This is a change from previous shows that usually featured displays of new internal combustion engines and SUVs. Each of the Big 3 automakers has promised to deliver hybrid vehicles by 2001. Cost estimates for these cars are still about \$ 15,000 above the market level needed to make these cars acceptable. A Honda Motors Executive said US carmakers are trying to catch up with Japanese cars exhibited in Tokyo.

GM & Amoco plug into EV1 electric cars. Naperville Sun, 2/8/98. A GM-Amoco partnership is working to produce a parallel hybrid using a direct-injection diesel engine. GM is working on a series hybrid. Both cars are based on GM's EV 1. Further down the road are cars using a fuel cell.

Chrysler's seen the future, and it's plastics. Chicago Sun-Times. At the Detroit Auto Show, Chrysler exhibited two cars made of injection-moulded plastics. The Spyder is a subcompact that derives its matte finish from a process that avoids the cost of painting. The Dodge Intrepid ESX-2 has a shiny finish produced by a top layer, similar to shrink wrap, which is applied over the injection-moulded body. Both these cars would avoid an estimated \$ 350-million investment in a paint shop for a new assembly plant. They would also reduce the number of body parts by 2/3 compared with the usual 4000 found today.

RECENT ARTICLES ABOUT ELECTRIC VEHICLES-Continued

For the automotive world, 1997 was a strange year. Chicago Tribune. You know the auto business has changed when Rolls Royce features cupholders, Chrysler shows a concept car with dual Grey Poupon holders in the back, Ford shows additional chrome, and every U. S. automaker emphasizes 2 ton sports-utility vehicles that are really trucks.

Americans burning fuel at record pace. Chicago Sun-Times, Auto Show, p-D. Last summer's gasoline consumption averaged 336 million gallons per day. Passenger car mileage has remains unchanged. Nine out of ten vehicles get less than 30 miles per gallon (mpg). Twenty percent get less than 20 mpg. Customers are buying record numbers of sports-utility vehicles that average about 20 mpg. Small cars getting 40 mpg are not popular with buyers in these days of cheap gasoline. Average acceleration 0-60 mph has dropped by two seconds in the last few years.

Small cars slump under weight of sports-utilities. Chicago Sun-Times, Auto Show, p-E. Sales of small cars declined in 1997:

Ford's Contour - down 13% Chrysler Neon - down 19% Chevy Prism - down 23%
Geo Metro - down 38% Mercury Tracer - down 10% Luxury models - up 6%
The only way to reverse this trend would be for Congress to tax gasoline \$ 2/gallon.

End of road nears for conventional auto engines. Chicago Sun-Times 2/5/98. GM Chairman John Smith predicts a slow "phase-off" of internal combustion engines in 20-30 years. At the same time, more hybrid cars with small engines will be sold.

Cleaner burning cars to be sold nationwide. Chicago Sun-Times 2/5/98. The EPA has been mediating negotiations between automakers and the Northeastern states to resolve the mandated ZEV requirement. The Big 3 and Toyota agreed that beginning with the 1999 model years, emissions will be significantly lowered by use of larger, improved catalytic converters, engine electronic control module changes, and other measurers. Automakers wanted to sell the same car in all states except California.

Ahead of the curve. Chicago Tribune Auto Show edition 2/13/98, page 3. Smaller grilles, higher trunklids, flush-fitting bumpers and handles are not just a styling expression. They are the result of careful design to reduce wind drag. A Chrysler manager observed that a 10% reduction in aerodynamic drag can increase fuel economy by 3%. To get the same improvement, 300 pounds would have to be taken off a car's curb weight, a difficult task.

Chrysler in 1934 produced the Airflow, a 4-door sedan that didn't win public acceptance. Most cars today have a drag coefficient around 0.35. GM's EV and the prototype Dodge Intrepid ESX-2 both have a 0.19 coefficient. Reducing the drag is a major reason for the similar look of most of today's cars. The lowest drag coefficient of any object is the 0.10 for a raindrop.

FROM OTHER EV NEWSLETTERS

EV Circuit, the Ottawa Association, in their jan/feb Newsletter has an editorial written by Rick Lane about the effects of a severe ice storm in southeastern Ontario and western Quebec Provinces. Many persons were without power for three weeks. Small engine-generators were hot items. There were more than 150 cases of carbon monoxide poisoning from improper use of these devices. (Editors' note. I just finished going through a similar experience of a 22-hour service interruption due to the same cause. The only things that worked in my home were the gas water heater and the telephone. The gas furnace needed power for the control and blower to function. I am now thinking about a 1 kW, 96-volt inverter that could provide energy from the battery in my electric car to provide energy for essential services for about 12 hours).

There is a 3 page article on AC motor selection written by Earl Wallingford. It provides useful information about motor applications for electric cars. Also, included is a useful 2 page reprint from Trojan Battery Co. on battery maintenance procedures.

Global EV News in the February Executive Report reports that The Defense Department has transferred hybrid vehicle work costing \$ 20 million over the last six years. This activity will now be the responsibility of the Departments of Energy and Transportation. The Defense Department will continue development of hybrid electric combat vehicles.

Financial support of electric vehicles in the 98 budget has been reduced slightly from 1997. President Clinton has proposed a \$6.9 billion, 5 year investment in techniques to reduce "greenhouse gas" emissions that will include ev projects. Beginning in 2000, individuals could receive a \$ 3000 tax credit for vehicles that achieve twice the efficiency of today cars, and an additional \$ 1000 if the efficiency is three times greater. An interesting item is \$ 6 million for a Clean Cities Program to emphasize greenhouse gas reductions and demonstration programs.

The Northeast Sustainable Energy Association (NESEA) 1998 program will feature hybrid-electric vehicles at a conference to be held May 7-8 at Crowne Plaza LaGuardia in New York City. The event will be a technical workshop featuring discussion on many topics related to hybrid electric vehicles. The 1998 10th anniversary of their Tour de Sol will be run between New York and Washington, D.C. May 8-14.

SEVA, the Sacramento group in their February newsletter reported that two members presented information on the conversions. Member Rick Prestel has finished his 3-year project to convert a 1981 VW pickup truck. It has a 108-volt system using 6-volt batteries, a 1.6 kW Zevron charger, a ZAPI 600-amp controller, and a Prestolite series-wound motor. Member Ruth MacDougall presented vuegraphs of her conversion of a Geo Metro that she bought for \$ 300. She previously had an electric City-EL and wanted to avoid the maintenance associated with lead-acid batteries. The Metro has a 96-volt system provided by 10 GNB1180, 85 Ampere-hour batteries that cost \$ 143/kWh. She used an Auburn controller. The car weighed 70 pounds more after conversion. Project cost was \$ 8000.

The issue also has a 2 page article on arcing of carbon brushes.

FROM OTHER EV NEWSLETTERS -Continued

VEVA, the folks in Vancouver, in their February newsletter described Member Bill Glaizer's car manufactured by Jet Industries in 1981. It is a conversion of a Mercury Lynx. This was a showcase car that included an air conditioner, stereo and gasoline heater. The batteries were replaced in 1990 and are still ok after seven years of modest use. Bill installed a new Curtis controller, KW charger, and dc-dc converter for the 12 volt battery.

The issue has a description of an in-wheel motor used in the Aurora Solarcar that was a strong finisher in the latest Australian race. The 18.26 lb. motor has an astounding 98% efficiency at rated power of 1.8kW. Additional information on the motor can be obtained by calling (Australia) +61-03-9654-7155.

The issue also has an informative 3-page article on **THE ELECTRIC TORPEDO** built by the legendary Walter C Baker in 1902. He was the first person to top 100 mph. Project cost back then was \$ 10,000. The complete account may be found in the Mar/Apr issue of Vintage Motorsports magazine.

EDITORIAL

The direction of electric car commercial development is beginning to be defined. It appears that hybrid cars with some combination of a small engine and electric motor will dominate. The public hasn't accepted a battery-driven car with a limited range. Gasoline is an effective energy-storage medium. One gallon of gasoline weighing seven pounds contains 115,000 Btu, (16,500 Btu/lb.) A 70-pound deep-discharge 6-volt lead-acid battery will deliver a constant 75 amps for about 2 hours. The energy delivered by one battery is $(6\text{volts})(75\text{amps})(2\text{ hrs.}) = 0.9\text{ kWh}$. The heat equivalent of this battery energy is a minuscule 3071 Btu. (43.9 Btu/lb.).

The electric car is more efficient. A typical converted electric car can travel about 3 miles on one kWh. (1023 Btu/mile) The 27.5 mpg EPA mileage standard requires 4528 Btu/mile. Expensive Nickel Metal Hydride batteries, or other exotic types cannot approach the energy storage ability of gasoline. The electric car is then useful only for special-use purposes within its range capability, or requires opportunity charging.

Persons who have used electric cars know they can be economical. A typical conversion project costs \$ 7-9000 for a car that can last an additional 15 years. When electric car use is substituted for a standard car, the idled standard car life is extended and the IC-engine car requires fewer replacements. This saves the owner money for depreciation, finance charges, and operating expenses. Previous issues of the FVEAA Newsletter have documented these savings. It would require a massive marketing program to make the public aware of the economics and persuade them to accept a limited range electric car. Therefore - the hybrid solution.

William H. Shafer