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

Address Correction Requested

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

DISCUSSION TOPICS - 1. A Speaker from Argonne Labs will present information about the FUTURE CAR 1998 competition.

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 the member to receive our monthly Newsletter that contains useful information about electric car components, construction, policies and events. Dues for new members joining in November will be $ 20.

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

President - Ken Woods
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NOVEMBER, 1998 VEEPSEZ

The PRESEZ from Ken Woods was not available by the Wednesday publication deadline. Ken is busy contacting all the present officers and board members to determine who is willing to serve another term. He has arranged to have a person from Argonne present a program on the 1998 FUTURE CAR challenge. This is a competition in which students from about 15 colleges start with a new full sized 4-door sedan donated by GM, Ford, and Chrysler. Various strategies are employed to increase mileage to a 60 mpg goal.

BILL

Minutes Of October Meeting

The meeting at the College of DuPage was called to order by President Woods at 7:40 PM. Fourteen members attended. It was the first meeting for guest Lynn Prine from Homewood..

The minutes and Treasurer Corel's report that the saving account has $ 2481.06 and the checking account has $ 1093.33 were approved.

The first discussion item concerned hybrid vehicles. Member Meyer reported his Nissan requires 30 amps @ 120 volts to maintain a steady 40 mph speed on a level road. This can be expressed as a power level of 3.6 Kw (About 5 horsepower). A 5HP engine coupled to a 30-amp auto alternator @ 120 volts would move the car at a steady 40 mph without discharging the battery. The group believed a more realistic size would be a 50 amp alternator driven by an 8 HP engine.

There were several engine types suggested; a single-cylinder Briggs & Stratton air cooled, a motorcycle engine,. and a 2-cylinder outboard (motor). The outboard has a volummetric advantage, could be water cooled to provide winter heat but would not meet emission regulations because of the mixed oil and gas combustion.

It was suggested that the FVEAA bench-test a combination of a 5 HP engine and 30-amp alternator reconnected to supply 120 volts. This idea received little support.

It was mentioned that The typical FVEAA converted vehicle requires about 1/2 Kwh (1606 BTU) of energy to move one mile. For comparison, an IC-engine car getting 30 miles per gallon uses 4000 BTU/mile.

Former Member Steve Clark has Unique Mobility "Electrek" Vehicle # 5 in mint condition and wishes to sell the vehicle. It has a 96-volt system, 32 HP GE motor, a top speed of 75 mph, regen braking, heater and defroster. Steve's number to get further information is (630) 963-3110.

Member Shafer lead a brief discussion about the economics of converted electric car ownership and use, based on the data appearing in the October newsletter.

There was a discussion of the Clean Cities Rebate program that could provide $ 4000 to each person in northern Illinois who completes and licenses a project car. The program is funded by an additional registration charge of $ 20/vehicle paid by fleet owners having more than 10 vehicles. (Editor's Note -Additional details are in a letter from the Illinois EPA included in the November Newsletter).

Member Ed Meyer has a friend who has examined Ed's Nissan and wants to convert a restored 1955 Chevy pickup truck. He owns a body shop in Romeoville at the junction of Route 7 and 53. He knows body and restoration work but needs help with the design and electrical aspects of a conversion. He is willing to do the work at his shop. After discussion, members recommended that Ed invite his friend to become a FVEAA member and we would be glad to assist him with the project. Ed will report on the reaction at the November meeting.

The meeting was adjourned at 10:38 PM

Submitted by Secretary Dave Aarvold

FROM OTHER EV NEWSLETTERS

The Eastern Electric Vehicle Club (EEVC) October newsletter had the third and final installment of a story about the EEVC assistance to the Cinnamonsen High School participating in the 1998 Tour de Sol event. They also noted that McGraw Hill has published a new book, *Motor Control Electronics Handbook*, that covers the subject. It sells for $ 79.50. They also report that Allied Signal has furnished to Renault two of their Auxiliary Power Units (APU) used for aircraft. They will be tested in a minivan in a series hybrid configuration.

Electric Grand Prix, the NY-based group, has broadened their interests to now include news from the US Energy Department's Clean Cities program for New York. Future publications will be known as **"The Genesee Region Clean Communities News".** Editor Heaney reprinted an article "China's Transportation Growth Threatens Health, Political Stability, and their Environment" that appeared in the Aug/Sept 1998 issue of the Phoenix EAA Chapter. Several recent stories have appeared about the degradation of air quality in Bejing and other large Chinese cities. The issue reports the City of Syracuse, NY has installed a new CNG refueling station for buses. The $ 4.3-million addition contains three Knox Western compressors each capable of delivering 1500 cfm @ 4800 psi. Each compressor is powered by a 500 HP Caterpillar engine fueled by natural gas. (Editor's note- The FVEAA has noted that compressing natural gas to this level consumes as much energy as an electric powered vehicle would consume).

The Group's November Newsletter with the new title reported on a visit to a school bus facility that has two Ingersoll Rand CNG compressors. One has a 50 cfm capacity and the other is 40. They stated they buy gasoline for 67 cents/gallon and pay 44 cents for an equivalent gallon of CNG fuel.

The October Executive Report of EV News reports there was much interest at the October 1-3 sessions of EVS 13. There were 2614 participants and 150 companies had exhibits. In 1997-98, 970 electric vehicles were delivered to companies and 576 to individuals. In Europe there is an estimated 15,000 electric vehicles. The US has an estimated 3000.

They report Ford has reduced the lease price for the 1999 Ranger from $ 633 to $ 349/month. California Rangers will be equipped only with NiMH batteries that increase the range by one-half. The State's $ 5000/vehicle subsidy was instrumental in this decision. The 1999 Ranger purchase cost will be $ 34,950.

The issue also has a Don McGrath article about he Corbin *Sparrow*. The three-wheeled vehicle is classed as a motorcycle. It holds only the driver in a vehicle that is 57 inches high and has a 61 inch wheelbase. The body is steel-reinforced fiberglass. The vehicle has a curb weight of 1350 pounds and a 60 mph top speed. Thirteen Optima 12-volt sealed batteries make up a 156-volt system and account for half the vehicle curb weight.

The motor is an electronically-commutated DC 15 Kw unit. The vehicle has a single-charge range of about 40 miles and sells for $ 12,900. The manufacturer in Hollister, CA has orders for 400 units, is currently producing 2 per day, soon to increase to 8

EV CIRCUIT issued by the **Ottawa** group in their Sept/Oct. newsletter had a report about the Canadian EV Conference 98. They also had a report about a newly-converted Ford Ranger pickup that was converted by Don Hill. The truck has an 9" Advanced DC motor, a Curtis 1231c controller. twenty 6-volt Exide batteries located 5 under the hood and 5 under the truck bed to balance the load.

FROM OTHER EV NEWSLETTERS - Concluded

The issue also notes that Toyota Canada has opened a center in Timmins where Toyota and Lexus products will be tested for cold weather performance. The Center will be staffed by 50 engineers.

VEVA, the Vancouver group, in their October Newsletter reported that AC Propulsion has produced a 200 horsepower Golf electric concept car for VW based on the Golf IV platform. It seats 4, can be recharged in one hour from a 20 kw source, and has a 70-mile range. Member Dave Gordon acquired a 1981 Bradley II from his uncle who built the car on a VW platform using a kit. He can be contacted at daveg@octnet.com and is interested in hearing from other Bradley owners. Bill Glazier had an article further describing his CVT design.

RECENT ARTICLES ABOUT ELECTRIC VEHICLES

Plugged In. Chicago Tribune 10/11/98. Miami Beach had to do something about the traffic congestion that prevented easy access to the beachfront entertainment and convention district. The only available parking was blocks away. Their solution - battery powered shuttle buses built by a Chattanooga company. They established a five-mile, two-way circulator system using 22-passenger electric buses to provide access to 3400 parking spaces with . On October 2, the traffic count on this service passed 1-million, 55% higher than projections.

AVS, the bus builder, was established in 1992 and has built 69 electrically-powered buses that first appeared in Chattanooga as a "temporary experiment". It has proven so successful that the Transit Authority plans to replace its aging fleet of 70 diesel buses with AVS hybrids..

Hybrid Electric Bus. PICM, July 1998, page 38. A design team that includes Bowling Green State University, Flxible Bus Co, The Greater Cleveland Transit Authority, Howard University, Lincoln Electric Motor Co., and NASA Lewis Research Center had built an experimental hybrid bus that uses a Teledyne Model 204 gas turbine operating at 1800 degrees F, and an alternator as its power source. A unique feature is the use of a Maxwell 2100 pound, 20-farad, 400-volt capacitor capable of storing 1600 kilojoules. There is a sophisticated on-board energy management system that keeps the turbine running at its most efficient setting. A 350-pound, 150 Kw, liquid-cooled, vector-controlled AC motor for the drive system. A drive cycle analysis developed by NASA-Lewis, using parameters defined by the Transportation Department's *White Book* show that 48 % of peak power requirements are during acceleration and indicate the 150 Kw motor will be adequate.

There were several reasons for choosing to store energy in a capacitor. The state of charge can be precisely determined from a terminal voltage measurement. Energy delivery is linear and, unlike electrochemical batteries, is not dependent on state of charge. The system is not current-limited. Capacitors are particularly able to deliver high peak currents. Each Maxwell *PCM 150056 Power Cache* capacitor module has a double layer of carbon-based, porous fibre electrodes with a surface area of about 2000 square meters. Their power density is in the order of 2000-400 watts per kilogram.

Prototype vehicle assembly was completed in 1997. This year it has been tested under lab conditions and will later be field tested by the Cleveland Transit Agency.

RECENT ARTICLES ABOUT ELECTRIC VEHICLES - Continued

New-generation motor powers electric car race winner. Design News, 10/5/98, page 26. The indy-style race car from Bowling Green University won the 1998 APS Race in Phoenix. It was powered by a third-generation liquid cooled motor made by the Lincoln Electric Motor Co. (Cleveland). The motor is built on a NEMA 256 frame and delivers 160 horsepower @ 10,000 rpm.

Intel on Wheels. The Economist 10/31/98, page 69. Another approach for buses is use of a fuel cell. This article describes the work of Ballard Power Systems. The company's work has been the covered in previous issues of the FVEAA Newsletter. They are concentrating on the manufacturing problems associated with producing five products for three markets; **cars, buses, lorries, small generators running on natural gas, and portable applications such as hedge trimmers.** They have an impressive array of industrial partners including Daimler Benz (25%) and Ford (15%). It is now the supplier of choice for six of the biggest 10 auto companies. It faces competition from Allied Signal, United Technologies, DeNora in Italy, and Siemens in Germany. GM and Toyota are also developing fuel cells. Once the oil industry joins the "Green Group" Ballard's future looks rosy.

New Batteries Required. The Economist, 10/31/98, page 87. When it comes to storing energy, batteries cannot compete with fossil fuels. GM's EV-1 have a gravimetric specific energy of 31 watt-hours per kilogram. The specific energy of petroleum is 11,840 wh/kg, with about 25% of this useful in providing propulsion. For many years the Advanced Battery Consortium (USABC), a joint research venture between the auto manufactures, the Department of Energy, and battery manufacturers has been working on building a **"better battery"** that will provide a single-charge range of 350 miles for an electric car. NiMH batteries (80 wh/kg), lithium-ion (95wh/kg), zinc-air (200 wh/kg), and sodium-sulfur 200 wh/kg) all fall short of this goal. Hybrid cars will small engines are likely to provide almost all of the environmental advantages of the electric car. It seems as EVs look destined to be left in the technological slow lane. (Editor's Note - This article doesn't consider the usefulness of a battery vehicle for short trips).

Reinventing Diesel. The Economist, 10/31/98, page 86. Small diesel engines appeared at the recent Paris Motor Show. The VW Lupo and Toyota's Yaris are examples. It is also under development at BMW, Rover, Peugot, and Citroen have similar small cars in process. The Yaris delivers an energy economy of 90 miles per gallon. A new type of turbo-charged, direct-injection diesel makes the high mileage possible. In a common-rail system, a high-pressure pump sends fuel at up to 1400 times atmospheric pressure into a pipeline running along the top of the engine . Injection pressure is independent of engine speed. Computer control of the injectors optimize the combustion process. Exhaust Gas Recirculation (EGR) can reduce the higher output of nitrous oxides that result from diesel combustion temperatures. Particulate emissions and eliminating sulfur from the fuel remain a unsolved problems. These diesels may provide a solution to the global warming discussed at the Koyto conference.

First Auto Fatality. (Online) It's February 12 and I'm going just across the North Downs (Great Britain) hill from here, about 3 miles to Purley. One hundred years ago, this is the place where the first auto fatality occurred. The guy's electric car went out of control approaching the Purley way and Brighton road, It rolled over, badly pinching one of his legs and he died of shock the next day, following an unsuccessful amputation.

RECENT ARTICLES ABOUT ELECTRIC VEHICLES - Concluded

Engineering the EV Future. Institute of Electrical and Electronic Engineers (IEEE), November 1998 Issue. This special report on electric vehicles examines six areas of electric vehicles; (1) Air Quality as the major driving force behind EV development, (2) The great battery search, (3) The Nickel Metal Hydride (NiMH) battery status, (4) Fuel cell development, (5) Developing standards to connect the car to the electrical grid, and (6) A look at hybrids, specifically the Toyota Prius. This is a comprehensive overview of the subject today. It is beyond the scope of this Newsletter to do a "Reader's Digest" condensation. For those seriously interested in these subjects, get a copy to read.

The Future of Fuel. Naperville Sun 9/27/98. This is a report on Chrysler's second-generation hybrid, the ESX-2. The engine is a 3-cylinder direct-injected diesel with a small (133 pound) battery. The five-speed transmission shifts manually but operates as an automatic. It adds 8 mpg to the mileage. The body frame is aluminum to which a thermoplastic polyester plastic (soda pop bottle material) surface is bonded (glued). Assembly is simplified since the body consists of six large panels, compared with 80 steel panels in a Dodge Intrepid. The first ESX featured the technology to meet the PNGV goals but came at a likely price premium of $60,000. The ESX-2 premium is now down to $ 15,000.

Fresh Approaches. Chicago Tribune 9/27/98, page 18. Tougher emission standards are encouraging development of lighter, cleaner autos. All autos and light trucks must meet federal emission standards that are 70 % tougher than current requirements. There will be another comprehensive review of emission standards in 2001. It is likely that future fuels will prominently feature methanol (made from coal) and natural gas. Moving the mileage requirements from their present levels toward 60 mpg will cause production of smaller, lighter autos with hybrid drive trains able to use the new fuels.

Demands for stricter fuel economy will be met by new powertrains. Automotive News. The article starts with the statement:"Get ready for a revolution". A Delphi forecast report from the Office for the Study of Automotive Transportation at the University of Michigan concludes that by 2007 20% of new passenger cars will use alternative fuels, and battery-electrics will not be included. The Delphi consensus is the CAFE will be 32 mpg by 2007. (Editor's note - there goes all the heavily-marketed SUVs) Automakers will respond primarily with hybrid vehicles. EV's will represent just 1% of the market. Use of diesel fuel will increase. The report concludes consumers will accept the new technology as long as sales price and performance are comparable to present cars and light trucks. The panelists think consumers would be willing to pay an additional $ 200 for a low-emission vehicle and $ 300 more for a 40 mpg car.

FVEAA MEMBERSHIP RENEWALS AND OFFICERS FOR 1998

FVEAA fiscal year ends in November. This Newsletter contains a 1998 membership renewal form. Officers will be elected at the December meeting to serve next year. Our publication policy is to send the December Newsletter to everyone who had paid for 1998. and discontinue further mailings to those who fail to renew by January 10th. We think our monthly publication is unique. It contains a mix of articles that appeal to techies as well as those who are primarily interested in policy matters and the future trends. **SEND YOUR RENEWAL APPLICATION AND $ 20 CHECK TO DALE COREL. BE SURE TO FILL IN YOUR CURRENT MAILING ADDRESS, TELEPHONE, E-MAIL, AND FAX NUMBERS SO OUR NEW ROSTER THAT WILL ACCOMPANY THE FEB. 99 NEWLETTER WILL BE ACCURATE. The Roster is sent only to paid members.**

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 North Grand Avenue East, P.O. Box 19276, Springfield, Illinois 62794-9276 Mary A. Gade, Director

(217) 524-4343

October 29, 1998

Mr. William Shafer
Vice President
Fox Valley Electric Auto Association
1522 Clinton Place
River Forest, Illinois 60305-1208

Dear Mr. Shafer:

Thank you for your letter inquiring about the eligibility of converted electric vehicles for a rebate in the Illinois Alternate Fuels Rebate Program. As you pointed out, any business or individual in the State is eligible to receive a rebate. For a conversion rebate, the amount of a rebate is for 80 percent of the cost of the conversion up to $4,000 per vehicle. If the cost of converting a vehicle to operate with electricity is $7,000, then the eligible rebate amount is $4,000.

I have enclosed a copy of the rules for this program. I want to highlight a few items concerning the rule:

1. The Illinois EPA needs to amend the dates in the rule to reflect SB1840 that was passed by the General Assembly this past Spring. Originally, this program was set to expire at the end of 1998. With the amendments passed by the General Assembly in SB1840, the rebate program will continue until the end of 2002. The Agency's state rule in Ill. Adm. Code 275 (enclosed) will be amended within the next few months to reflect these changes. This does not affect the application process and any applications received in the past are still valid.

2. At the current time, there is no funding for this program. However, this was addressed in SB1840 and it is expected that funds will become available by Summer 1999. The source of the funding is a fee applied to business fleets in the Chicago area. There is a Clean Air Act requirement that motor vehicle fleets in the Chicago area start using clean, alternative fuels for new vehicles and the rebate program was established, in part, to help fleets defer some of the costs. Any Chicago area business with ten or more vehicles in its fleet will be assessed an additional $20 for each vehicle's annual registration over a four-year period. The additional $20 for each fleet vehicle will be deposited into the Alternate Fuels Fund for the rebate program. Many fleets will be exempt or will comply by other means with this Clean Air Act requirement. Therefore, it is not anticipated that the Alternate Fuels Fund will be depleted by fleets applying for a rebate to defer their compliance costs.

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3. Rebates will be processed as funding allows. There is a priority system established in Section 275.240(b) of the rule that will determine how the applications are to be prioritized for funding. It is possible that more funding will be applied for than what is available. Since this is a statewide program, it is difficult to estimate at the current time the total amount of funding and the number of applications that may be received for this program.

4. I recommend that you read the rule in its entirety. Please note that the conversion of a vehicle must take place in Illinois and that copies of receipts/invoices must be submitted with the application. The age of the vehicle prior to conversion is irrelevant. Also, per federal law in the U.S. Environmental Protection Agency's Memorandum 1A, a converted vehicle cannot have greater emissions than prior to the conversion. A copy of the conversion rebate application package is also enclosed.

If you have further questions, please call me at (217) 524-4343.

Sincerely,

Darwin J. Burkhart
Alternative Fuel Programs
Bureau of Air

Enclosures

THE ILLINOIS ALTERNATE FUELS REBATE PROGRAM CAN HELP PAY FOR YOUR CONVERSION PROJECT

The preceeding letter was received in response to my inquiry made to the Illinois EPA asking for details of the Illinois Alternate Fuels Rebate Program. Cost is certainly an important factor for any individual contemplating a conversion project. A $ 4000 rebate can be a vital component in deciding to proceed. If you are serious about doing a project, I suggest you borrow from me the sixteen pages of Rules relating to the program.

This Rebate is in addition to the 10% Federal Income Tax Credit available for converting a car. To get this credit, you must submit IRS Form 8834 along with your Federal tax return..