FOX VALLEY ELECTRIC AUTO ASSOCIATION NEWSLETTER FOR APRIL, 2001

NEXT MEETING: Friday, APRIL 20 at 7:30 PM in the Triton INDUSTRIAL CAREERS BUILDING, (East Campus), Room 108

DISCUSSION TOPICS: 1. Meeting schedule for the next four months. 2. Starting the Triton Project. 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 which will entitle members to receive our monthly Newsletter that contains useful information about electric car conversions, construction, news, policies, and events. Membership is not required to attend our meetings. Dues for NEW members joining in April will be $ 14

To obtain info about the FVEAA you may contact either Past-President Ken Woods or President Shafer

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PRESEZ

The Illinois Solar Energy Association will have their annual exhibit of solar energy devices and applications at the IBEW (Electrical Workers) Training Facility on May 12. Last year the FVEAA and ISEA jointly sponsored seminars and exhibits of solar energy and electric vehicles. The FVEAA has been asked to provide electric vehicles for display but this year there will be no EV seminar.

One of the reasons for no formal FVEAA participation in the ISEA event this year is because the **Triton Project** will begin the following Saturday, May 19th**.** Triton Trustees approval is expected shortly. It will require most of the FVEAA effort for the next four months.

Last year Net Gain displayed their dragster, Fred Kitch his Ford Ranger, George Krajanovich his Dodge Omni, and I brought my Mazda RX-7. Net Gain has agreed to bring their dragster. I have asked FVEAA members with working cars if they can exhibit this year. If you can attend please let Past-President Ken Woods know. He has information about this year's event and can arrange for an opportunity charge. His E-mail address and phone number are shown above.

We need at least four members at each working session. I will be getting in touch with members about helping with the Triton Project.

I recommend the FVEAA suspend our monthly Friday night meetings for the next five months. The usual Friday schedule would be replaced by a 1-hour meeting on the third Saturday, one hour before the 10 AM Project starting time. I will continue the regular issue schedule for our newsletter. We will discuss this proposal at the April meeting.

BILL

MINUTES OF THE MARCH, 2001 MEETING

The meeting at Triton was called to order by President Shafer at 7:40 PM. Ten members and one guest attended. The minutes were approved as published. There was no Treasurer's report

Gabriel Murphy, a member of Triton's Auto Tech Teaching Staff presented a discussion about the FORD R44E Automatic Transmission used in the 1996 *Ranger* to be converted by Triton Project.

He noted that auto engine life has been extended to over 100,000 miles but transmission life is still about 60,000 miles, unless proper maintenance on the unit is performed. The chief causes of failure are heat deterioration of the transmission fluid and seal wear. He noted that a vehicle with an automatic transmission should never be towed because the turning rear wheels will cause the driveshaft to rotate and generate internal heat that can destroy seals or cause fluid degradation.

The R44E is completely electronically controlled. It can handle 440-lb-feet of torque, even though none of the Ranger engines come even close to delivering this much peak torque. The unit has three shift points plus an overdrive function. Planetary gear assemblies provide the three speeds.

The engine control module governs the shifting points of six 12-volt solenoids in the unit. There is a 16-pin connector on the transmission. There is about a 6% loss in the transmission assembly that will somewhat reduce the single-charge range. The big advantage is persons not skilled in stick shift driving technique can use the vehicle.

The internal hydraulic pump pressure is 300 psi, with a minimum of 40 psi required to function. The transmission has a torque converter (This will be retained. A motor idling speed of about 300-rpm will be required).

Mr. Gabriel presented much more material not covered in this summary.

Member John Emde presented a "show-and-tell" of electrical components required for the Triton Project. In addition to the major components; motor, batteries, and controller, he had examples of 17 other components. He verified the $ 10,600 Project Budget present to Triton by listing current catalog prices for these units and the contract labor expected costs.

Member Kevin Zak gave an update of Net Gain activities. He had trophies awarded *Bad Amplitude* appearances, including the prestigious "Best Engineered Entry" at the World of Wheels. Kevin is also working with Illinois Tool Works to investigate Member Ray DeBoth's battery heater suggestion.

Past President Ken Woods reported on the ISEA annual solar event to be held at the IBEW Training Facility, 127th Street & Ridgeland Avenue in Alsip. It will be held on May 12th.

Kevin Zak noted that Net Gain still has the 1986 Mazda RX-7 available for a conversion project. You can buy it for a mere $ 450. Member Doug Mather has an 8" Advanced DC motor removed from his Fiero when he replace it with a 9" motor for better torque. He is willing to sell the motor for a concession price. Together these would reduce the cost of a conversion project.

From the notes of Bill Shafer in the absence of Secretary Dick Ness

From other EV newsletters and articles affecting EVs

DEVC, The Denver Group, in their March Newsletter, provided specifications for GM's upgraded EV-1. The cars are now all equipped with NiMh batteries that provide a constant 60 mph range of 160 miles. Energy consumption is 0.373 kWh /mile. Acceleration is 0-60 in 6.3 seconds with an average power of 104 kW. Complete data is available on the web at **http://ev.inel.gov/fop/eva/ev1.html**.

They note that the lead-acid battery industry is going to offer batteries for hybrid vehicles with a cost of about $ 100/kW and a life of 100,000 miles. Also being developed is an equalization system for individual cells during battery recharging.

They note that former FVEAA member, Dave Stensland now living in Boulder, drove to Las Vegas in his wife's new *Prius.* They attended the electric drag races.

California will now provide a $ 9000 incentive for purchase of a full-service EV.

EEVC, the Eastern Group, in their March Newsletter, featured extensive coverage of EEVC participation in the annual Physics Olympics for high school students. Highlight of the event was the competition for student-built model electric cars.

EV Circuit, The Ottawa Canadian Group in their Jan/Feb Newsletter featured a post-event inquiry about an incident that occurred at the Organization's Electrathon last June. They note that there are 100 on-the road EVs now registered in Canada. They note US registration is 1414 EVs owned by individuals. Details may be accessed on the web at **www.econogics.com/ev/evwhere.htm**.

There was an interesting account by EVC member Patrick Chen who converted a VW Jetta. He describes how the car went up in flames. The fire seems to have been started by an electrical malfunction under the dash that subsequently spread to the cables in the front engine compartment. He provided three spectacular pictures of the fire.

The issue has a description of an unusual power level meter The gauge displays voltage on a right-hand voltmeter pointer and current on the left-hand current pointer. The meter is used in a MFJ-817 Peak Reading SWR/Wattmeter that Radio Hams use to measure the ratio of transmitted power to that reflected back by the antenna. The intersection of the two pointers can be interpreted as an instantaneous power level by a calibrated background on the meter face. The meter may be built for about $ 30. Mark Brueggemann who lives in Albuquerque developed it. Details may be accessed on website **www.qsl.net/ka91lxp/ev/evgauge/evgauge.html**

VEVA, The Vancouver Organization, in their March Newsletter on the cover has a photo and description of the *Corbin Sparrow.* The vehicle cannot be licensed in Canada because it has only a single headlight. California licenses the vehicle as a motorcycle. Design changes are in the works to provide dual headlights so it may be classified as an automobile.

They report the NEDRA races in Las Vegas were partially rained out, but if you want to see log on to Bruce Parameter's website **http://members.crest.org/ev-list-archive/msg21022.html**

From other EV newsletters and articles affecting EVs – Continued

By-Wire Cars Turn the Corner. IEEE *Spectrum* April 2001, Page 68. This article describes functions that in future cars may be better done by electrical systems replacing present mechanical linkages. These include direct fuel injection, active suspension, braking, steering, throttle control, and solenoid-actuated valves in each cylinder that eliminate the current camshaft.

All of these are possible with the adoption of a 42 volt system replacing the present 12 volts. When you floor the accelerator no longer will there be an immediate response. Instead other sensors may detect a road hazard ahead or an incipient skid and change the signal. Electrical braking will allow each wheel to be individually controlled. There will be back-up hydraulic system. The first of these may be offered on the rear axle of a pickup truck. Customer reaction is uncertain.

Steering-by-wire can allow different placement of the steering wheel to increase safety. It will send signals to actuators at the corners of the car. Microprocessors at each wheel will have a number of inputs. Gone will be the hydraulic power steering pump, replaced by servo actuators.

These techniques will require a lot of well-tested software.

The May issue of Car and Driver had a description starting on Page 105 of the three vehicles developed by the Partnership for a New Generation of Vehicles (PNGV) Program. The objective of this program initiated in 1995 is to produce a 4-door, 6-passenger vehicle that will get 80 mpg.

Three development vehicles are currently being tested. The 2250 lb. ESX is the Dodge entry. Its three-cylinder engine is a 1.2-liter, 12-valve direct-injection, turbocharged, diesel developing 72HP @ 4200 rpm and 122 lb-feet of torque @ 2200 rpm. There is also a 20bhp @ 2200 rpm AC permanent magnet motor developing 98 lb-feet of torque 0-1100rpm. The 165-volts SAFT Lithium-ion battery is rated 6 amp-hours and stores 1 kWh. The car does 0-60 in 11 seconds.

The Ford entry is the Prodigy. It has a four-cylinder engine is a 1.2 liter, 16-valve direct injection diesel developing 74 HP@ 4200 rpm and 113 lb-feet of torque @ 2250 rpm. There is also a 47 bhp motor (@4500 rpm that produces 207 lb-feet of torque @ 2250 rpm. The 288-volt NiMH battery is rated 4 amp-hours and stores 1.1 kWh. The 2400-lb car does 0-60 in 12 seconds.

The GM entry is the Precept. Its 3-cylinder Isuzu engine is a 1.2 liter, 12-valve direct injection diesel developing 54 bhp @ 2500 rpm and 125 lb feet of torque @ 2000 rpm. There are separate motors for the front and rear. Together they develop 47 bhp and 192 lb-feet of torque. There is a third motor for reverse. The 350-volt NiMH battery is rated 8.6 amp-hours and stores 3 kWh. The 2600 lb car does 0-60 in 12.2 seconds.

The Car and Driver writers have an irreverent way of expression. The most tart observation – the cars get pretty good performance from an engine that wouldn't peel the cheese from a cold pizza. Editor's note - Henry Ford produced a 60-hp V-8 in 1935.

So far The feds have provided $ 1.7-billion dollars to the program. This year's expenditures are budgeted at $ 234.-million. Foreign automakers are not eligible to participate in the PNGV, but Dodge, now owned by Daimer-Chrysler is apparently grandfathered in.

I thought the following letter *SPECTRUM*
hybrids would interest the FVEAA readers.

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March 12, 2001

Forum, IEEE *Spectrum*
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Sirs,

After reading the "Are Hybrid Vehicles Worth It" twice, I still don't know what a Perf-Prius is. The authors seem to define it as a Toyota Corolla with a difference. The car exists only in the authors' imaginations and they proceed make emission calculations for comparison purposes. I prefer experimental data.

Here is a real-world 10-year record for a battery powered electric vehicle. It is a 1980 Mazda RX-7 converted to battery power in 1990. It has been regularly substituted for an IC engine vehicle for short-trip driving within its 30-mile range capability. Last year the average trip length was 9.6 miles and the total annual cost was $ 1365. The energy efficiency (AC metered input) was 0.522 kWh/mile.

Generating sources used for recharging last year according to ComEd's Year 2000 Environmental Disclosure document were 71% nuclear, 21% coal fired, 1% natural gas, and the rest purchased from unknown sources. Mazda emissions last year were therefore 373 lb. of carbon dioxide, 1 lb. of nitrogen oxide, 1.1 lb. of sulfur dioxide, and 0.004 lb. of high-level nuclear waste for 1406 miles.

The complete data may be accessed on our website, www.fveaa.org , click on Member's Cars and Bill Shafer's Mazda.

The search for a "better battery is Quixotic. Fuel cell cars using hydrogen for reforming gasoline face cost problems and continued depletion of petroleum reserves, something my grandchildren will be forced to deal with. Hybrids are probably a good interim step, particularly when the engine is a direct-injected small diesel.

The real solution for fuel and emission problems is to market a low cost ($10,000) battery car with good performance that can be used for short trips. It will have a long life with periodic battery replacements.

Car use can be similar to a toolbox containing many different tools. One uses the tool appropriate for the task at hand.

Sincerely,

MISCELEANOUS ITEMS

The Triton Project

Triton Board approval of the Ford Ranger conversion is still pending. A delay may jeopardize the starting date. Time is required to order material needed for the Project, especially the shop manuals. I estimate it will require at least three weeks prior to starting to order and receive materials. Time must also be allowed to recruit students and to release information to the community, aimed at interested adults who may wish to learn about electric car elements. I am working on an expedited process.

One particularly crucial item is remains. Triton is unable to locate the Title. **No Title- No License**. You cannot send a car to the crusher without a Title. There is no reason for the conversion unless the finished vehicle is useful. Ray Oviyach is working on this matter.

The FVEAA must organize member's participation. My objective is to have at least two or three FVEAA members, working at each session to guide the process. The Table below shows the work planned at each date. Please pick the date(s) that you plan to be there.

Date	Task Scheduled	Initial
May 19 *	Orientation – Baseline weights – Tag electrical connections.	
May 26	Basic physics – Performance goals – Remove engine & trans.	
June 2	Preliminary design – Remove bed	
June 9	Install rear battery racks under bed	
June 16 *	Battery operation. Install motor – transmission assembly	
June 23	Catch-up allowance.	
June 30	Controller operation. Install power cable conduits & pull cable	
July 7	Install front battery racks, aux battery & dc-dc converter	
July 14	Install "potbox" & connect to accelerator pedal	
July 21 *	Auto transmission control design	
July 28	Install & wire controller	
Aug. 4	Install & wire power brake vacuum pump	
Aug. 11	Install & wire instruments	
Aug. 18 *	Install & wire heater components	
Aug. 25	Test auxiliary systems – catch up	
Sept. 1	Labor Day weekend	
Sept. 8	Install and wire automatic transmission controller	
Sept. 15 *	Final power connections Static test – reinstall bed	
Sept. 22	Test drive –Parking lot	
Sept. 29	Wrap up	

- Proposed meeting dates for the FVEAA during this Project

IN MEMORIUM

FVEAA Co-Founder Ken Meyers died on April 6. We lost more than a member. Ken assisted many members with their projects, never accepting payment. Ken converted an *NSU PRINZ* in 1975 and regularly used it for work commuting. He and Co-Founder, John Stockberger built several conversions in the late 70's. Ken was converting a *FIESTA* at the age of 83. We remember Ken at our meetings, quietly explaining the mysteries of lead acid batteries or the design of power transistor controllers. He was truly a remarkable man. Several members attended a memorial service on April 9th.