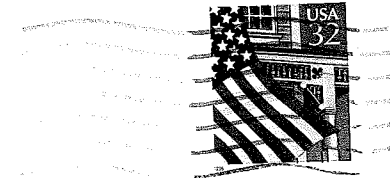


Fox Valley Electric Auto Association
1522 Clinton Place
River Forest, IL 60305-1208



John Emde
6542 Fairmount Avenue
Downers Grove IL 60516 -2919

Address Correction Requested



NEXT MEETING: Friday, July 18 at 7:30 PM in Room K-161 at The College of
Dupage SW Corner of 22nd Street & Lambert Road in Glen Ellen.

**DISCUSSION TOPICS - 1. Reconsideration of Nissan sale 2. Begin construction of a
decision tree for an EV conversion. 3. Open Topics.**

MEMBERSHIP INFORMATION

Any person interested in electric cars is welcome to join the FVEAA. The cost for a full year's dues is \$20 that will entitle the member to receive our monthly Newsletter that contains useful information about electric car components, construction, policies and events. Dues for new members joining in July will be \$ 8.

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

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JULY 1997 PRESSEZ

The Nissan conversion work is about finished. Congratulations to Bob Munroe the Project Manager, to the members who bought participation shares to finance the effort, and to members who worked on the project to produce an excellent conversion that performs well.

At the June meeting, we decided to sell the car to any member making a cash, or other suitable offer that will net the FVEAA \$4500. If a suitable offer isn't made, we will put the vehicle disposition on hold until the participation shareholders return their questionnaire.

During our "What's Next?" discussions earlier this year, the top choice was construction of a decision tree for conversion of a car to electric power. We will start this on July 20th.

KEN

MINUTES OF JUNE 20 MEETING

The meeting at the College of DuPage was called to order at 7:36PM by President Woods. Fifteen members and one guest attended. The minutes were approved and the Treasurer's report of \$ 1419.52 in the checking account and \$ 2322.42 in the savings account was accepted.

No bids were received for the Nissan so alternatives listed below were proposed:

1. Finish the punch list items because these may have a negative influence on car acceptability. The car would then be rebid.
2. Reduce the suggested minimum bid to \$ 4500 and rebid in July.
3. Advertise the car for sale in other EV organization newsletters. (Rejected)
4. Convert participation shares into \$ 20 lottery chances and hold a drawing to decide who gets the car. Other chances would be available to club members who do not hold participation shares. Three hundred chances are necessary to recover costs.
5. Redeem shares for those holders who wish a return of all or part of their holdings from the Treasury and keep club ownership of the car. Keeping the Nissan will result in increased insurance costs and administrative problems of who can garage the car and supervise its assignment. Also, the treasury is insufficient to redeem all shares.
6. Show the car at public events and sell lottery chances to the public. (Rejected because members want the future car owner to be a club member.)
7. Trade car for something of equal or higher value that would be could be more marketable. One member suggested he might be interested in trading a restored vehicle valued at \$ 4-5,000 for the Nissan.

After discussion, Ray Oviyach and Ed Meyer were authorized to have the springs replaced by Joliet Spring Co. A final work session to install new brake shoes and pads will be scheduled. These are the essential items. Addition of a heater and battery thermal management will be important this winter and could be considered later.

The final decision was to have the President poll shareholders and ask:

1. Who wishes immediate redemption of all or part of their shares? Some club members purchased multiple shares. The largest holding is \$ 1000 and several are for \$300-500.
2. Who would be willing to wait another six months to redeem their shares?
3. Who would be willing to wait one year?
4. Who would be willing to donate all or part of their shares to the Treasury?

He will also solicit shareholders comments about the suggested alternatives. A decision will be made after responses are received.

Property manager Dana Mock has a list of electric car part's suppliers, information and components he extracted from the Internet.

Member Andy Redpath discussed his nearly-complete owners manual project. Only minor revisions are needed.

Member Paul Harris suggested and will investigate the possibility of reassigning the car title and arranging an insurance policy to designate a Primary Driver.

Submitted by:

Secretary Dave Aarvold

RECENT ARTICLES ABOUT EV'S

Is there an electric car in your future? Design News, 6/23/97, Page 101. Their opinion is summarized by the lead sentence in this article. It says, "No, there will not be an electric car in every garage in the near future." The article then goes on to present their evaluations based on test drives of GM's EV1, Toyota's RAV-4EV, and the Solectria Sunrise, Force, and E-10.

Governmental mandates may be pushing EV sales, but cars now being offered will not cut it with the general buying public. The EV1 is designed to minimize every factor that reduces range, including no exterior radio antenna, wheel skirts, and a rather pinched appearance. The car's design and performance is excellent. The public rejects a lease cost based on a MSRP of about \$ 35,000.

Toyota's RAV4-EV has a more conventional appearance, a respectable performance, an air conditioner, NiMH battery, and a lease price about the same as GM's EV1.

Solectria's cars have been around for a few years and may be considered as a big garage hobby shop job. They have sold 160 cars that are \$ 35,000 conversions of a Geo Metro (\$75,000 with a NiMH battery). This car features a power selector lever at the original gearshift position and a drive system that gives good performance. The E-10 is \$ 50,000 converted Chevy S-10 pickup mostly useful for utilities. The Sunrise is the company's technological tour-de-force. The prototype has a composite body produced by a sailmaker. Performance is very good, particularly the 300+ mile range with NiMH batteries. Production models are expected soon.

A different opinion was expressed in two other articles. Playboy had an article titled "Charge It" in which they noted the rich and famous aren't snickering at the GM EV1. Carefully driven it is almost ideal for almost everyone's daily commute. The (Newly-reduced to \$ 399/month) lease price makes the car economically attractive. The story closes by saying, "As we turn the corner into the next century, one thing is certain. The cars of tomorrow will be vastly different from anything on the road today - except, perhaps, the EV1.

Robert Stempel, the former CEO of GM, in an article in the Columbus Dispatch observed that EV's are inching closer to commercial acceptance but vehicle cost will have to be reduced to at least \$ 20,000. He expects the electric car "smile strategy" will spread from California and Arizona to Florida, up the East Coast, and across the rest of the country. With a NiMH battery the "range reluctance" will be diminished.

Jim Mateja, auto writer for the Chicago Tribune in a June 16 article in the business section on page 5 reported "**Ford weak on battery power.**" This is based on his evaluation of the Ford Ranger conversion. Acceleration was slow with 39 lead-acid batteries on board the 4700 pound truck and a 90 hp motor. TRop speed is limited to 75 mph. Fifteen inch tires inflated to 50 pounds that transmit every nuance of the road. Payload is limited to 700 pounds. The \$ 32,795 price tag is a distinct disadvantage. The advantage - fuel economy is equivalent to 300 miles per gallon that will provide Ford with some leeway to sell 15 mile-per-gallon gasoline sports utility vehicles that are popular and profitable.

RECENT ARTICLES ABOUT EV'S - Continued

The IEEE Spectrum in June had EV articles on page 68. They reported a research team from JPL at CalTech and USC have developed a direct methanol liquid-feed fuel cell that converts a methanol-water mixture directly into electricity. Fifty watt test cells have a measured 34% efficiency in converting chemical to electric energy. Key to the cell is a NAFION (Dupont) polymer membrane coated with a platinum-ruthenium catalyst. The drawback - the perfluorinated membrane allows not only protons to pass, but also about 10% of the methanol.

The MIT Technology Review on page 67 of their May-June Issue had an article headline, "Next Stop: The Electric Bus". Development of electric powered buses has been overshadowed by the more-glamorous GM EV1 and other passenger cars. The ills of private vehicle driving in Mexico City, Manila, Beijing, Bangkok, Cairo, and (of course) Los Angeles are chronicled. In the long run, the largest cities in the developing world cannot rely on the private automobile and the vast fleets of buses that now provide transit. The typical bus travels about 200 miles per day, wearing out and requiring replacement after three or four years of use. Buses may be the ideal platform for electric substitutes. Buses operate on fixed routes so electric buses can substitute where the route is within battery range. Battery packs can be designed for quick replacement at the end of each run. The article recommends a strategy of developing and manufacturing about 20,000 electric buses per year for sale at a competitive price.

Electric Vehicles Drive Innovations In Carmaking was the headline in the Transportation Section of The Sunday Chicago Tribune on April 20, page 20. It describes some of the manufacturing techniques used for the EV1. Many parts of made of aluminum to save weight. The frame weighs only 300 pounds. The composite material exterior panels are glued to the frame and oven-baked at 375 degrees for 15 minutes. EV1 assembly at GM's Lansing Plant is completely different from the usual assembly line. The 60 workers there essentially build the car manually with an average 45-minute stay at each work station. Once the drive system is in place, the car is driven to the next work station, impossible with a gasoline-powered car. This eliminates a long, and costly, conveyor system flanked with ranks of robots.

Toyota's Hybrid was the subject of two articles. The Chicago Tribune on May 4 reported on a test drive of the vehicle by a group of American journalists. The car will be sold in Japan this year. **The June 6 Chicago Sun-Times reported the hybrid will double fuel economy.** A 1.5-liter gasoline engine is teamed with an electric motor and a split power device in the transmission. The planetary gear arrangement varies the power going to either the wheels or the generator. When descending a hill or stopping, the engine is shut off. Both the engine and the motor supply torque during hard acceleration.

The Hartford Connecticut Courant reported Tour-de-Sol results in their May 24 issue. The event was initiated in 1989. With 40 competitors is now the largest electric vehicle race in the world. The route started in Waterbury and ended four days later in Portland, Maine. The route was chosen because it included a variety of temperatures and a varied terrain. The Kinetecar built by a student group from a Community Technical College set a new range record for hybrids by going 450 miles on one tank of gasoline and a full battery charge.

RECENT ARTICLES ABOUT EV'S - Concluded

Not One of your Big Jump-Starts is the headline of a **New York Times** article on **May 7** about the **GM EV1** program. Lowering the month lease price from \$ 549 to \$ 399 hasn't improved acceptance of the EV1 test program. Before signing a lease, GM sends an electrician to a prospective customer's house to check how to wire the \$ 1000 charger that is required. GM rejects 80% of lease applicants because it wants to keep close control of the program. Early participants tend to be EV enthusiasts who have been waiting for years for such a vehicle. By pampering a select group GM gets a lot of good press, accumulates valuable manufacturing and cost data, and creates an EV mystique. So far, GM has spent \$ 350-million on the program.

J. D. Power Associates editor John H. Rettie said the market for electric cars was bound to remain minuscule as long as cheap, plentiful gasoline is available. GM, however, is considering expansion of the program.

GM's Turbine Backup was the subject of a recent **Popular Science** article. GM and Williams International (Supplier of turbines for cruise missiles) have teamed up to develop a new auxiliary propulsion unit (APU) for hybrid-electric vehicles. It features an integral heat-recovery unit making the turbine the most fuel-efficient APU ever built. A car's fuel efficiency may be doubled with the APU. The small size is an advantage when used for hybrids.

FROM OTHER EV NEWSLETTERS

This is an off-month for EV Associations who issue newsletters on a bi-monthly basis. So far I received only three.

GLEAN (Global Electric Auto News) in their **June Executive Report** had a report on the Tour de Sol. There were 32 entries, including a 1971 Microbus conversion done by fourth through eighth grade students at Riverside School in Lyndonville Vermont. The fit & finish of many participants was top notch. A Solectria Force with NiMH batteries established a record range of 249 miles. A further report will appear in the next issue of EV News. New instrumentation checked battery charger waveforms. One looked like a square wave with a ski ramp on top; another like static with lots of energy at 120, 180, 240 and other multiples of the 60 hertz supply frequency. There were many inefficient chargers due to losses caused by these distortions.

The 1997 Michigan High School Electrathon Competition June 7th Race results posted 23 cars entered and finishing. Two entries from Lake Orion High School went 33.750 and 32.500 miles during the 1-hour competition.

VEVA (The Vancouver Group) reported their June show was a huge success. There was a 2-page report on five vehicles that participated; the Wabbit, the Zombie and Wilde EVolutions (a converted Land Rover) by E-Car; the Blue Meanie that featured a 12 speaker stereo system, and a Porsche 914 conversion by Al Godfrey.

FVEAA Nissan Conversion Project

Original proposal September 1994

The club members were behind the proposal of financing and converting a 1989 or later conventional automobile to electric operation.

After several meetings and discussions Dale Corei offered a 1990 Nissan that could be purchased at a reasonable cost. Dale also had access to a supply of 12 volt Gell Cell batteries at a very good price. He also had available an assortment of heavy cables, connectors, and volt and ammeters. With that knowledge the club voted to go ahead with the conversion of the Nissan as a club project.

Bill Shafer worked out a financial proposal to offer share certificates as a means of providing working capital. The Nissan was purchased and George Krajnovich offered his garage and equipment as a work place to remove all unnecessary gasoline items from the car to prepare it for EV conversion. V. Vana, Dick Ness, Dana Mock, John Emde, Bill Shafer, Dale Corei, (wife) Corei, Ed Meyer and Bob Munroe assisted in getting the car ready. Dave Meyer provided trailer hauling to move the car to George's garage and then to John Emde's shop.

John Emde provided design and machining for the transmission and drive motor adapter plate. The fabrication of the battery racks, support bracket for the motor and hoist equipment for fitting the motor and transmission into the motor compartment. Paul Savaleta cleaned the transmission case, and Ray Oviyach, V. Vana, Bill Shafer, Dale Corei, Ken Woods. George Krajnovich Ed Meyer and Bob Munroe worked on getting the car ready to move to Ed Meyer's location where the final work was done to get the car ready for testing.

Ken Myers and Dana Mock worked on instrumentation using some of the original dash read-outs for temperature and added a voltmeter and ammeter for voltage and current consumption. Ken Myers was working on a club built controller but couldn't have it ready for the test date so a decision was made to purchase a Curtis controller.

Work crews including Ken Woods, Bill Shafer, Ed Meyer, Dana Mock, Ken Myers, Dave Aarvold, Fred Kitch, Dale and (wife?) Corei, Ray Oviyach, John Emde, George Krajnovich, John Stockberger, Dick Ness, Scott Ortiz and Bob Munroe worked at getting the car ready.

Dana Mock and Ed Meyer designed and worked on the DC to DC converter, and the 12 volt and 120 volt battery chargers

The Owners Operating Manual preparation as been taken on by Andy Redpath and is in its final stage.

With still some items to be resolved, club members were able to test drive and evaluate the car's performance at Ed Meyers at our May 17th 1997 Meeting. Many positive comments were received after the meeting. The Car performs well and is easy to drive.

Submitted by Bob Munroe, June 24th. 1997

NISSAN STATUS AS OF 7/9/97

The rear springs have been replaced with variable-rate springs. They are designed for a battery weight 150 pounds above the present rear weight of 1377 pounds to accommodate the additional weight of future 6 or 8-volt lead-acid batteries that will replace the present gel cells. A poor connection at one of the gel cell battery 130-volt strings was located and tightened. The single-charge range is now restored to the test value of 27 miles in urban traffic.

If a member offers a cash bid of \$ 4500 or more for the car at the July meeting, the members present will probably sell the car. Other offers will be considered. Lacking this, the sale will continue to be on hold until shareholders return their survey inquiry.

THE POTRANS UNIVERSAL POWER ADAPTER

Members who acquired a POTRANS 40 Watt Universal Power Adapter that Dale Corel distributed gratis at the April 18th FVEAA meeting may require application instructions. This device has a two-pin AC input on at one end of the board. A 20% minimum output load is required. Six DC output pins are on the other end. The output voltage/current rating chart and specifications are reproduced below:

PIN CHART

MODEL NO	DC OUTPUT CONNECTOR					
	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6
	OUTPUT #1	OUTPUT #1	OUTPUT #1	RETURN	RETURN	RETURN
	OUTPUT #2	OUTPUT #1	OUTPUT #1	COMMON	COMMON	N.C
	OUTPUT #2	OUTPUT #1	OUTPUT #1	COMMON	COMMON	OUTPUT #3

OUTPUT VOLTAGE/CURRENT RATING CHART

MODEL	OUTPUT #1			OUTPUT #2			OUTPUT #3			MAX OUTPUT POWER	
	Vnom	Imin	Imax	Vnom	Imin	Imax	Vnom	Imin	Imax		Tol
	1.5V	0.5A	8A	1.5V	0.5A	1A	1.5V	0.5A	1A	1%	30W
	1.2V	0.2A	3.5A	1.2V	0.2A	2A	1.2V	0.2A	2A	5%	40W
	1.5V	0.2A	3A	1.5V	0.2A	2A	1.5V	0.2A	2A	5%	40W
	1.2V	0.1A	2A	1.2V	0.1A	1A	1.2V	0.1A	1A	5%	40W
	1.5V	0.5A	3A	1.5V	0.5A	3A	1.5V	0.5A	3A	3%	40W
	1.5V	0.5A	3A	1.5V	0.5A	3A	1.5V	0.5A	3A	3%	40W
	1.5V	0.5A	3A	1.5V	0.5A	3A	1.5V	0.5A	3A	3%	40W
	1.5V	0.5A	3A	1.5V	0.5A	3A	1.5V	0.5A	3A	3%	40W
	1.5V	0.5A	3A	1.5V	0.5A	3A	1.5V	0.5A	3A	3%	40W
	1.5V	0.5A	3A	1.5V	0.5A	3A	1.5V	0.5A	3A	3%	40W
	1.5V	0.5A	3A	1.5V	0.5A	3A	1.5V	0.5A	3A	3%	40W
	1.5V	0.5A	3A	1.5V	0.5A	3A	1.5V	0.5A	3A	3%	40W
	1.5V	0.5A	3A	1.5V	0.5A	3A	1.5V	0.5A	3A	3%	40W
	1.5V	0.5A	3A	1.5V	0.5A	3A	1.5V	0.5A	3A	3%	40W

INPUT SPECIFICATIONS

Input Voltage: 85 to 264 VAC
 Input Frequency: 47 to 440 Hz
 Input Current: 0.85A (rms) for 115 VAC; 0.45A (rms) for 230 VAC

OUTPUT SPECIFICATIONS

Output Voltage: See output rating chart
 Output power range: 8 to 40 watts
 Ripple and noise: 1% peak to peak max on all outputs
 Overvoltage protection: Short circuit protection on all outputs
 Temperature Coefficient: +/- 0.04%/°C max on all outputs

GENERAL SPECIFICATIONS

Efficiency: 65% min at full load
 Hold-up time: 16 msec min
 Line regulation: +/- 0.5% max at full load
 Inrush current: 30 amps @ 115 VAC or 60 amps @ 230 VAC at 25°C cold start
 Withstand voltage: 3750 VAC, input to output; 1250 VAC, input to GND
 Insulation resistance: 10M ohm min, output to GND
 Operating temperature: 0°C to +50°C
 Storage temperature: -20°C to +85°C
 MTBF: 50,000 hours min per MIL-HDBK-217D
 EMI requirements: Meets conduction limits of
 a. FCC 20780 Level B
 b. VDE 0871 Level A

EDITORIAL PAGE

Completion of the Nissan conversion and FVEAA experience with both the project conversion process and financial aspects has prompted your Editor to take advantage of a page available in this Newsletter issue. Here are some observations about electric cars.

There is no doubt the California Zero Emission Mandate initiated electric car commercial activities that otherwise would never have happened. GM spending \$ 350 million on the EV1 program is an example. Other companies have also expended a lot of money to develop technically advanced electric cars. Underlying the whole program is the objective of producing an electric car with a performance that resembles a gasoline car. Much work has been directed to development of a chemical storage system with a high energy per unit of battery weight or volume. This is a quixotic quest.

One gallon of gasoline stores 120,000 BTUs of chemical energy convertible to heat. A single 6-volt deep-discharge battery can store 3000-6000 BTUs of chemical energy convertible to electrical energy. The gasoline engine can convert 12,000-20,000 BTUs of energy useful for moving the car, providing air conditioning, and energy for the many amenities found in commercial cars. This is about four times the energy available from a battery.

Commercially-produced electric cars have encountered a cost barrier. Present prices exceed \$ 30,000 (Almost double this if NiMH batteries are used). The public is resisting this cost level. Commercial EV ownership takes a determined environmentalist or a wealthy individual wishing to exhibit affluence. Mass production could bring costs down, but this is a typical chicken-egg dilemma. There is another way to own and use an electric car.

Recycling a conventional car and converting it to electric drive can be a do-it-yourself project costing about \$6500. This will provide the owner with a car having a performance that will keep up with urban traffic patterns, can travel on expressways for a limited distance, and is adequate for over 80% of the usual urban driving. The annual cost of owning an electric conversion is about one-third the annual cost of owning a conventional compact car and using it for the same driving missions. Conversion cost can be recaptured with 3-4 years of use. Substituting an EV for gasoline car short-trip use makes both air quality and economic sense.

This is a marketing challenge for EV association members. Those who now have a converted electric car should work to change the way car use is perceived. The economic and environmental benefits of driving electric in a recycled and converted car should be stated at every opportunity. Never apologize for limited range. Emphasize the advantages we enjoy.

William H. Shafer
July 7, 1997