

# FVEAA NEWSLETTER

May 1994

President	Vice President & Editor	Secretary	Treasurer & Librarian	Director	Director
<b>Ken Woods</b> 1264 Harvest Court Naperville, IL 60564-8956	<b>Bill Shafer</b> 308 South East Ave Oak Park, IL 60302-3512	<b>Dave Aarvold</b> 915 Oak Street DeKalb, IL 60115-3470	<b>Dale Corel</b> 595 North Gateshead Elk Grove Village, IL 60007-3433	<b>John Emde</b> 6541 Fairmount Downers Grove IL 60516-2919	<b>John Stockberger</b> 2 S 643 Nelson Lake Rd Batavia, IL 60510-9762

## NEXT MEETING - May 20 at 7:30 PM

Will be in Room 1046 in the Student Resource Center at  
the College of DuPage, southeast corner of 22nd Street & Lambert Road

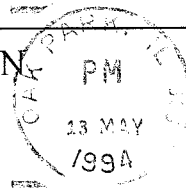
DISCUSSION TOPIC - Can a recycled, converted EV help you avoid the  
consequences of mandated Employee Trip Reduction (CTR) requirements?

### MEMBERSHIP INFORMATION

Any person interested in electric cars is welcome to join the FVEAA. The cost for a full year's dues is \$15 which will entitle the member to receive our monthly Newsletter which contains useful information about electric car components, construction, policies, and events. Dues for new members joining in June will be \$ 6.25

## NEWSLETTER

FOX VALLEY ELECTRIC AUTO ASSOCIATION  
308 South East Avenue  
Oak Park, Illinois 60302



**First Class**

John Emde  
6542 Fairmount Avenue  
Downers Grove IL 60516 -2919

**ADDRESS CORRECTION REQUESTED**

## PRESEZ

The April 1994 Annual Auto Issue of Consumer Reports says it like it is with the lead article, "Is Detroit trying to unplug electric cars? An article in the New York Times stated that General Motors is preparing to put its electric vehicle act on the road and planning for a flop.

The Big Three (spell that GM and Ford) begs credulity when the heads say "We just can't do this." The same Big Three refused to adopt double disc brakes and clutch plates in the fifties. Auto Specialties developed a special machine to bond the linings and then used radio to encourage the industry to adopt disc brakes. The Big Three resisted seat belts and air bags until they discovered that the public demanded them. The Big Three couldn't build a high mileage car at a profit, until the Volkswagen Beetle and the Japanese car makers took 33% of the American market and then the cried for protectionism and "leveling the playing field".

The experience of the Fox Valley Auto Electric Association and the world wide network of other Electric Auto Clubs have proved over the past twenty years that current deep discharge lead acid batteries can provide viable transportation for short range driving use. The argument by the Big Three that a "breakthrough" battery is needed first is a copout.

Over thirty members of our club experienced the pleasure of driving the Ford ECOSTAR last month. This electrically converted European delivery van performed flawlessly.

Volkswagen may produce the ultimate point A to point B machine and sell a jillion of them worldwide. Ken

## MINUTES OF APRIL 18 MEETING

The meeting in Room 1046 at the College of DuPage was called to order at 7:41 by President Woods. Nineteen members and one guest attended.

The March meeting minutes were approved.

The revisions to the ECOSTAR proposal to CECo recommended by the ad-hoc committee in response to changes made by members were discussed. The revised version was approved. The President was authorized to transmit the approved proposal to Edison and enter into negotiations for the test on behalf of the FVEAA.

President Woods announced invitations to participate in various Earth Day Events. FORD (ECOSTAR) and SOLEQ will have vehicles at the State of Illinois Center on April 22. FVEAA will be at Steinmetz High School in Chicago in the AM and at Holy Angel's Church (Aurora) in the evening.

Member Bohlmann reported the failure of transistors when he rewired the controller in the Valpo Escort. The probable failure cause was adjustments made in the base resistors which were not adjusted for turn-on times.

There was a discussion of EV licensing. FVEAA Illinois members should contact Dave Hamm, Secretary of State Office in Springfield (217) 782-2709 if they have difficulties with obtaining their plates.

A viewing of the video produced by ELECTRICAR, a firm producing EV conversions commercially, concluded the meeting that was adjourned at 9:58

Submitted by:  
Dave Aarvold, Secretary

## RECENT EV ARTICLES

### PROTOTYPE EV'S

READERS TO VW: BUILD THE NEW BEETLE; Tribune 2/13/94

This question was posed on January 16th. By a 59:1 ratio the readers say : Go Ahead". The CONCEPT 1 is being developed with three propulsion options, gasoline, electric, and hybrid

PROGRAM OPPORTUNITY NOTICE FROM NATIONAL STATION CAR ASSN 4/23/94

This initiative, being led by the electric utility industry, hopes to demonstrate up to 5000 electric vehicles developed for work commuting. The program is called EV America. Technical guidelines will be released on April 25th. Contact the Electric Transportation Coalition, 701 Pennsylvania Avenue, NW 4th Floor; Washington DC 20004 ( FAX 202-508-5924)

SCOOTING INTO NEW MARKETS; Tribune 3/6/94

Honda will launch the world's first electric motor scooter. 200 will be leased to Japanese government agencies for 3 years @ \$ 8095.

SWATCHMOBILE DISPLAYED; Tribune 2/23/94 & 3/5/94.

Prototype electric cars were displayed this month in Stuttgart. The project is a joint venture of Mercedes-Benz and Swiss watchmaker Swatch. If production is authorized they will be on sale in 1997 for \$13,800.

A SURGE FOR ELECTRIC MINI-VAN; Tribune 9/19/93

A converted Chrysler Caravan minivan was named as one of the 100 most technological significant products of 1993 by R&D Magazine at an awards ceremony at the Science Museum in Chicago. The AC drive system developed by Westinghouse features a 100 HP motor that accelerates the van from 0-60 in 10 seconds. Nickel-iron batteries are used that have an anticipated 100,000 mile life.

### PUBLIC POLICY

CALIFORNIA CHARGES AHEAD; Tribune 4/27/94

The Transportation Committee voted 7-2 to reject a bill that would stop the state from requiring the marketing of zero-emission vehicles starting in 1998

DOES "GREEN" MEAN "CLEAN"? ; Auto Week 2/28/94

The EPA is not sure that electric vehicles will produce an environmental benefit according to a recently-written draft report that states that power plant emissions from EV recharging may be equivalent to those from standard engines. It all depends on how the electric power is produced. (This isn't a factor for FVEAA Illinois cars since Edison's generation is over 80% from nuclear - Editor)

ELECTRIC CAR MAKER PLAYS DOWN DIFFICULTIES; Christian Science Monitor 3/11/94

US Electricar (Sebastol California), a company that converts Geo Prizms and other cars and sells them for \$40,000, says the Big 3 automakers are wrong to oppose electric cars.

### MISCELLANEOUS

CALIFORNIA FIRM OFFERS ELECTRIC CAR CONVERSIONS; Source & date uncertain

Solar Electric Engineering of Rohnert Park, CA is offering electric vehicles, including battery powered bicycle for \$ 975, a converted Fiat X19 for \$ 5000, and the "Stardrive" for \$ 25,000.

## MISCELLANEOUS (CONTINUED)

ELECTRIC RACER BREAKS SPEED RECORD; Design News 1/3/94

An EV racer built by a team of engineers from Southwest Research Institute in San Antonio achieved an average 101.3 mph speed, breaking the old 98.8 record for cars weighing under 500 kilograms. Eight 12-volt lead-acid batteries and a 40HP series-wound motor from GE were used.

ROBOTIC LAWNMOWER; Tribune 4/12/94

Pouland-Weed Eater, a landscaping company, is testing 200 solar-powered robotic lawn mower.

WHAT ABOUT ELECTRIC CARS DURING POWER PEAKS? WM (Prospect Heights) Tribune 4/27/94

Our next national crisis is being formulated by the EPA with their mandated quota of zero-emission vehicles. How many electric cars can be plugged in before the utility says "tilt"?

THE SILENCE IS SHOCKING; AUTOWEEK 4/11/94

Mostly friends and relatives were in the stands at the Fourth Annual APS Solar Electric 500 in Phoenix. It will not be easy for mainstream race fans to adjust to the silence of the electrics. Billy Roe set a national 1-mile speed record of 107.162 mph in an electric-powered, modified 1985 Lola Indicar sponsored by Arizona Public Service, Exide, and Motorola. This car had a prototype motor running at 10,000 rpm developing 157 HP. The 200-pound motor and controller package was designed and built by the Industrial Electronics Group at Motorola. James Worden was the winner of the 200 kilometer EPRI stock car feature in a Solectria converted Geo Metro using Ovonic batteries.

LATE "BRAKING" NEWS; Solar & Electric Racing Association, October 1993.

The energy required to decelerate a vehicle is given by the equation :

$$\text{Energy}(lb-ft) = 0.335[(\text{Maxmph})^2 - (\text{Minmph})^2][GVW(lb)]$$

A 1760 pound car braking from 150 mph down to 60 mph develops over 1.1 million lb-ft

ELECTRIFYING RESULTS; Tribune 1/30/94

FLYWHEEL TO POWER ELECTRIC CAR; Design News 1/3/94

These articles describe development efforts to utilize a flywheel system in an electric vehicle. The first article covers Chrysler "Patriot" concept car, exhibited at the Detroit Auto Show, that uses a turbine fueled by liquified natural gas @ -258 degrees F to spin a 20-inch carbon-fiber disk being developed by Satcon Technology Corp of Cambridge, MA. The flywheel has an edge velocity of 1400 meters per second. The combination has a max power capability of 500 HP.

The second article describes the work of American Flywheel Systems, Bellevue WA to develop a contra-rotating pair of flywheels spinning up to 200,000 rpm.

(Neither of these systems is likely to be used by a hobbyist. - Editor)

ELECTRIFYING TIMES; WINTER/SPRING 94

Received a copy of this interesting publication that appears three times a year. It is packed with electric vehicle articles, information, ads, and events. It costs \$ 8.50 to get 3 issues. Contact Bruce Meland, 63600 Deschutes Market Road, Bend OR 97701. Phone (503) 388-1908, FAX (206) 693-4408. (I didn't understand some of the material such as "Interdimensional Power System" or "The Energy Machine" using over-unity technology - Editor.)

## Events

### 1994 American Tour de Sol - May 19-28 New York City to Philadelphia

Northeast Sustainable Energy Association, 23 Ames Street, Greenfield MA 01301 (413) 774-6051

### Michigan High School Electrathon Race - June 11 (For Michigan High Schools)

D Paulson or P Zeller (616) 784-7595 or (800) 968-3955

### Saturn HEV Challenge - June 14-20 Southfield Michigan. (Intercollegiate competition)

Bob Larson - DOE (708) 252-3735 or Nicole Hill (708) 252-6574

### Cleveland Grand Prix - July 8-10 at Burke Lakefront Airport (Intercollegiate competition)

Kevon Makell, Centerior Energy Company, (216) 447-3552

### S/EV 94 October 3-5 - Providence RI (Solar & EV Symposium)

(413) 774-6051

### EVS-12 - Anaheim Convention Center (12th Biennial International Symposium)

SHO (Electric Power Research Institute) 167 South San Antonio Rd, # 10, Los Altos CA 94022 (415) 949-2050

## FROM OTHER EV NEWSLETTERS

**The Vancouver Electric Vehicle Association (VEVA)** is proceeding with plans to sponsor an Electrathon event by building a demonstration vehicle (Cost estimate -\$ 2000) and granting each participating school \$ 1000 for a basic kit including motor, controller, pot box cables, terminals and battery charger. They also described the pulse-charging technique by Electronic Power Technology that was used in the 24-hour, 831-mile run by a Chevy S-10 conversion. By only charging the battery from 25 - 80% a greater amount of energy is absorbed in a short time. (This was the same technique used by Bob Aronson - Electric Fuel Propulsion - in the second cross-country electric car race about 25 years ago. - Editor)

**The Aussies (AEVA)** reported on the results of their National Electrathon that included Electrathon vehicles, Electro-Karts, and Electro-Cycle categories. The Lynch motor, developed in Devon - UK, was described. This is a PM pancake motor that is 20cm in diameter, weights 11 kg, has a 6kW continuous output (16 kW peak) at 48 volts and 3250 rpm (They can operate from 12-48 volts). The cost is £ 780.

**The Electric Grand Prix Corporation (Rochester NY)** reported on a student project at the New England Institute of Technology to build a ground-up EV, called Solar Tech II. Their design provides for interchangeable battery packs. They also published a 2-page response letter addressed to FORBES discussing the "Alex Trotman" article appearing in Jan, 94.

## MANDATES

In 1990 the Congress amended and extended the Clean Air Act, a measure that will affect the way in which cars are used. Americans support clean air and a wholesome environment, but achieving the Act's objectives will mean individual sacrifices, higher costs, and inconvenience. The legislation took many years of debate in the Congress, lobbying, and arguments of a host of interest groups. To carry out the Act the EPA has now issued regulations that impose strict controls on pollution problems, many of which will affect individuals, motor vehicles, the service industry, and businesses located in metropolitan urban areas.

The Chicago metropolitan area has been declared by the EPA to be a "severe non-attainment" area because ozone standards have been exceeded. Illinois is therefore required to adopt measures to reduce emissions by at least 15% by 1996. In 1993 the Illinois Legislature adopted Public Act 87-1275 that, among other things, regulates work commuting by private cars (Called Employee Trip Reduction or ETR). Under its provisions every employer in the region with over 100 employees at one worksite must cut by 25% the trips those employees make in their own cars during rush hours.

The FVEAA on Earth Day in 1990, the same year as the Clean Air Act renewal, issued its "DECLARATION OF ENERGY INDEPENDENCE", in which we said that the freedom of any United States citizen for unrestricted travel anywhere, at any time, with anyone, was an essential part of our liberties. We further observed that it is the obligation of each citizen to act in a responsible manner during his travels, including awareness of the environmental price exacted by automobile use in urban areas. Freedom for auto use is challenged by the mandates of the Clean Air Act. It is appropriate that three years later we review the situation, discuss the topic, and consider how recycled and converted electric cars can contribute to improving the situation.

California, to meet the Act requirements, mandated that zero-emission vehicles (ZEV) be part of auto sales by 1996. The opposition of the Big 3 auto companies has been extensively reported. Their arguments:

1. Consumers will not pay the likely electric vehicle cost for a car of limited usefulness. This argument was well-stated by Peter Huber in his FORBES February 19, 1990 essay entitled "Who will buy the electric car?" In it he points out the huge advantage internal combustion engine cars (ICE) have over the electric competition. Almost 40 times more energy can be stored by gasoline than even the best batteries can achieve. He also points out the electric will have an initial purchase price disadvantage. He concludes that no one will buy an electric until the US collectively puts a premium on energy independence, includes balance-of-trade considerations, and exacts the environmental price for ICE motoring.
2. A ZEV merely transfers emissions from a tailpipe to a utility smokestack.
3. Widespread ZEV recharging will eventually require costly investments in new utility facilities and raise the cost for electricity.
4. There are better ways to deal with environmental non-compliance than ZEV. (A) Old cars are the worst polluters. A California company bought old cars and junked them. This turned out to be a cost-effective means of pollution reduction. (B) Improvements in communications and computers may lessen the need to commute to a workplace for persons dealing primarily with information. (C) Flexible workhours can be instituted which will reduce the rush hour congestion causing increased emissions while cars are slowly moving down a packed expressway. (D) Alternative fuels can be used. Reformulated gasoline can be used during the summer months when fuel evaporation is at a maximum and ozone violations are most likely to occur. Other fuels such as ethanol, methanol, compressed natural gas, and liquefied natural gas can be used.

The FVEAA, with 20 years of experience with ZEV use, will consider this issue at the May meeting.

Bill Shafer

## MAGNITUDE AND VALUE OF EMISSION REDUCTIONS BY EV USE IN 4 CITIES

Member Scott Ortiz attended a meeting at which a paper on the subject was presented by Wang and Santini of Argonne Lab. It was to be published in the TRANSPORTATION RESEARCH RECORD. He furnished the FVEAA with a copy of the document which is summarized here for the member information.

The paper compares the emissions of competing gasoline vehicles (GV) and electric vehicles (EV) assuming these are driven in the same pattern in Chicago, Denver, Los Angeles, and New York. Five compounds: hydrocarbons (HC), carbon monoxide (CO), nitrous oxides (NO), and sulfur oxides (SO). The "avoided cost" value in \$/ton of emission reductions are valued for each vehicle.

EVs are being considered to reduce emissions in urban areas. California has mandated sale of these after 1997. Other areas facing requirements of the 1990 Clean Air Act mandates may follow the same requirement.

The federal EPA Mobile 5A model estimates that GV emissions @ 5mph are two or three times more than those driving cycles with an average speed of 19.6 mph. EV emissions are much more stable than those stated for GVs. Differences in emission control strategies for power plants in various areas and the primary energy source for these plants have not been properly considered by previous studies. Also, the relative GV and EVs speed variation factor have been ignored.

It was reported that Chicago violates the federal ozone standard; New York the ozone and CO; Denver the CO; and Los Angeles ozone, CO and NO. The study assumed that the stage II technology to control refueling emissions have been implemented, so HC is not a factor.

The speed, fuel economy and EV electricity consumption used in the study for 6 different driving cycles is shown in Table 1. The following energy efficiencies were used: drivetrain - 85%, motor - 85%, battery - 80%, battery charger - 90%, electric distribution and transmission - 92%.

TABLE 1 AVERAGE SPEED, GV FUEL ECONOMY, AND EV ELECTRICITY CONSUMPTION UNDER SIX DRIVE CYCLES

Driving Cycle <sup>a</sup>	Average Speed (mph)	GV Fuel Economy (MPG)	EV Electricity Consump. (Kwh/mi.)
NYCC	7.1	9.5	0.40
ECE-15	11.7	16.9	0.32
SAE C	15.4	21.3	0.35
SFUDS	18.5	26.1	0.37
SAE D	28.4	35.1	0.41
HWY	48.6	36.1	0.39

<sup>a</sup> For specifications of most of the driving cycles, see Reference 10. NYCC--New York city cycle; ECE-15--Economic Community of Europe Cycle 15; SAE C--SAE C cycle; SFUDS--simplified federal urban driving schedule; SAE D--SAE D cycle; HWY--highway cycle.

The study included the emissions from refining crude oil into gasoline. The NO emissions from battery recycling were included for EVs. The baseline EV used in the study was a 2-4 passenger car with a size and weight similar to the Ford ECOSTAR.

All vehicles were assumed to have a daily operating period of 1.6 hours/day, which is equivalent to 10,500 miles per year @ 18.5 mph.

Table 4 summarizes the average emission rates for EV recharging. All electricity for Chicago was assumed to be from nuclear sources so EV emission reductions are 100% for all pollutants.

TABLE 4 AVERAGE EMISSION RATES FOR EV RECHARGING (GRAMS PER KWH)

Pollutant	Chicago <sup>a</sup>	Denver <sup>a</sup>	Los Angeles <sup>b</sup>	New York <sup>c</sup>
HC	0.0	0.013	0.067	0.013
CO	0.0	0.123	0.087	0.150
NO <sub>x</sub>	0.0	1.484	0.156	0.400
SO <sub>x</sub>	0.0	0.714	0.029	3.900
CO <sub>2</sub>	0.0	687	623	643

<sup>a</sup> Average emission rates were calculated from the rates of coal-, gas-, and oil-fired plants weighted by their mix. The marginal power-plant mix is presented in Table 3.

In other areas, CO emissions are reduced by 70% in NY and Denver, NO emissions are reduced 10-40% in Denver, 80% in New York, and over 90% in Los Angeles. SO emissions would increase in LA, NYC, and Denver, but the national totals are capped and offsetting measures would be necessary.

The estimated value of EV emission reduction (In \$ per vehicle) calculated in the study were:

CHICAGO	DENVER	NY	LA
\$ 3205 - 9390	\$ 5994 - 8995	\$ 8535 - 12,220	\$ 12,572 - 19,208

The values may be used to get an idea of the worth in terms of reduction of administratively imposed costs of complying with emission standards if EVs were substituted for GVs. The range is the sum of value for each pollutant and depends on which driving cycle (Table 1) is considered. The study assumes car will last 13 years and in its lifetime will travel a total of 52,473 miles for NYC driving cycle, 84,454 for ECE-15, 113,794 for SAE C, 136,700 for SFUDS, 209,853 for SAE D, and 359,115 for HWY cycle.

It is interesting to note that in Chicago, the average value is about the same as the expected recycling and conversion cost experienced by FVEAA members.

