

FVEAA NEWSLETTER

JANUARY 1995

President	Vice President & Editor	Secretary	Treasurer & Librarian	Director	Director
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NEXT MEETING - January 20 at 7:30 PM
Will be in Room 1048 in the Student Resource Center at
the College of DuPage, southeast corner of 22nd Street & Lambert Road

DISCUSSION TOPICS - Sale of the FIAT and further work required for the Cooperative Construction Project.

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 or present member renewing their memberships for 1995 is \$ 15. The Treasurer's 1995 record was used the mailing of this issue.

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

FIRST CLASS



John Emde
6542 Fairmount Avenue
Downers Grove IL 60516 -2919

ADDRESS CORRECTION REQUESTED

PRESEZ.

At the January meeting World Electric Transportation 1995 Calendars by Clarence Ellers will be available for \$ 5. Also, a decision will be made on the disposal of our club FIAT. Members present will decide on the winning bid for the car over \$300 that is offered to me, either by mail or phone before January 15.

A critical path with intermediate dates for completion of various phases of the new club project suggested by Bob Munroe and his committee will be developed 1/20/95.

Ken

MINUTES OF THE 12/16/94 MEETING

The meeting was called to order by President Woods at 7:40. Twelve members attended.

The minutes were approved and the Treasurers preliminary report was accepted.

There were no floor nominations for 1995 officers. All present officers were unanimously reelected to serve another term.

The Triton FIAT was returned to the FVEAA. and is stored in Member Alcon's Downer's Grove garage. Two days before the transfer the car was vandalized in the Triton auto shop parking lot. A side and rear window were smashed. Member Oviyach commented on the car's condition. In addition to the broken windows, the grill has been damaged, the rear springs are sagging, and the transmission needs repair. Although the batteries were replaced last year, there was no visible electrolyte in many of the cells when the car was delivered.

Member Stockberger, who - with Ken

Meyers - originally converted the car, stated in his opinion the present value of the car as is would not exceed \$ 300. Usable parts include the 400 amp aircraft starter-generator, a Darlington transistor controller, the 36-volt battery charger, miscellaneous contactors and cables, and the tow bar. If these were removed and recycled into another vehicle they would have an estimated value of \$ 600-800.

Disposition of the FIAT was discussed. Members decided to sell the car to the person with the highest bid over \$ 300. A disposition will be made by members at the January meeting. (See page 7)

The Cooperative Construction Project (CCP) was discussed. The ad-hoc committee suggested that a present converted EV owned by a Member could be upgraded instead of the original project. Members present were asked if they would consider this idea for their vehicle. Member Dana has a converted OMNI and plans to convert another vehicle, using a Continuously Variable Transmission, Kranovitch would be interested in selling his kit-car URBA built on a VW Bug chassis and convert a minivan, Emde is consider selling his Subaru and convert another car, Shafer would consider replacing the 500-amp starter-generator with a series wound dc motor in his RX-7. The members rejected the alternate plan and decided to proceed with the original project.

Up-front project financing will be secured by issuing Certificates of Participation. Information is shown on pages 9 & 10.

The meeting was adjourned early at 9:45 due to the holiday season.

Dave Aarvold
Secretary

THE COST OF DRIVING ONLY A CONVENTIONAL CAR

The next time you pull up to the gasoline pump you probably will notice the cost of fuel has gone up 5-7 cents. The increase is due to the cost of producing reformulated gasoline. The use of this fuel in regions not in compliance with air quality requirements was mandated by the provisions of the 1990 Clean Air Act. The change will be costly.

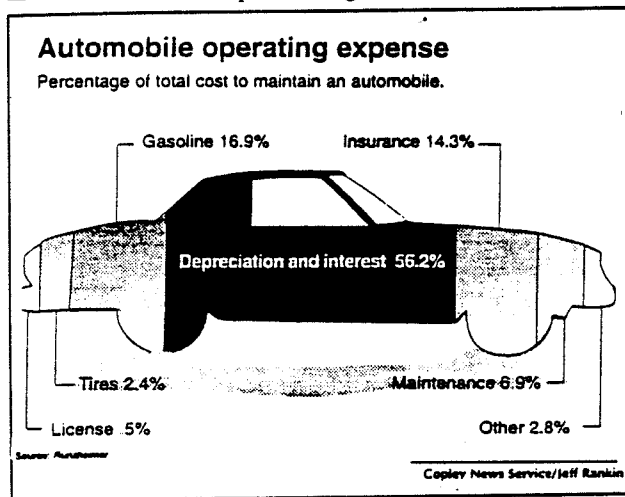
No rational businessman would ever try to market a product that was less effective and cost more than a something already on the market. Yet this is precisely the result of the move to reformulated gasoline. The fuel contains additional oxygen and eliminates minute amounts of certain metals that were part of the previous gasolines. Production of reformulated gasoline requires use of expensive platinum-based catalysts and expensive refining methods. The fuel may reduce the miles per gallon conventional cars achieve.

Using only a petroleum fueled car for all driving missions is costly. The accompanying illustration shows the inefficiency of a conventional car. Only about 14% of the total energy in the fuel is useful. The engine causes 62% of the energy loss.

An EV is 85-90% efficient. Power plant loss must also be considered when comparing an EV to a gasoline auto. Plant efficiencies are 30-35% which makes the electrical system 25-30% efficient. EVs and gasoline cars have about the same overall efficiency.

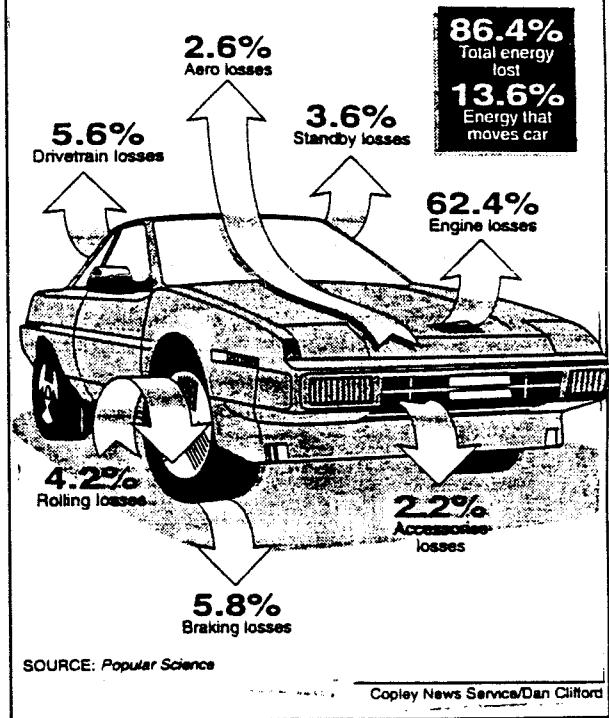
EVs are the most efficient in urban stop-and-go driving at relatively low speeds. The gasoline car has its worst performance in these situations. Using an EV for short-range trips makes sense. Save the gas car for longer driving missions.

The second illustration prepared from Runzheimer data shows that depreciation and interest is the biggest component of automobile operating expense. The long life of electrical drive components reduce the depreciation. EV simplicity also will reduce the 7% maintenance cost component of gasoline cars.



What a waste

Very little of the energy produced by the gasoline your car burns actually goes to move the car — only 13.6 percent. The whopping majority of the energy is lost. Here's where it all goes:



These two factors highlight the desirability of marketing the advantages of EV ownership and use. The perennial question of "How far will it go?" turns off most persons looking at an EV. The economy of EV ownership and use within its capabilities can be emphasized.

William H Shafer
January 6, 1995

RECENT EV ARTICLES

EVs Could Be Light Years Away From Mass Production. Daily Herald Sunday Oct 22, 1994 - Page 4 (Reuters)
While cars were on display in the Providence (RI) Convention hall, a meeting in an upstairs conference room said they expected mass production is some time away. Robert Stemple noted "We're not getting the performance in below-freezing weather. New designs are required." James Ellis, GM's EV program manager stated the best lead-acid powered EVs can travel 60-80 miles before recharging, and they have no heat. These views were challenged by David Freeman, the New York Power Authority CEO who said, "Get out and sell those EVs, they will sell."

New Technology is Overcoming EV Obstacles. Chicago Tribune 11/13/94 (Auto Letters)
John Maxon, ComEd's EV Coordinator, noted that EVs will become more acceptable as auto owners become more aware of the environmental costs of conventional car driving, - even with EV range limitations.

Solar Sailing. Chicago Tribune 10/23/94. Persons who wish to cruise the waterways quietly can purchase a solar powered boat, the Dolphin-Star for about \$ 25,000 from Sun-Wize. The twin-hulled catamaran carries four passengers at 13 mph, which is about twice the speed of average sailboat. Solar cells are encapsulated in a skid-resistant plastic skin. Energy storage is also provided by gel-cell batteries. They are also investigating the possible use of their propulsion system as auxiliary power for conventional sailboats.

Solar Car Breaks the Australian Cross-Country Race Record. Chicago Tribune (Page and date uncertain)
The Aurora Q-1 broke the speed record for the Perth-Sydney race. The car travelled the 2,485 miles at an average 31 mph speed for the 8-day race. In 1982 the previous race took 20 days to complete. About sixty businesses contributed the \$ 375,000 for vehicle design and construction.

Hybrids Take Center Stage in Detroit. IEEE Spectrum, September 1994, Page 14. Forty vehicles were entered in The Hybrid EV Challenge: 16 were Ford Escorts, 12 were based on a Saturn, and 12 were purpose designed as hybrids. The Escorts and purpose-built cars were series type range-extendors with small engine-generators. The Saturns were a power-assist type with both the engine and electric motor connected in parallel to the driveshaft. Range extendors were found to be about 46% more effective in the range test.

America's Auto Future May Lie in Hybrid Cars. Kane County (IL) Chronicle. 5/21/94, Section D Page 4
Hybrid cars have demonstrated a fuel economy of 60-90 miles per gallon and have very low exhaust emissions. Volvo hybrid design uses a turbine to drive a generator. On battery power the car goes 0-62 mph in 23 seconds and has a range of 53 miles. With the turbine-alternator engaged, the car goes 0-60 in 13 seconds and has a 400 mile range.

It's a Small-Car World. Autoweek, 12/26/94 Page 6. Electric cars exhibited at the 12th EV Symposium at Disneyland in December included Ford's new concept car, the EVent that is an electric minivan. Also shown were Solectria's Sunrise, a \$ 20,000 car with a carbon-based fiber body; a Peugeot 106 model EV that sells for \$12,000 in France that also requires a \$100/month battery rental payment; Electric Car Co of Everson WA exhibited a mock-up of its \$ 30,000 MI-6, Renaissance Cars in FL showed a 23-seat sports car that carries a \$ 20,000 price tag; US Electricar exhibited its converted Chevy S-10 pickups and Geo Prizms.

Chrysler Corp Rolls Out First Safety-Certified EVs. Chicago Tribune. Date and Page unknown.
Chrysler has produced 50 Dodge Caravan electric cars that are the nation's first to be safety certified. The vans are being distributed to various utility companies around the country for an extensive evaluation of practicality, reliability, troubleshooting, and development.

Here Come The Electric Cars. California wants them, Detroit doesn't. Environmental Magazine Aug 94.
Ford's Ecostar, GM's Impact, Chrysler's Electric Caravan, and several other EV's are currently being test-driven in California prior to the 2% Zero Emission Vehicle (ZEV) mandate for 1998. This is seen as a solution for the 8-million cars in the Los Angeles Basin that daily emit 1,246 tons of noxious pollutants. The Big Three believe consumers will not buy the limited performance electrics and that development money spent on these vehicles will be wasted.

Its The Battery, Stupid

Popular Science February, 1995 Page 62

This article examines the realities of the California EV mandate and battery capability. The CA Air Resources Board (CARB) required that starting in 1998, 2% of all vehicles sold must be Zero Emission Vehicles (ZEV). Only battery powered EVs can meet this requirement.

The regulation may end up leaving environmental regulators with a black eye because available batteries will not meet requirements. EVs marketed in 1988 are likely to be conversions of gasoline vehicles currently selling for about \$30,000.

The law does not require buyers to purchase EVs. With their low single-charge range buyers are likely to pass EVs on dealer lots. A sales failure could end up permanently turning off EV interest.

The article points out the ZEV regulation was responsible for a large amount of EV and battery research. It questions if this is the proper to encourage technological progress.

The final paragraphs of the article have been pasted-up in the following columns.

Even Stempel, whose background includes involvement in the GM solar-powered Sunraycer and the GM Impact EV projects, is leery of CARB's ZEV policy. He says "While I believe in electric vehicles, the California sales mandate dictates electric vehicle technology and eliminates other possible solutions."

The ZEV category was conceived from the outset to include only battery-electric cars. Internal-combustion engines modified to burn hydrogen, for example, could have trouble qualifying as ZEVs because their exhaust contains minuscule amounts of burned lubricating oil. Fuel cells, other than those fed by pure hydrogen gas, may also run afoul of the mandate. Is this any way to encourage technological progress?

Engineers unencumbered by politics and ideology approach the problem of developing low-pollution vehicles in an entirely different way. The number one question a methodical engineer asks is, what's the most practical energy source for clean vehicles? One environmentally unfashionable, but inevitable, answer: Don't overlook petrochemicals.

Much of the original excitement about electric vehicles was sparked by energy-efficient engineering specialists like Paul MacCready of AeroVironment Inc., who headed the team that developed the GM Sunraycer car and the brisk-performing GM Impact prototype.

It's ironic that MacCready argues against battery EVs as a marketable alternative for today's family car. He offers an illuminating perspective on the usefulness of chemical fuels. A rubber band, he notes, can store sufficient mechanical energy to lift its own weight one-half mile. A lead-acid battery stores enough energy to lift itself

ten miles. A quantity of gasoline, however, can lift its weight 1,000 miles. MacCready observes that even a threefold increase in the energy density of lead-acid batteries—which nobody is promising—would still make them only 1/33rd as good an energy-storage medium, pound for pound, as gasoline.

MacCready and many other engineers view high-energy-density liquid chemicals such as gasoline and diesel fuel as the most practical propellants for a cleaner future. Burned at a miserably rate by hybrid vehicles (see "Emerging Technologies for the Supercar," June '94) with small, constant-speed piston or turbine engines powering electric drivetrains, these chemicals may make better environmental sense than a symbolic fleet of underachieving battery-powered cars.

The illogic of California's ZEV mandate requires manufacturers to build electric cars, but nobody is obliged to buy them. And despite CARB's EV boosterism, there's very little convincing evidence that many people actually want to own an electric vehicle. The result could be dealer lots filled with rows of unsold battery-mobiles.

Robin Segal, a doctoral candidate at the University of Pennsylvania's Wharton School of Business, published a study last year based on questionnaires completed by 662 California residents who were asked about their attitudes toward purchasing electric, natural gas, or gasoline-fueled vehicles. "In market simulations run using vehicles described by representatives from the electric utility industry as well as from the American automobile industry, the electric vehicle market potential will not exceed about one percent," the study concludes.

CARB, and the regulatory agencies of other states, err when they use the term ZEV. No vehicle—other than perhaps the bicycle—operates without some impact on the environment, whether during its manufacture, operation, or ultimate disposal when worn out. "Zero emissions" is a label born of politics and junk science that should be immediately retired.

Government owes the public straight talk about the realities of emerging transportation technology. And it should stick to mandating results, not commanding inventions of its own choosing. As a maxim attributed to NASA engineers during the early days of the space program says: "There's no such thing as a scheduled breakthrough."²⁵

EV supporters should read the entire article. Spend a couple of bucks for a newsstand copy or go the public library. Those who believe the way to get EVs rolling is a governmental mandate should consider the consequences of a failure if the Evs don't sell.

Editor

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FAX TRANSMISSION COVER SHEET

Date: January 7, 1995
To: Popular Science (Readers Talk Back)
Fax: 12124818062
Subject: It's The Battery, Stupid - 2/95 issue article on P 62
Sender: William H Shafer - FVEAA Vice President

Stuart Brown's article provides a realistic assessment of EV prospects. No rational company would try to market a more expensive product that has less performance than existing merchandise. Irrational regulators are attempting a similar outcome by mandating ZEV's. This is not the way to gain EV acceptance.

The immutable physics of electrochemical energy storage will limit economical EVs to a single-charge range of about 40-60 miles in urban driving. If these are lemons, then proponents should make lemonade by pointing out that an EV can be a useful, economic transportation **TOOL**. When used within their capability, and with opportunity charging, EVs can fulfill over 50% of all driving trips. EV's are most efficient in urban stop-and-go driving; the gas car is poorest in these situations.

The long life of electrical drive components reduce the depreciation and interest expense of car ownership which accounts for 56% of auto operating expense. If an individual recycles and converts a vehicle he can expect a typical project cost of \$7000 and vehicle life of 15 years. Using an EV means less frequent visits to an auto dealer for an expensive new car.

EV Associations, such as the FVEAA, may be found throughout the US. They can assist anyone who does not want to wait for a Detroit EV (Or Peugeot - Page 11).

FROM OTHER EV NEWSLETTERS

AVEA (the Aussies) in their November Newsletter reported on use of an Israeli-developed Zinc-air battery in 50 test vehicles for the German Post Office. The battery system uses replaceable zinc anodes. Batteries are mechanically rechargeable in just one minute. Each charge will move the vehicle 250-300 Km. Under moderate use conditions the electrode has an estimated useful life of 1800 cycles (9000 hours). The calculated battery ownership and recharging costs will come down to 7 cents per km for 10,000 vehicles and will drop to 4.5 cents for 100,000.

The Eastern Electric Vehicle Club (EEVC) in their November Newsletter reports that Motorola has a new IGBT module, the Arrow part No MHPM400A60M. It is a 600V/400A half bridge with a 10 microsecond short-circuit capability. Further information can be obtained from Dave Hooser at Motorola, 5005 East McDowell Road, Phoenix AZ 85062-2953, phone (602) 244-5517.

The cover of their December Newsletter contains a photo of Soleletria's new Sunrise exhibited at EVS-12. The issue has an article on EV safety considerations authored by Bob Batson and Michael Beebe.

The Southern California group (EVAOSC) November Newsletter reports their October meeting featured Dr William Brecht, Director of Research for the Trojan Battery Company. He noted a production facility for their bipolar battery is about 18 months from pilot-plant operation and 4 years from commercial availability. In the lab this battery has demonstrated 50 wh/kg, about 3 times that of the conventional lead-acid battery. The issue also lists 26 opportunity charging locations in California.

Their December issue has two photos of AC Propulsion's 1994 Civic Hatchback conversion that features a trailered hybrid module. Inside are many photos of the EVs exhibited at EVS-12.

The Sacramento EV Association (SEVA) October Newsletter contains an article by Scott Perry that describes the options for a minimalist or niche vehicle that would meet his daily 21-mile commute from home to work. Tony Cygan had a short article about design considerations for his Yellow Porsche project.

Great Lakes Electric Auto News (GLEAN) November/December Newsletter was an impressive 30-page document. They announced formation of "ELECTRICORE", an Ohio not-for-profit consortium for EV development. It has 52 participants located in 18 states. Chrysler will use the Horizon battery in their NS-series Electric vans. GM-Delco is forming Delco Propulsion Systems (DPS), a new business unit that will bring together Delco, Allison Transmissions, and Delco Electronics. DPS will be based in Indianapolis. The issue also contains a description of Michael Orr's conversion of a 1986 Fiero. Computer-literate EV persons can now log on to the Internet for an EV discussion group using the Internet address - EV@SJSUVM1.SJSU.EDU. 2500 copies of this newsletter were mailed.

The New England EV Group (NEEAA) October Newsletter contains a 1980 article about construction of a hybrid version of a VW Bug by Peter Teague. A lawnmower engine was used for the project.

The Vancouver EV Association (VEVA) October Newsletter describes progress in the VEVA Electrathon Canada Project. VEVA has constructed a demonstration prototype. VEVA has developed a "Kit" that includes a motor, controller, potbox, disconnect, fuse assembly, meter with shunt, two batteries, cables and terminals, and a charger.

World Electric Transportation (WET - Clarence Ellers) October Newsletter reports on the GM-Ovonic partnership expected to supply nickel-metal hydride batteries for EVs.

The November Newsletter was mostly devoted to a preview of EVS-12 in December. Clarence exhibited his hybrid-electric car.

The Michigan High School Electrathon Competition sent the FVEAA a copy of their November Newsletter in which information is being supplied to 30 high schools expected to enter the 1995 event.

Events

Environmental Vehicles '95 Conference January 23-25 at the Hyatt Regency in Dearborn Michigan Technical sessions, tutorials, exhibits, and policy discussions Sponsored by SAE and The Association of Graduate Engineers at the University of Michigan Registration fee \$ 245 for non-members. Information from ESD, 100 Farnsworth, Detroit MI 48202. Phone (800) 589-9907.

Society Of Automotive Engineers (SAE) 1995 Meeting. February 27-March 2 at Cobo Center in Detroit MI. EV technical papers For information call (412) 776-4920.

American Tour de Sol 1995 Race. May 20-29 beginning in Waterbury CN and ending in Portland ME Sponsored by Northeastern Sustainable Energy Association (NESEA) Five categories of cars; Production, Commuter, Solar Racing, Mass Transit, and Open. Pre-registration fee \$40. Registration \$400 for car entry Information from NESEA at 50 Miles Street, Greenfield MA 01301, phone (413) 774-6051 or fax (413) 774-6053.

Arizona Public Service (APS) EV Race at Firebird International Raceway in Phoenix AZ March 3-5. For information call (602) 250-2265.

Cleveland Electric Formula Classic at Cleveland's Burke Lakefront Airport July 21-23, for Formula Lightning cars Information from Kevon Makell, Phone (216) 447-3552.

THE FIAT IS BACK AND WILL BE SOLD

The 1975 Fiat has been returned to the FVEAA by Triton College. Two days before the transfer, the car was vandalized in the Triton automotive parking facility. The rear and one side vent windows were smashed.

At the December meeting attending members discussed the value of the car in its present condition. The difficulty and expense of glass replacement devalues the vehicle. The car performance limitations and deficiencies reported by John Newton were published in the December Newsletter. Member Ray Oviyach noted he found repair parts for this car are almost impossible to obtain. The battery was replaced last year. The consensus was that the primary value was the 400-amp aircraft starter-generator, the transistorized controller, the battery and cabling. If these items were removed and recycled to another vehicle they would have an estimated value of \$600-800.

The members decided to sell the Fiat **AS IS** to the person with the best bid exceeding \$ 300. These bids should be mailed or phoned to President Woods (708) 420-1118 before January 19. Purchase offers will be reviewed during the January 20th meeting and the winning bid selected by the membership. The car is presently stored in Member Toulors Alcon's garage in Downers Grove. If you wish to arrange an inspection of the car you may phone him at (708) 963-5359.

TAKE ADVANTAGE OF THIS OPPORTUNITY TO ACQUIRE THESE EV COMPONENTS (AND CAR).

COOPERATIVE CONSTRUCTION PROJECT LAUNCHED IN JANUARY

FVEAA members at the December meeting decided to proceed with the Cooperative Construction Project. This was first suggested by Member Bob Munroe in August and an ad-hoc committee was appointed to study his proposal. Their progress reports were discussed at each of the four remaining meetings in 1994. In December members decided to proceed with a project to convert a car in John Emde's plant in LaGrange. The major component requirements were listed in the August newsletter. Commercially-available components will be used; these include a series-wound DC motor, Curtis or equivalent controller, golf-cart style batteries and a commercial charger.

The purpose of the project is to give FVEAA members an opportunity to work together on a car conversion and become familiar with steps involved in the design and construction under the guidance of members who have converted a vehicle. No new technology will be used for this first project although there are several attractive options, such as a brushless DC motor, that may be later applied to an individual project or employed in a second club project, depending on the results of the first effort

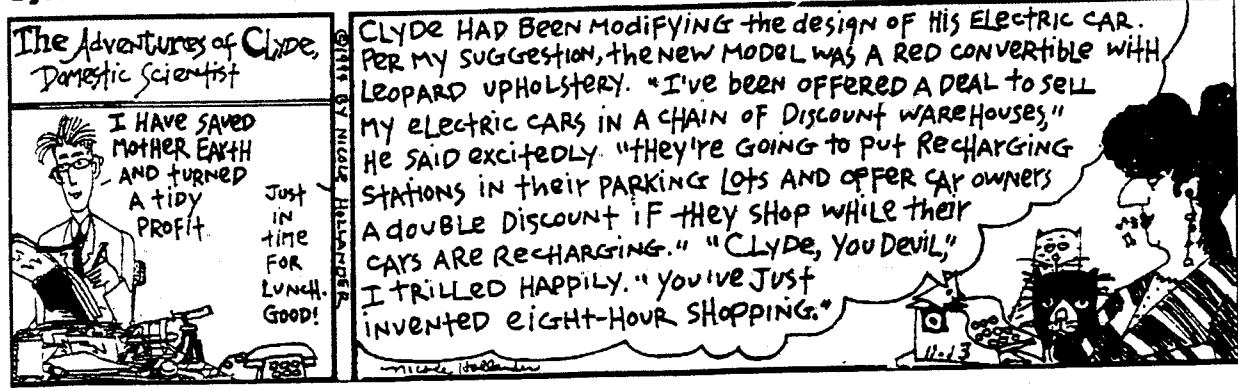
Financing is the first needed step. FVEAA members and others will be invited to each contribute \$ 100 for a Participation Share in the project. An estimated \$ 4-5000 will be required to start the project (obtain a car and purchase the major components). Members set March 15th as the deadline date to see if sufficient Participation Shares are purchased to allow the project to proceed. A sample Certificate is reproduced on the back of this Newsletter page. Those wishing to support this project should sent their \$100 check for each Participation Share to Treasurer Corel. A validated Certificate will be promptly returned.

It is estimated the work will require about 4 months. The ad-hoc committee plans to develop a project preliminary schedule and set up a timekeeping and accounting system.

THE FVEAA WILL APPRECIATE YOUR SUPPORT OF THIS VENTURE.

by Nicole Hollander

Sylvia



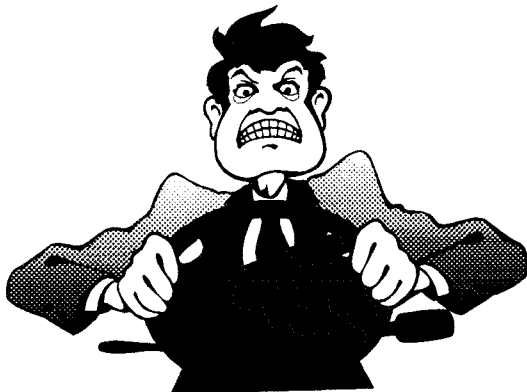
FOX VALLEY ELECTRIC AUTO ASSOCIATION INC.
CERTIFICATE OF PARTICIPATION

CERTIFICATE NUMBER _____ ISSUED _____

THIS CERTIFIES THAT _____
HAS CONTRIBUTED \$ 100 TO THE FOX VALLEY ELECTRIC AUTO
ASSOCIATION FOR ONE PARTICIPATION SHARE IN THE 1995
COOPERATIVE CONSTRUCTION PROJECT.

TERMS OF PARTICIPATION

1. The purpose of the project is to provide an opportunity for FVEAA members to gain experience in the conversion of a petroleum fueled car to an electric battery-powered vehicle. Members who have completed a conversion will direct the work.
2. Funds raised by participation shares will be used to purchase a car and conversion components.
3. The estimated project cost is \$ 7,000. The project will proceed if sufficient participation shares are subscribed by March 15, 1995. If insufficient funds are received by this date the FVEAA Treasurer will redeem each certificate for \$100.
4. The completed vehicle will be licensed, tested and auctioned. The total conversion costs will be subtracted from the total amount received from participation shares. The remainder will be pro-rated and returned to each participant up to a maximum of the initial contribution. Any funds remaining will be retained by the FVEAA for financing future activities.



Ken Woods, FVEAA President

Dale Corel, FVEAA Treasurer

SAMPLE