

Fox Valley Electric Auto Association  
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**NEXT MEETING: SATURDAY November 20 at 10AM at Warfield Electric Co., 155 Industry Avenue in Frankfort, IL. See location map in this Newsletter**

**DISCUSSION TOPICS: 1. Manufacturing facility inspection. 2. Presentation (The Warfield series-wound motor for electric cars.) 3. Officers election 4. Inspection of unique autos at Member Larry Claypool's 'Vair Garage in Frankfort. 5. Lunch at the Bierstube in Frankfort.**

#### 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 members to receive our monthly Newsletter that contains useful information about electric car components, construction, policies, and events. Membership is not required to attend our monthly meetings

To obtain information about the FVEAA, you may contact either Past President Ken Woods or President Shafer

President & Newsletter Editor- Bill Shafer  
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(708) 771-5202

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November

PRESSEZ

It has been a privilege to serve as your president for the past seven years. We have a diverse and talented membership, and I see a great future. We have a membership active in electric vehicles. Commercial EV development of has been all but abandoned by auto manufacturers. It is now back in the hands of organizations such as the FVEAA where individuals can build their own conversions.

I am particularly pleased with last year's addition of seven new members from Net Gain Technologies to the FVEAA. The introduction of their drag racer into the FVEAA thinking has expanded our horizon. There are 170 drag racing tracks in the U.S. The public exposure to EVs is bound to increase.

I will remain active as liaison between the FVEAA and the Illinois Solar Energy Association. The FVEAA and ISEA have conducted four joint events; at Argonne, Earth Day in 1990, at Triton, and at DuPage College in 1993. I look forward to another joint event next year.

KEN

## MINUTES OF OCT. MEETING

The meeting was the first held at the College of DuPage on September 15. Vice President Shafer opened the meeting at 7:45 with introductions of members and guests. Fifteen members and three guests attended. Doug Mather from Woodstock and Dave Stensland from Yorkville joined the FVEAA.

Doug has an **Electrified Fiero (ELF)** that he has driven 4000 miles thus far. Dave has a Mazda pickup sitting in his driveway that he intends to convert.

President Woods arrived at 8:10 and continued the meeting by having the minutes of the last meeting approved. Treasurer Corel reported no change in the checking account and \$ 2130.77 in the checking account. His report was accepted.

Conversion of a car by Triton students was discussed. The College would seek a program sponsor willing to commit \$7000 to cover equipment purchases and ask an instructor to supervise an after-hours project as part of SAE student activities. FVEAA members would agree to assist the instructor with one or two members present at each session. A number of FVEAA members agreed to participate in the program. Bill Shafer agreed to prepare a draft proposal with the assistance of Ray Oviyach.

Member Ed Meyer reported the latest data on the battery chargers he built for Members Krajanovich and Shafer. Both chargers experienced failures of the TRIAC. It appeared that both were the result of inadequate heat sinks and being permanently connected to the battery.

Remedial measures included improved heat sinking and ventilation. Installation of diodes in the charger dc-leads as also suggested.

Member Jerry Mitchell commented on his experience with pulse charging. He reported improved single charge range after using a charger from PULSE TECH. Apparently the technique involves repetitively charging and discharging a capacitor. The resulting high-peak current tends to dislodge surface deposits of lead sulfate.

President Woods distributed copies of the Illinois Solar Energy Association news release about homes on the 1999 tour of energy-efficient locations. The tour is scheduled for Saturday.

New member Doug Mather described the ELF and his use. He noted the Fiero conversion weighs 4000 pounds, too heavy for the 8" Advanced DC motor and 6-volt batteries for the 108 volt system. He noted the e-meter was his most valuable instrument because it records current delivered to the battery during charging and subtracts outgoing current during operation to provide an accurate battery status indication.

The November FVEAA meeting will be at Warfield Electric Co. in Frankfort. The meeting will be on **SATURDAY, 11 at 10 AM**. We will be able to inspect the motor-manufacturing facility and ask about the newly developed WARFIELD DC motor we first inspected at the September meeting.

Submitted by Secretary Dave Aarvold.  
Also from the notes of Bill Shafer.

## RECENT ARTICLES ABOUT ELECTRIC VEHICLES

**Note from Conde-Nast's Traveler:** Driving Ford's new *EXCURSION* 124,000 miles will emit 134 tons of carbon dioxide. Driving a Toyota *PRIUS* hybrid the same distance will emit just 27 tons. See next article.

**TOP GAS SIPPERS ARE POOR SELLERS** *Columbus Dispatch* (From the *Washington Post*). According to the latest sales data compiled by J D Power's Associates, high-mileage cars now account for just 0.6% of US auto sales. SUV's made up 48.1% of the market. They concluded that fuel economy alone does not influence customer choices. The article also notes the new Honda \$ 20,000 *INSIGHT* which will be available in the US starting in December will achieve 61 mpg in the city.

**BATTERY PROMISES MORE GET-UP-AND-GO.** *Chicago Tribune* 10/10/99. This is an article about the EXIDE *ORBITAL* Select Battery. It features a "jelly roll" construction of a lead sheet and separator. Electrolyte is contained in the spongy separator. This increases the amount of active material involved in the reaction. The battery will deliver 1000 cold-cranking amps (CCA) When the CCA rating increases, the reserve capacity decreases. This could be bad if you were to leave the lights on while the vehicle is parked. (Editor's note - spiral wound construction is not a new idea. Optima has been selling its RED TOP and YELLOW TOP batteries using the same technique for several years)

**Parade Magazine October 3 issue** has an article noting both GM and DAIMLER-CHRYSLER will unveil prototype hybrids in January that are expected to approach 80 mpg. Ford Chairman William Ford noted, "My grandfather said you can have a Ford in any color you want - as long as it is black". Paraphrasing that comment, William said, "as long as it is green."

**There were several articles about Hybrid car programs.** Vehicles included are the Toyota *PRIUS*, being test-driven according to Chicago Sun-Times articles on 11/5, in the Chicago Tribune on 10/3, the Columbus Dispatch on 9/19, and the Naperville SUN on 10/3. Honda's *INSIGHT* received mention in the Tribune also on 10/3. Ford's P 2000 got some ink in the Sun-Times on 9/27. (Editor's note - this will be the last time hybrid programs will be mentioned in this publication. These are not *electric* cars as has been previously noted. Also, the car companies have effective PR departments to write and distribute press releases about programs.)

**GEM.** The *Columbus Dispatch* had two articles about the GEM electric cars for lease in the September 14 paper. Immke Circle Leasing has three types of vehicles available; the two-passenger, a four-passenger, and pickup truck versions. These are built by a Fargo, North Dakota firm. Immke offers test drives. For information, go the their website [www.autoleasingandsales.com](http://www.autoleasingandsales.com) or e-mail to [allmakes@autoleasingandsales.com](mailto:allmakes@autoleasingandsales.com)

## RECENT ARTICLES ABOUT ELECTRIC VEHICLES – Concluded

From EV News, September issue: Total DOE spending related to EV programs totaled \$ 105-million. Congress voted increased spending for hybrid systems from \$ 23 to 38.8-million for the coming year. The US Battery Consortium received a boost from \$ 6 to 9-million. Fuel cell technology stays at \$ 34 million. Field testing Evs stays at about \$ 3-million. In doubt is the US Postal Service request to purchase 6000 Evs for delivery service. Tax breaks for Evs remain unresolved.

Southern California Edison's EV fleet has accumulated 2.5 million miles. Their fleet includes 228 Toyota RAV-4, 18 Hondas, 13 Chevy S-10, 10 Ford Rangers, 9 GM EV-1, 6 Nissan Altra, and 2 DaimlerChrysler EPIC vehicles. SCE will purchase an additional 17 RAV-4 vehicles. The GM EV-1 is much requested by employees but the sport coupe is not deemed appropriate for most business uses. NiMH batteries are used in by most SCE electric vehicles. The fleet manager commented the initial purchase price is so high that he couldn't recommend them to outside companies. There are, however, cost offsets to consider such as tax breaks and other incentives.

The issue also has an article by John Applebee, Director of the Center for Electrochemical Systems and Hydrogen Research at Texas A&M University, in a *Scientific American* article in July, 1999. He wrote about fuel cell electric vehicle development challenges. A major problem is the process efficiency. Slow reaction of oxygen at the cathode limits efficiency to 40-60%. Proton Exchange Membrane (PEM) cells use platinum for the catalyst. One Kw of cell capacity requires about \$6-9 of the metal. Another area for cost reduction is the corrosion-resistant metals. They now cost about \$ 95 per kW, but mass-production could reduce this to about \$ 10. The final challenge is hydrogen storage. A small car would require three Kg of hydrogen. At atmospheric pressure, the volume would be 36,000 liters.

DOE has calculated the equivalent miles per gallon for GM's EV-1 as 332.1 MPGE. When the final rule on this Petroleum Equivalent Fuel Economy (PEV) number is approved, it can be used in determining CAFÉ scorecards.

A new EV speed record of 239.5 mph was set at the Bonneville Salt Flats on August 20 by Dempsey's World Record Associates. The bullet-shaped vehicle had two AC Propulsion motors bolted together @ 150-200 horsepower each. There were 6120 C-cells making up the 400 volt system (340 volts @ 800 amps). The vehicle weighed 2459 pounds.

**MEMBERSHIP RENEWAL FOR 1999-2000.** Your Membership renewal is due November 30, the beginning of our fiscal year. A renewal application is included with this Newsletter. Please fill it out and send it, along with your \$ 20 check, to Treasurer Dale Corel. The Newsletter Editor has a new computer and will enter the membership rolls from your renewal application. Please include an accurate e-mail address if you have one.

## FROM OTHER EV NEWSLETTERS

**Useful information from the Ottawa Group's July/August Newsletter that the last FVEAA Newsletter didn't have space for. Battery terminology:**

**SLA** is an acronym for Sealed Lead Acid batteries. Sealed means the user does not have access to cells for adding water or specific gravity checks. SLA batteries may be gelled electrolyte, absorptive glass mat, or non-maintainable flooded cell batteries such as the DELCO "Freedom".

**SLA** applies to Starting, Lighting, and Ignition batteries found in cars. Their primary function is to start your engine and supply the difference between power required and alternator output. SLI batteries do not have deep-cycling capability because of their plate construction. They deliver high power for a short period during starting with energy being replenished by the alternator.

**CCA** stands for Cold Cranking Amps rating. Battery Council International (BCI) defines CCA as the current the battery will supply at zero degrees F for thirty seconds and maintain cell voltage above 1.2 volts per cell (7.2 volts for a 12 volt nominal battery).

**Reserve Capacity** is the number of minutes the battery can deliver before going "dead".

**DEEP CYCLE** batteries are rated by the number of minutes it can deliver 75-amps before the voltage drops below 1.2 volts per cell.

**VEVA, the Vancouver group**, in their October Newsletter has a lead articles on Nissan's *Hypermini*. The car will be introduced in Japan next February. The two-passenger vehicle is designed for commuting and shopping trips. The car weighs just 1848 pounds, using aluminum and other lightweight materials. It will have a single-charge range of 70 miles and a top speed of 60 mph. Expected price tag is \$ 35,000.

They also describe the US PRODRIVE bicycle assist package. The equipment weighs 28 pounds and can be installed in about 30 minutes on 26 inch wheel bicycles. Two 12-volt, 12 amp-hr sealed batteries, pulse-width controller, and brushless motor provides an 18 mph top speed (without pedaling). Eight hour, or optional three hour recharging is available. Package costs \$ 895 (Canadian) from Allwin Enterprises, PO Box 23897, 5000 Miller Road, Suite 110, Richmond BC, V7B-1Y1, Canada. Information can be obtained on the web: [www.currietech.com](http://www.currietech.com).

EV News September issue notes that Corbin is working on two more cars following the success of the *Sparrow*. They have 500 orders and deposits for the car. Their two new cars will be IC engine powered. They also report Chattanooga-based AVS Systems, a builder of electric buses has a \$7-million order from the City of Tempe, AZ for 30 buses that seat 22 persons. Tempe has an option for 170 more. The buses include a 28 kw Capstone turbine-generator to extend range. The AVS Bus has been tested by the City of Chattanooga for 2 ½ years.

## ELECTION OF OFFICERS FOR NEXT YEAR

FVEAA past presidents have contacted the following persons about becoming officers of the organization in the coming year. They have agreed to be nominated:

|                                 |             |
|---------------------------------|-------------|
| President and Newsletter Editor | Bill Shafer |
| Vice President                  | Bob Munroe  |
| Treasurer                       | Dale Corel  |
| Secretary                       | Dick Ness   |
| Director and Registered Agent   | John Emde   |
| Director                        | Ed Meyer    |
| Director and Past President     | Ken Woods   |

If any other FVEAA member wishes to serve in any of these positions, he can be nominated from the floor at the November meeting.

## SPECIAL MEETING THIS MONTH

We decided at the October meeting to cancel our regular Friday meeting take advantage of Jerry Warfield's offer to inspect his electric motor facility at a special meeting in November. Warfield Electric in Frankfort, IL designs and builds electric motors. They also repair all kinds and sizes of motors. After we inspect his facility, we will have their presentation on a new motor designed for electric cars. We will also be able to discuss its design with Warfield engineers.

Following this we will have a brief meeting to elect officers for the coming year and conduct other business. We expect the inspection, discussion, and election will require about two hours.

We will then adjourn and drive about three miles to Member Larry Claypool's 'Vair' shop. Larry is the expert on Chevy Corvairs and has a collection of unusual cars, many with rear engines. Larry has arranged for us to have lunch at Frankfort's Bierstube restaurant. We will order off the menu with each individual picking up his check. For sauerkraut lovers, this should be a unique opportunity.

The November Newsletter includes a map. At the October meeting, new member Doug Mather asked about airport facilities near Frankfort for those who don't relish driving fifty miles on Chicago Expressways. Harlem Howell Airport is about four miles east of Warfields. If the weather is VFR and you plan to fly in, call Bill Shafer to arrange ground transportation to Warfield's. You must be there by 9:30 AM.

I hope many of our members will take advantage of this special meeting.

**BILL SHAFER**

# PUTTING PERFORMANCE IN YOUR ELECTRIC CAR - Part III

## REVIEW

In Parts I and II we defined a reference car conversion having the characteristics listed in the Table on Page 2 of Part II. We found the car will require 23 kW to sustain 60 mph and 10.35 kW at 30 mph. In this Part we will deal with the standard test driving cycle SAE and examine the efficiency of various components.

## STEADY-STATE EFFICIENCY

During the development of electric cars test vehicles were constructed. The following data was obtained from a General Electric car, called the ETV-1, built for DOE. The curb weight was 3350 pounds. It used a 15 kW shunt-wound motor, 96 volts, 175 amps, 5000 rpm. The design features and test data are applicable to our Reference conversion car. At a steady 35 mph, the ETV-1 had a 100-mile range and 166 watt-hours/mile of energy losses and auxiliary power use. Energy was distributed as shown by the following:

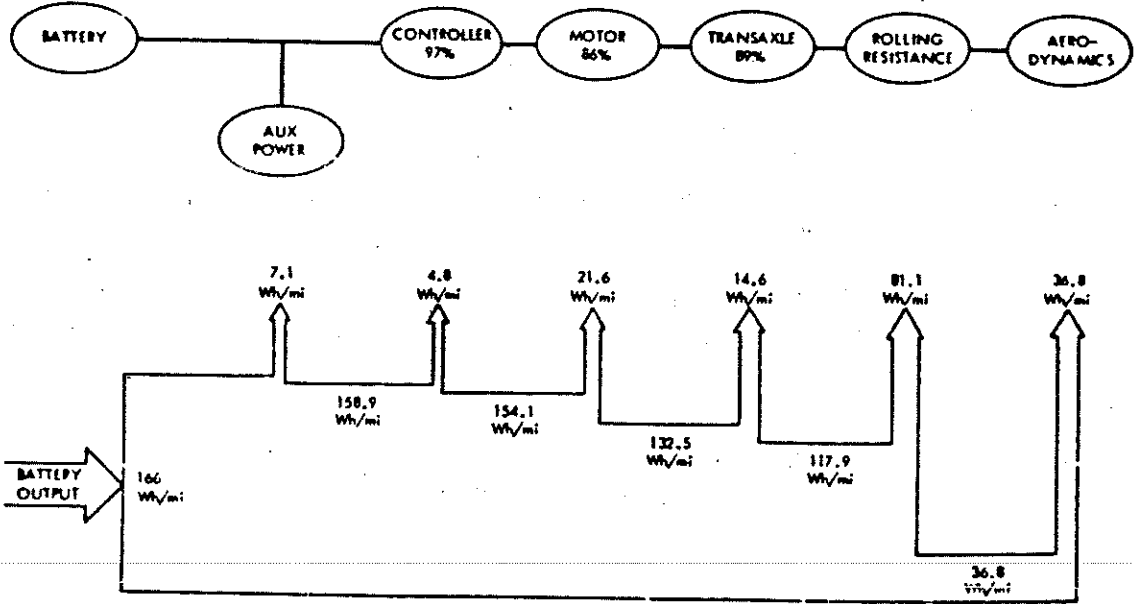


Figure 4-3. ETV-1 Energy Flow Distribution at a Steady 35 mph Speed

At a steady speed of 55 mph the range dropped to 55 miles. Auxiliary power and loss input was 213 watt-hours. Aerodynamic losses were principally responsible for the increase.

**PUTTING PERFORMANCE IN YOUR ELECTRIC CAR, Part III, Page 2/2**

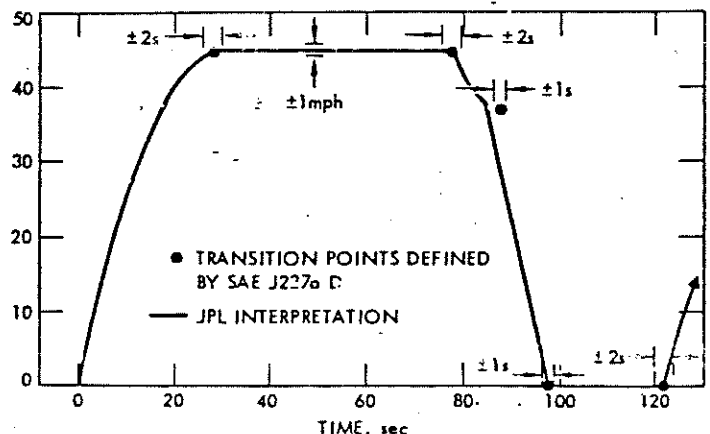
There have been claims of extreme single-charge range by vehicle developers that give a false impression of the capability of their product. Their tests are usually conducted on a test track at a steady speed of 25 mph. When asked how fast the car would go they frequently say "60 mph", leaving the impression that their car could travel 100 miles at 60 mph. This is deceptive.

**STANDARD DRIVING CYCLE**

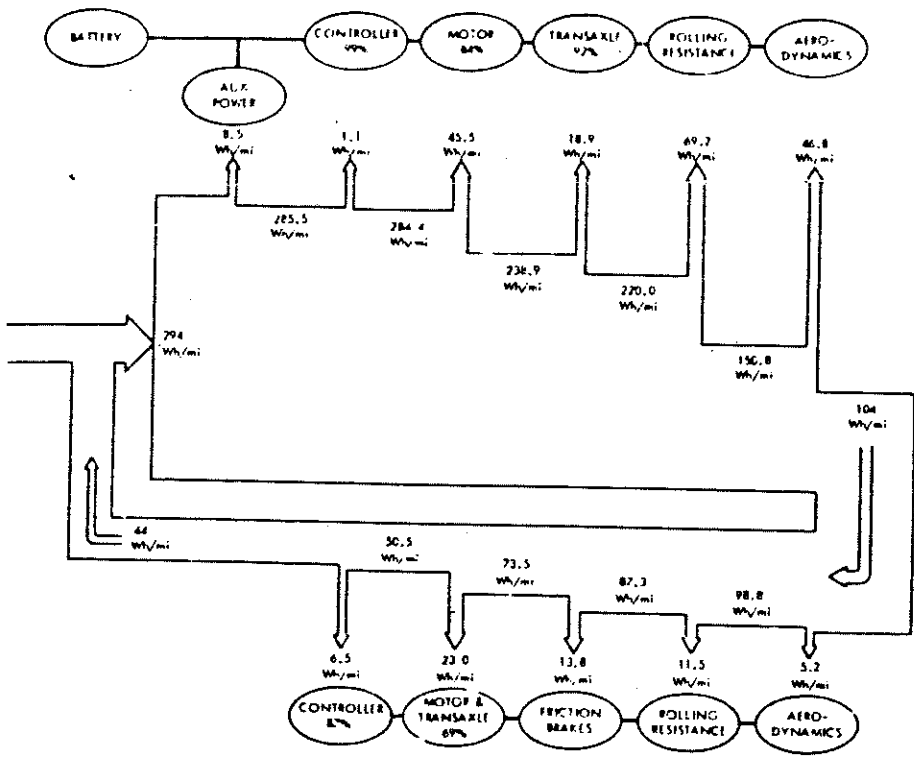
The SAE developed several EV standard driving cycles to be used to compare EV performance. The SAE J237, Cycle D, called the *URBAN* cycle, represents typical urban driving. This is the one we will use.

Cycle D is shown by this graph of speed-time.

The car is accelerated to 40mph in 30 seconds. This is followed by a 40-mph steady speed for 50- seconds. Next there is a 10-second coasting period followed by deceleration and braking to a stop in the next 10- second period. The final part is 10 seconds spent at standstill. Subsequent 100-second cycles are repeated. There are other cycles applicable to city driving conditions and highway travel.



The final diagram shows the energy flow distribution for the ETV-1 over the SAE J227D Driving Cycle. In this instance, the effect of regenerative braking is included. Note that regeneration returned 44 watt-hours per mile of the 294 watt-hour input, a 14% recovery.



William H. Shafer  
2 November, 1999





# FVEAA MEMBERSHIP APPLICATION

1999 - 2000

PLEASE PRINT

NAME \_\_\_\_\_

DATE \_\_\_\_\_

ADDRESS \_\_\_\_\_

PHONE ( ) \_\_\_\_\_ - \_\_\_\_\_

FAX ( ) \_\_\_\_\_ - \_\_\_\_\_

E-MAIL \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

ZIP \_\_\_\_\_

SUBZIP \_\_\_\_\_

RENEWAL? (Check)

NEW APPLICATION ? (Check)

What is your principal interest in electric cars?

General

I would like to convert a car.

I own an EV Make? \_\_\_\_\_ Yr \_\_\_\_\_ Year acquired \_\_\_\_\_

EV public policy and environmental applications.

Other (Please describe below)

**LIST BELOW YOUR COMMENTS, QUESTIONS, OR SUGGESTED EV TOPICS FOR DISCUSSION**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Exclude my name from the next published list of members

**FVEAA annual membership is \$20. The fiscal year begins November 1. Dues for new members joining after that date is adjusted according to the following schedule:**

|          |       |       |       |       |       |       |       |      |      |      |      |
|----------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|
| Nov      | Dec   | Jan   | Feb   | Mar   | Apr   | May   | Jun   | Jul  | Aug  | Sep  | Oct  |
| \$ 20.00 | 19.00 | 18.00 | 17.00 | 16.00 | 14.00 | 12.00 | 10.00 | 8.00 | 6.00 | 4.00 | 2.00 |

Make your check payable to the FVEAA and mail to : **DALE COREL , FVEAA Treasurer**  
595 Gateshead North  
Elk Grove, IL 60007-3433

FVEAA November 20 Meeting  
 Saturday at 10AM at  
 Warfield Electric Co.  
 155 Industry Avenue in  
 Frankfort, Illinois

