

FVEAA NEWSLETTER

OCTOBER 1994

President	Vice President & Editor	Secretary	Treasurer & Librarian	Director	Director
Ken Woods 1264 Harvest Court Naperville, IL 60564-8956 (708) 420-1118	Bill Shafer 308 South East Ave Oak Park, IL 60302-3512 (708) 383-0186	Dave Aarvold 915 Oak Street DeKalb, IL 60115-3470	Dale Corel 595 North Gateshead Elk Grove, IL 60007-3433	John Emde 6541 Fairmount Downers Grove, IL 60156-2919	John Stockberger 2 S 643 Nelson Lake Rd Batavia, IL 60510-9762

NEXT MEETING - October 21 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 TOPICS - Continued consideration of the proposed cooperative construction proposal and development of a community college course for EV conversions.

MEMBERSHIP INFORMATION

Any person interested in electric cars is welcome to join the FVEAA. The cost for a full year's dues is \$15. This will entitle the member to receive our monthly Newsletter that contains useful information about electric car components, conversion techniques, policies, and events. Dues for new members joining in October will be \$ 1.25.

FOX VALLEY ELECTRIC AUTO ASSOCIATION
 308 South East Avenue
 Oak Park, IL 60302-3512



FIRST CLASS

Dale Corel
 595 Gateshead North
 Elk Grove Village IL 60007 -3433
 2,106.62
 664.34
 2,770.96

ADDRESS CORRECTION REQUESTED

PRESSEZ

Two proposals for our club's future activities have come forward in the last month.

The first is to construct a state of the art conversion vehicle using off the shelf components. This vehicle would be a club car financed by selling shares in the project at \$100 per share. After completion the car would be sold by a silent auction or raffle to share holders or club members.

The second proposal would involve FVEAA members to prepare a community college level program that could teach electric car technology to class members. This program would be coordinated through a community college, possibly DuPage where we meet..

The two proposals, construction and educational program, could be combined. In my opinion this would improve the quality of both proposals.

I would like to hear your comments, whether or not you are geographically situated to participate in the proposed program.

Ken Woods

MINUTES OF SEPTEMBER MEETING

The meeting was called to order by President Woods at 7:45 PM. Fifteen members and two guests attended.

Treasurer Corel reported \$ 2106.62 in the savings account and \$ 742 in the checking account. Members were reminded that 1995 annual dues (\$15) will be payable in November.

Member Munroe reported four loads of EV material was removed from Newton's basement and stored at Member Poynten's place. Sale of a 13 transistor set of "Mary Jane" Darlington transistors to Member Emde for \$ 1 was approved in recognition of his many contributions to the FVEAA. He will use these to upgrade his Suburau.

Member Munroe's proposal for a group conversion of a car was continued from the September meeting. Development of a kit for conversion of an RX-7, a pickup truck, and other vehicles was considered. Three alternatives were proposed:

1. Car and components purchased by an individual with conversion by the club.
2. Conversion financed by share sales and sold by silent auction after completion.
3. Conversion financed by share sales and raffled following completion.

A place for conversion work would be required. It was suggested the FVEAA could develop a technical course covering fundamentals of EV conversion. This course would be offered as a community college course. Vehicle conversion would be part of the course lab work. Woods will discuss this with Member Oviyach, Professor Emeritus of auto technology at Triton College.

New member Steve Marshall described conversion of a Dodge RAM 50 pickup truck at a Milwaukee technical college. The vehicle will have a 108-volt system with batteries located on the truck bed behind the cab. It will have a 9" Advanced DC motor, Curtis controller, KTA charger, and heater..

The meeting was adjourned at 10:15 PM.

Dave Aarvold
Secretary

EVents

Central Electric Vehicle Symposium October 25-27, Oklahoma City

Sponsored by Oklahoma University, Electric Vehicle Research Institute, and Electric Power Research Institute (EPRI) Speakers, Paper sessions, and Exhibits. Oklahoma Gas & Electric, PO Box 321, M/C 902, Okla City OK 73101. (405) 3225-4721. Registration cost is \$ 115

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 Electric Grand Prix Corporation in their July-Sept issue notes that EVAA, ETC, EPRI, and EEI have joined to form EVAmerica and initiate a program for utilities to purchase, place, and demonstrate 5000 EV's by the end of 1997. To date twelve utilities have committed. A Swedish consortia has also announced plans to purchase at least 200 EV's that weigh less than 2700 lbs, are 105 inches overall, have a top speed of 75 mph, and a 0-50 mph acceleration of 7.1 seconds with a high power motor, a range of 120 miles with lead-acid batteries, and a retail price of about \$ 17,437. Grand Prix also published the following 800 phone numbers for EV information: Ford - 800258-3835; GM - 800-253-5328; EAA - 800--537-2882; DOE Alternative Fuels Division - 800-423-1363. The issue also has an article on the Advanced Battery Consortium. Grand Prix's electric Cobra has completed preliminary road testing.

In their Oct-Dec issue they describe the charging cycle for the EPTI system which applies 0.2-2 second charging pulse followed by a discharge pulse that is 0.2-5% of the charging pulse. A stabilization time of 3-5 the length of the discharge pulse completes the cycle. The issue also contains an informative article on flywheel batteries that point out 545 amps @ 240-volts would be required to recharge a flywheel battery in 10 minutes. An individual wishing to subscribe to the publication which is published four times a year can do so for \$ 12. For information call (716) 889-9516 or -1229.

World Electric Transportation in the September issue covers the TROPICA, inspired by the Shelby Cobra, is a 2-seater sports EV. It is produced by Renaissance Cars in Palm Bay FL by Bob Beaumont of Citicar fame. The new production facility will soon have a 30 car per day manufacturing capability.. The car features two 12 HP motors gear belted to each rear wheel powered by 12 Trojan batteries and controlled by two Curtis controllers. This gives the car a 0-40mph in under 10 seconds and a 40 mile range. First production models will sell for \$ 15,515. The issue also has a block diagram of the 336-volt Magne Tek AC drive system for EV's.

EVAOSC September Newsletter cover features a photo of a converted Fiero, photos of an Electric Porsche Replica, and 2 pages of classified ads for components and cars. Member Saxe Dobrin has an article entitled "A Market Survey Of One" which describes the components making up his Honda CRX conversion, and its daily use.

FROM OTHER EVE NEWSLETTERS - CONTINUED

Sacramento EV Assn President's Message and article describe a "Smog Squad" event. This was a rally for clean air awareness in which volunteer workers were dropped off in each precinct to knock on doors and present the theme event. EV's were inspected at curbside during the walk. Participation drew lots of attention to the organization.

The Maine Sun announced plans to host a "Maine Solar Blast" Electrathon in Portland, May of 1995, as a part of the Tour De Sol race which will conclude in Portland. Clark Beasley originated the Electrathon concept that is popular in the UK and Australia. The event will also include alternative energy related activities such as workshops, exhibits, and information booths.

EV CIRCUIT, Newsletter of the Ottawa EV Council has a 3-page, Part III, description of a FIERO conversion (Called the ELF) that describes the power disc braking system, a Vicor DC-DC converter about the size of a chocolate bar, and motor mounting. Performance in the summer was found to be 3 km/kwh and 2km/kwh in the winter. Speed is 20 kph in 1st gear, 60 in 2nd, 90 in 3d, and > 100 in 4th gear. Range is > 44 km.

EEVC, the Eastern EV Club September Newsletter described Dureyea Days held in Boyertown, PA on September 5th. at which members of the organization exhibited their Evs. One member had his 6-year old son riding an electrified Big Wheel. The issue also describes a 40HP permanent magnet motor that measures 4x4x5.6 inches, weighs 10 lbs, but runs at 90,000 rpm. It was developed by Test Devices, Hudson MA and is expected to find application in flywheel applications. The motor torque is a modest 2.35 lb-ft between 20 and 90K rpm. A bicycle assist motor available from Chronos Research Lab, 11408 Sorrento Valley Road, Suite 204, San Diego CA 92121, phone (800) 364-8894. The motor weighs 2 lbs and is powered by a 3.7 volt Ni-Cd battery, good for 10-15 minutes, that fits in a standard water bottle holder.

AVEA, the Aussies, September newsletter contains a large number of EV articles in their 10-page publication. It was interesting to note that NiCd batteries are being added to San Francisco trolley buses to allow off-line operation. Specification for the Oxford (UK) electric buses were presented.

VEVA, the Vancouver EV Assn, September issue devotes a page to the specification for a 1981 Datsun truck conversion that has a 120 kph top speed, a range of 75 km, an acceleration 0kph in 18 seconds, and a 1800 kg weight. Member Randy Holmgren's advertised price is \$15,500 (Cdn) for the vehicle that has been driven 16,000 km since its 1992 conversion.

EAA August Newsletter, CURRENT EVENTS, was obtained by a FVEAA new member. This was the original parent organization for many associations. FVEAA at one time was listed as a chapter affiliate. The Illinois Not-For-Profit Act that governs our charter prohibited continued association. The FVEAA was dropped. (Any FVEAA member wishing to join the EAA as an individual may call me for a membership application. Annual dues are \$ 35 - Ed).

KITS AND COSTS

The following three pages were extracted from the book - Build Your Own Vehicle by Bob Brandt. It is available from Tab Books (McGraw Hill) for \$ 16.95. These pages discuss the component 1992 costs quoted by KTA Services, list available kits, and compare conversions.

Figure 4-23 shows you an actual quote provided from one of the established, long-time suppliers—KTA—in mid-1992. (KTA's address and phone number have since changed; check their new listing in chapter 5.) Notice the KTA quote is dominated by four items: motor, controller, charger, and the costs of making a custom motor-to-ve-

~~K~~T A SERVICES

12531 BREEZY WAY
ORANGE, CA 92669
714/639-9799

July 27, 1992

Thanks for the opportunity to furnish an EV components quotation on your 1983 Mazda RX-7 conversion. We'll assume that the vehicle will be using a 108-volt battery system comprised of 18 ea. 6-volt batteries with L-posts. Top speed should be about 70+ MPH, and maximum range would be 50-65 miles. The components recommended are listed below, and are the same as our California certified Kit #4:

DESCRIPTION	PRICE	DELIVERY	REMARKS
PROPULSION MOTOR & ADAPTER:			
ADVANCED DC #FB1-4001 SERIES-WOUND MOTOR & DRAWING	\$1500 00	1 WEEK	
PROTOTYPE EVCC ADAPTER PLATE, COUPLING, AND HARDWARE KIT	650 00	2-3 WEEKS	FURNISHED BY EVCC
EVCC 9" CRADLE MOTOR MOUNT WITH 4" X 8" BASE PLATE	150 00	IN STOCK	PROTO. CROSS-MEMBER REQ D
TOTAL MOTOR & ADAPTER	2300 00		
MAJOR PROPULSION COMPONENTS & INSTRUMENTATION:			
CURTIS-PMC #1221B-7401 MOTOR CONTROLLER & MANUAL	\$ 750 00	IN STOCK	
CURTIS-PMC #PB-6 POTBOX	60 00	IN STOCK	
ALBRIGHT #SW-200B MAIN CONTACTOR	130 00	IN STOCK	
BUSSMAN #KAA-400 SAFETY FUSE	22 00	IN STOCK	
GENERAL ELECTRIC #TQD-200 MAIN CIRCUIT BREAKER	110 00	IN STOCK	
BLACK PLASTIC SWITCHPLATE & MOUNTING HOWE. FOR #TQD-200	20 00	IN STOCK	
SEVCON #622-11014 13.5 VOLT/25 AMP DC-DC CONVERTER	420 00	IN STOCK	REPLACES AUX. 12-V BATTERY
KTA SVCS #V50150-914 DUAL-SCALE VOLTMETER	60 00	IN STOCK	
KTA SVCS #A500-50 DUAL-SCALE AMMETER	40 00	IN STOCK	
DELTEC #MKA-50-50 AUXILIARY CURRENT METER SHUNT	17 50	IN STOCK	
DELTEC #MKB-500-50 PROPULSION CURRENT METER SHUNT	22 50	IN STOCK	
ROTARY SELECTOR SWITCH & KNOB FOR METER SELECTION	7 50	IN STOCK	
CURTIS INST. #900R-108-BN BATTERY FUEL GAUGE	225 00	IN STOCK	OPTION TO KIT #4
AUXILIARY WIRING 10-POS. 25 A. BARRIER STRIP	10 00	IN STOCK	
K & W ENG #BC-20 ONBOARD BATTERY CHARGER	550 00	IN STOCK	
PHILLIPS #RLY8845F CHARGER INTERLOCK RELAY	15 00	IN STOCK	
48 FT #2/0 AWG CAROL ULTRA-FLEX WELDING CABLE	172 80	IN STOCK	
54 #54111 THOMAS & BETTS #2/0 x 3/8 WELDING CABLE LUGS	182 00	IN STOCK	
8 FT. HEAT SHRINK TUBING	15 00	IN STOCK	
WIRING DIAGRAMS, INSTALLATION INSTRUCTIONS, TAX CREDIT KIT	50 00	IN STOCK	INCLUDES BOOK 'CONVERT IT'
COMPLETE SET OF VACUUM RESTORATION COMPONENTS	303 00	1 WEEK	OPTION TO KIT #4
TOTAL COMPONENTS	3162 30		
TOTAL MOTOR & ADAPTER	2300 00		
8.25% CA SALES TAX - EXEMPT PER TAX CODE SUBDIV (b), SECT 6356.5	0 00		
FREIGHT & INSURANCE	0 00		PICKUP XMSN/FLYWHEEL/ETC. APPROX. 8/9. DELIVER COMPLETE KIT APPROX. 9/19.
TOTAL KIT #4 ORDER	5462 30		

The above quotation covers all the major components except for the batteries and a few minor things. Additional components are needed to restore vacuum if the vehicle has power brakes. Also, battery 'fuel gauges' are available as an option, as is the LB-20 booster for 114 or 120 volt systems. Prices shown here will be in effect for 60 days.

With kind regards,

Ken Koch

Ken Koch - KTA Services
KTAMEM175 WRI

hicle adapter. Notice also that the professionals at KTA tell you what performance you can expect from what you get, when you're going to get it, how much it's going to cost, and how long the quoted prices are valid. Be sure you get the same information, in writing, out of any supplier you choose.

Figure 4-24 shows the several kits KTA offers, each capable of powering different vehicle weights. Again, KTA gives you the performance you should expect per weight classification. It also points out that these kits are exempt from the California State sales tax and qualify for a California tax credit of \$1000 after being installed and inspected; you might have the same or similar savings available in your state, so check it out. From the KTA kit list, it should be apparent that you will mostly be interested in the two largest kit options, for powering vehicles up to 4000 and 5000 pounds, respectively. The largest kit—with the 22-hp dc motor—was the basis for the quote of FIG. 4-23 and the analysis of TABLE 4-4.

KTA SERVICES
 12531 BREEZY WAY
 ORANGE, CA 92669
 714/639-9799

AVAILABLE NOW...5 CERTIFIED PURE ELECTRIC VEHICLE RETROFIT/CONVERSION KITS

That qualify for the California State \$1000 tax credit and sales tax exemption...a savings of up to \$1433!

- KIT NO. 1:** For 2, 3, or 4-wheeled vehicles up to 1500 lbs. with optional electrical reversing if no transmission is employed. May be used on any motorcycle or small custom kit car of 1992 manufacture or older. Suitable for propelling 500 to 1500 lb. vehicle at speeds up to 55 MPH **Basic Kit \$2450**

- KIT NO. 2:** For 3 or 4-wheeled vehicles up to 3000 lbs. with optional electrical reversing if no transmission is employed. May be used on any custom kit car, compact passenger car, or compact pickup truck of 1992 manufacture or older. Suitable for propelling 1000 to 3000 lb. vehicle at speeds up to 50 MPH..... **Basic Kit \$3450 to \$4250**

- KIT NO. 3:** For 3 or 4-wheeled vehicles up to 3300 lbs. May be used on any custom kit car, compact passenger car, or compact pickup truck of 1992 manufacture or older. Suitable for propelling 1000 to 3300 lb. vehicle at speeds up to 85 MPH..... **Basic Kit \$4450**

- KIT NO. 4:** For 4-wheeled vehicles up to 4000 lbs. May be used on any custom kit car, passenger car, or pickup truck of 1992 manufacture or older. Suitable for propelling 1000 to 4000 lb. vehicle at speeds up to 85 MPH..... **Basic Kit \$4950**

- KIT NO. 5:** For 4-wheeled vehicles up to 5000 lbs. May be used on any full-sized passenger car, full-sized pickup truck, or mini-van of 1992 manufacture or older. Suitable for propelling 2000 to 5000 lb. vehicle at speeds up to 85 MPH..... **Basic Kit \$5250**

Kits do not include price of batteries, which can be purchased from a local battery supplier at a system cost of between \$200 and \$1300, depending on battery type and number. All *complete* kits are exempt from California State sales tax, and qualify for the State tax credit of \$1000 after being installed and inspected in a *pure* electric conversion or retrofit. All kits delivered or shipped in Southern California *free of charge*....an additional savings of up to \$100!

4-24 KTA Services kit offerings.

TABLE 4-4 adds the pickup truck chassis and battery costs to the FIG. 4-23 quote (the *Typical* column); shows what savings you might expect with a used and older chassis (the *Economy* column); and shows what extra costs to expect when using the latest new chassis and a few extra bells and whistles (the *High or custom* column). The

Table 4-4 Electric vehicle conversion costs compared

Item	Economy	Typical	High or Custom	Percent Allocated
Chassis	\$1500	\$3000	\$10,000	28 - 31 - 57
Pickup truck	Earlier model used	Late model used	Latest year new	
Motor adapter plate	\$400	\$800	\$800	8-8-4
Custom	Local or do-it-yourself	Professionally done	Professionally done	
Motor	\$800	\$1500	\$1500	15 - 16 - 10
Advanced dc 22 hp	Used	New	New	
Controller	\$400	\$750	\$750	8 - 8 - 4
Curtis PWM	Used	New	New	
Wiring & components	\$600	\$1850	\$2500	12 - 19 - 14
Switchers, meters, wire	Used	New	New	
Battery pack	\$1200	\$1200	\$1200	23 - 12 - 7
20ea 6 volt lead-acid	New	New	New	
Charger	\$300	\$550	\$800	6 - 6 - 4
120V, 20A, onboard	Used	New	New	
Total	\$5200	\$9650	\$17,550	100

amounts you might obtain for selling off the internal combustion engine components were omitted from the comparisons; you can expect the vehicle costs to be lower if you do sell them. The *Typical* column summarizes the 1987 Ford Ranger pickup EV conversion of chapter 11.

CONVERSION FOR FUN & PROFIT

Darwin Gross drew a picture of a two-seater sportscar EV on a napkin over lunch one day and said, "You could sell that for \$4995." My own scribbling on the napkin (aluminum tubular frame, plastic body, thin/hard tires, no power steering, heater (fabric top optional), motor, controller, batteries, etc.), led me to a more sedate \$9995. I'm talking about a TR3-sized sportscar that could whip a TR3 ala Bertone's Blitz—a mouth-watering idea. In thinking more about it later, if a person applied the Dr. Paul MacCready technique and optimized on cost, such a vehicle is not only energy efficient and high-performance, but very reachable. Think of it as a "poor man's Impact." And if a MacCready-style team was brought together to accomplish it, you'd have a working model on the streets within a year or so. Somebody's going to make a lot of money on this, or something just like it . . . you heard it here first.

COOPERATIVE CONSTRUCTION

Member Munroe's cooperative construction project has been discussed at the last two FVEAA meetings. His imaginative proposal has several attractive features:

1. It provides the up-front financing necessary to purchase conversion components and get the project started..
2. It provides an opportunity for instruction of FVEAA members who wish to undertake a project but are not sure of their abilities. Members who have completed individual projects can share their knowledge and provide guidance during conversion.
3. It provides a means for members who purchase project shares to recoup their initial investment.
4. After conversion completion, someone will end up owning and using an EV.

There was a discussion at the last meeting about financial arrangements. Persons attending responded to questions as follows:

1. Willing to contribute \$ 100? - 13
2. Willing to put in up to a a maximum of 200 hours on the project - 13
3. Will serve on the project committee - 6
4. Prefer a raffle of completed car - 1
5. Prefer a bid sale - 11
6. Willing to pay for the completed car:
 - \$5-6.000 - 4
 - 6-7000 - 5
 - 7-8,000 - 1
 - > 8,000 - 2

Member Steve Marshall who is converting a Dodge pickup at a community college gave members the idea of using a similar facility for the FVEAA project. Discussion of this idea elicited a proposal that, to make the project acceptable to a college, the FVEAA develop and EV conversion course. The FVEAA project conversion work at the sponsoring college automotive technology shop would be part of the course lab work.

This idea needs further consideration. Questions to be addressed include:

1. What textbook would be used ? There are a number of EV conversion books already published that could be considered.
2. Who will prepare and teach the course? This includes quiz and examination tests. What classroom materials and aids are needed ? Can the course be completed in 13 weeks, the normal college schedule ?
3. What course fee should be charged ?
4. Who will oversee tool use in the lab?
5. Can we find a sponsoring college ?

It was decided to include a questionnaire in the October Newsletter to solicit opinions of all FVEAA members. Our membership rolls include 21 out-of-state members who probably cannot participate in the project, but whose opinions will be valuable.

Please complete the project survey on the next page and return it to Ken Woods.

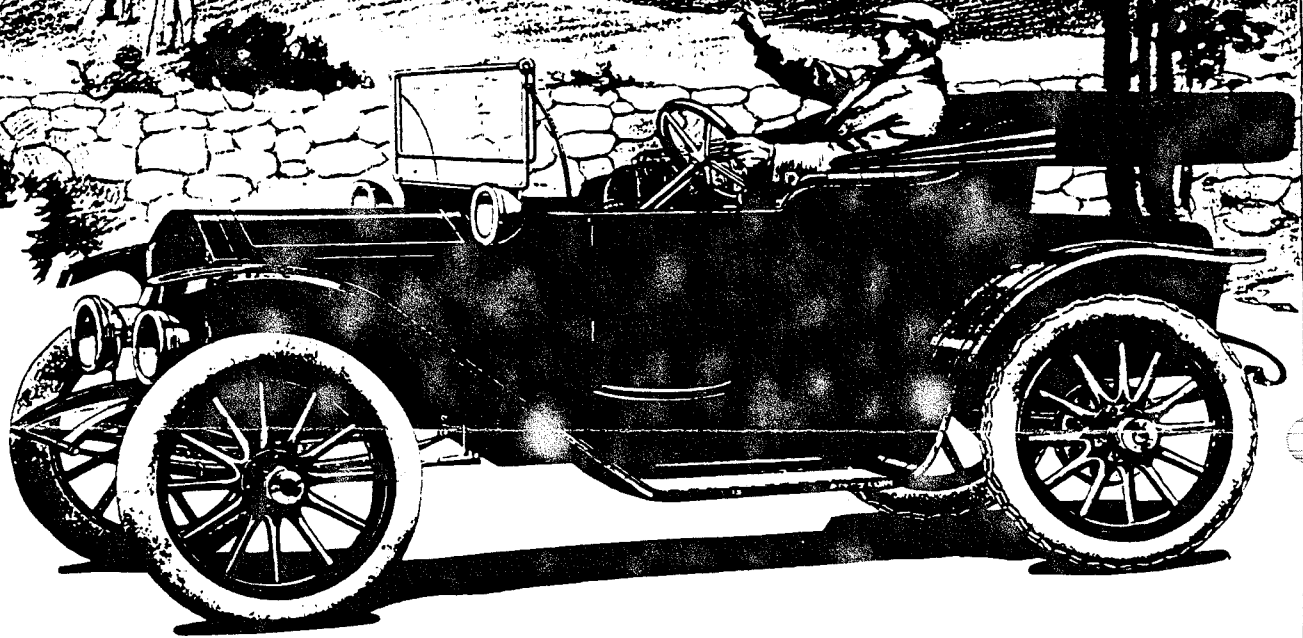
FVEAA COOPERATIVE CONVERSION PROJECT QUESTIONNAIRE

1. Do you favor the FVEAA project as described in the last two Newsletters? Y N
2. Should the FVEAA seek a sponsoring community college? Y N
3. Are you willing to buy a \$ 100 share to provide project financing? Y N
4. Would you buy a \$ 200 share ? Y N
5. Should share purchases be limited to FVEAA members ? Y N
6. What make, model, and year car would you like to see converted ?
Make _____
Model _____
Year _____
7. Do you prefer a raffle among the shareholders for the completed car? Y N
8. Do you prefer an auction among the shareholders for the completed car that will provide for a return of the initial financing? Y N
9. If 8 is marked yes, should extra money after share refunds be left with FVEAA? Y N
10. If 8 is marked yes, are you interested in bidding on the completed car? Y N
11. If 8 is marked yes, what are you willing to bid for the completed car? \$ < 5000 _____
5-6000 _____
6-7000 _____
7-8000 _____
>8000 _____
12. Are you willing to participate in the construction class? Y N
13. Should FVEAA members doing the conversion work be credited for time ? Y N
14. If 13 is marked yes, what should be their hourly credit rate < \$ 5/hr _____
 5/hr _____
 6/hr _____
 >6/hr _____

Use an extra sheet if you have additional comments or suggestions.

Return the completed questionnaire to Ken Woods
FVEAA President
1264 Harvest Court
Naperville IL 60564-8956

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