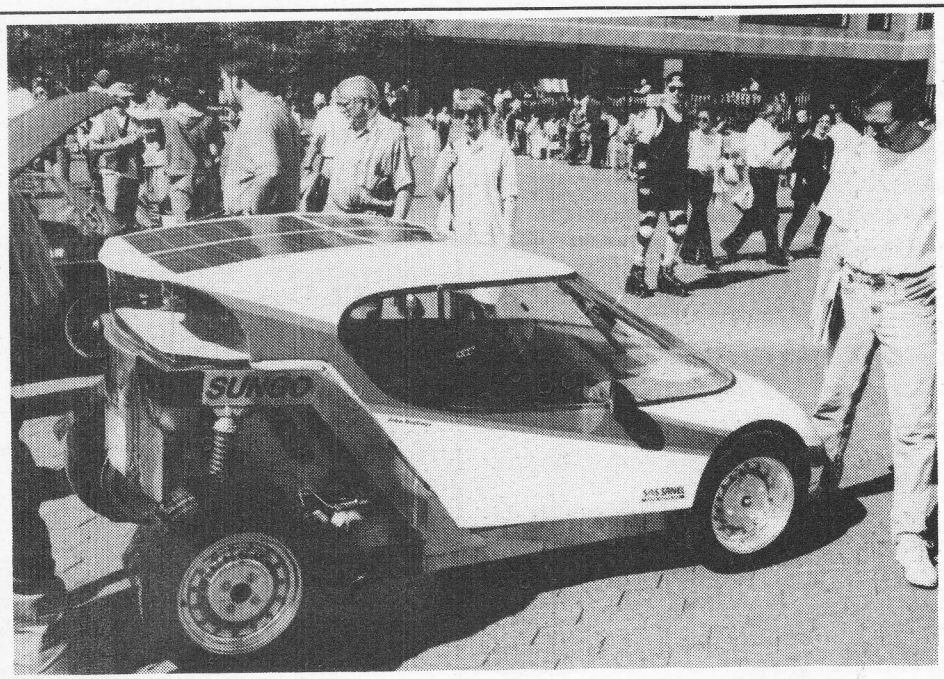
ELECTRIC AUTO ASSOCIATION

CURRENT EVENTS

September 1994 | Promoting the use of electric vehicles since 1967 | Vol. 26 No. 9



Tour de Sol (Part II)

by Michael Bianchi

I went to the ATdS last year and this because I wanted to see this technology on the hoof, and this is where it is visible in all it's variety. The SunRayce and the World Solar Challenge have the BEST solar powered vehicles. The APS 500 has the BEST electric racing vehicles. And the various local events show the variety of personal EVs out there. But, the ATdS has an mix that shows the range and variety of the EV idea, and I hope these reports have given a sense of what it was like to be there.

A Musician as EV Club Advisor?

Kathleen Allen is the facility advisor to the MIT Solar Electric Vehicle Club. They raced their Aztec, which took first in the Tour de Sol Racing category. Now, let me ask you. . . what would you think would be the background for an advisor for such a club? Electronics? Physics? Political Science? If you didn't say "Music" you missed the mark (as did I). Kathleen teaches a course in the physics and mechanics of the piano, tunes and repairs pianos, organs, and harpsichords. She is also a part-time undergrad specializing in musical instrument acoustics. This makes her a natural as an advisor because, "I have an office down the hall from theirs, I have a lot of tools, and I always know where they are! They have almost no tools and they NEVER know where they are."

When they had borrowed enough that she got intrigued by the project and tried to join, she was told they needed an advisor. So she was dropped in the deep end three years ago, knowing nothing about solar

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Eco-Car Challenge

By Clare Bell

An important part of SEER (Solar and Electric Expo and Rally) this year was the Eco-Car Challenge. This was a drive to the SEER site in Ukiah, with EVs, solar cars and other alternative energy vehicles converging from all over California. On Thursday, July 14, cars originating in the Bay Area and points south congregated at the San Francisco Exploratorium for a morning display and charge-up. Local EVs joined in the display, including Current Events editor's own #13 Porsche, wearing CE's logo.

The Cornell family Rabbit, Buzz Bunny 2, was sporting a homebrew version of a power trailer cooked up by the ever-inventive Mr. Cornell. He even managed to keep the thing relatively low-priced, at $800 including

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Features

Editor's Note

By Clare Bell

SEER Has High Praise for EAA

The encouraging news from SEER '94 is that EAA did everything right! EAA fielded a large fleet of EVs for the public to ride and drive. Scheduled EVents included the California Eco-Car Challenge, SEER '94 Solo Rally, held in association with Sports Car Club of America, EAA Ride and Drive, the Tour De Mendo, the Human Powered Vehicle Challenge, Electric Racecar Time Trials, Electric Boat Regatta and the triumphant Sun Day EV parade through downtown Ukiah. 25 EVs went in the parade.

Two years ago, at SEER '92 in Willits, CA., 20 EVs showed and half were for sale. This time, at Ukiah, there were 60-75 EVs and only one for sale. In 3 days, 600 copies of the Current Events special edition went out and an estimated 750 interested individuals visited the booth.

And there were absolutely ZERO questions about windmills on car tops! The folks attending SEER '94 were savvy!

25 members from different chapters signed up to staff the information booth. Seven to Eight EAA cars from East Bay, Peninsula (San Francisco) and San Jose chapters were on display throughout the show. San Jose Chapter had high representation, with 8-10 members working the exhibit. Even the new members who had signed up came. The consensus among attendees was that EAA did a good job both in terms of staffing and having materials to hand out.

CE's commendation goes to Anna Cornell, our EVent Co-ordinator, whose organizing skill and follow-through made the EV part of SEER run as smoothly as it did. Also a special salute to Bruce Brooks and PCTEK's Susan Hollis, for getting the 24 page special edition done while CE's editor was out of action for a few weeks.

Kudos also go to Cal Poly Pomona, whose "Intrepid" team coordinated matchups between drivers and passengers in the Tour de Mendo, both at the fairgrounds and the lake.

Quote from Chris Koveleski's letter to SEER '94 participants:

"Our most valued vehicle association, which co-ordinated the Ride and Drive, the Tour de Mendo passengers, and many other related events was the EAA. All of the members who attended took an active part in making it happen, and if it weren't for their dedication to electric vehicles, SEER '94 would have never been the success it was."

Front cover photo: (Michael Bianchi)
"It followed me home, Mom. Can I keep it?" Sungo EV at NYC Battery Park.

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Article Submissions
If you would like to submit an article for Current EVents—the preferred form is on a floppy disk, formatted for DOS (Ascii Format) along with a printed copy of the article. Also include camera-ready photos or graphics or include TIF formatted files with your copy. The deadline for articles is the 1st of the month. Articles submitted after the 1st of each month will be retained for future issues of Current EVents. Contact Clare Bell, Managing Editor for further information.

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EAA Membership
Hal & June Munro
2710 St. Giles Lane
Mountain View, CA 94040

Electrathon Competition News

By Steve Van Ronk

New Electrathon Groups Forming

The Great Lakes Electrathon Racing Association has emerged from a competition held this year at Jordan College. This small energy institute has made quite a name for itself with innovative courses in alternative energy. One of their most recent programs was an Electrathon competition involving 29 high schools in Michigan who produced 15 vehicles for their one and only race. Among the results of the race was formation of an Electrathon racing association to keep the sport growing in the Great Lakes area.

A group is being organized in Maine, concentrating on educational programs in high schools. The Maine group has not announced a name yet, but they have gained support from the region's energy education institutions to promote the sport throughout the state. This group hopes to produce an Electrathon competition in support of the 1995 American Tour de Sol as well as their own series.

An Inland Northwest club has started in Sandpoint, Idaho to cooperate with interested parties in eastern Washington and western Montana. Members of a local renewable energy promotions organization called The Solutions Group has started building two Electrathon vehicles which they intend to debut in an upcoming race to be held in Friday Harbor, Washington. Friday Harbor is north of Seattle and is yet another group getting involved in Electrathon racing. Although they do not yet have a team, local organizers decided that the best way to introduce the sport is to invite other teams to enjoy the hospitality of their island paradise.

A new group is being formed in Hawaii in cooperation with the Big Island Electric Auto Assn. and a number of Hawaiian schools. There is currently so many enquiries from Hawaii that we are not yet certain if they are all from the same group. Watch for these islanders! They have a long history of fun in the sun. Further information may be obtained on any of these groups by sending a self addressed stamped envelope to SolarEVolution, 105 N. 1st ave. No. 125, Sandpoint, ID 83864.

Builder's Primer Choosing A Chassis Layout

There are three basic chassis configurations commonly used in Electrathon competition. The conventional four-wheel layout like a go-kart or the family car is the most stable but usually has more rolling resistance from wheel contact with the ground. This layout is best suited for fast cornering and rough driving conditions. Three wheel configurations offer one less point of contact to the ground, which can be an advantage to reduce rolling resistance. Two wheels placed in the front of the vehicle offers the advantage of better stability in cornering, especially when braking, over the more common arrangement of one wheel in front. The two-wheel-front design can also be an aid in aerodynamic body construction by adapting more easily to the trailing edge required to approximate a laminar air flow. One complication found in two-wheel-front and four-wheel designs is the necessity of building accurate steering geometry and linkage. Included in this is the problem of brakes and spindles made for lightweight wheels used in Electrathon. If one uses go-kart equipment, this can be simplified greatly, but at the expense of some weight and rolling resistance. Use of bicycle wheels usually requires some machine work or hard searching to produce adequate parts. The one-wheel-front design is the least stable of all, but also the easiest to build. This design can be fabricated very quickly and inexpensively using salvaged bicycle or scooter parts. These vehicles can perform quite well and be built for half the cost of more complicated configurations. A one-wheel-front design is possibly the most common first vehicle due to its simplicity of construction. In any of the designs, the overall handling characteristics depend largely on weight distribution, which will be considered in the next issue.

Tour de Sol

Continued from page 1

cars, and managed to swim. The team was in a fair amount of trouble when she assumed guardianship. The trouble came from doing things without permission, not paying attention to the safety office, being clumsy, and being hypersensitive when criticized. There is a strange sort of blindness in people when they fill a building with toxic fumes while trying to build an environmentally sound car. So, she is trying to make herself obsolete by giving these bright, technically sophisticated people the social skills to get the things they need without upsetting the people they need them from.

Nancy Hazard

Nancy Hazard is the Associate Director of the Northeast Sustainable Energy Association (NESEA) and the Director of the American Tour de Sol (ATdS). The most exciting thing for her was the growth of the Production category from 3 to 6 cars, Ford participating in the event, and Chrysler, Ford, and Solectria competing head-to-head. Range records were set in both the Production (188.6, up from 130) and American Commuter (214.2, up from 180). At the other end, the number and quality of the student entries were most encouraging, and the energy and enthusiasm of the students themselves and their understanding of the pollution and energy problems that this country and the world face. Their application of their creative energies to solving those problems is tremendously exciting.

This is Nancy's 6th ATdS. The first event had 6 solar cars in the Tour de Sol Racing category and was focused on promoting solar energy. When the 1990 Clean Air Act passed, the possibility of practical EVs created the need for a practical category, and the American Commuter category was created, overnight charging was added and new rules were laid out. Last year added the Production category, and Nancy expects to see 2-wheel vehicles in that category next year. (BTW, the Ecostars were categorized as Production vehicles, even though none has been sold, because the lease program demonstrated a commitment to commercialization of the cars.) There is the possibility of a Mass Transit category (buses!) next year.

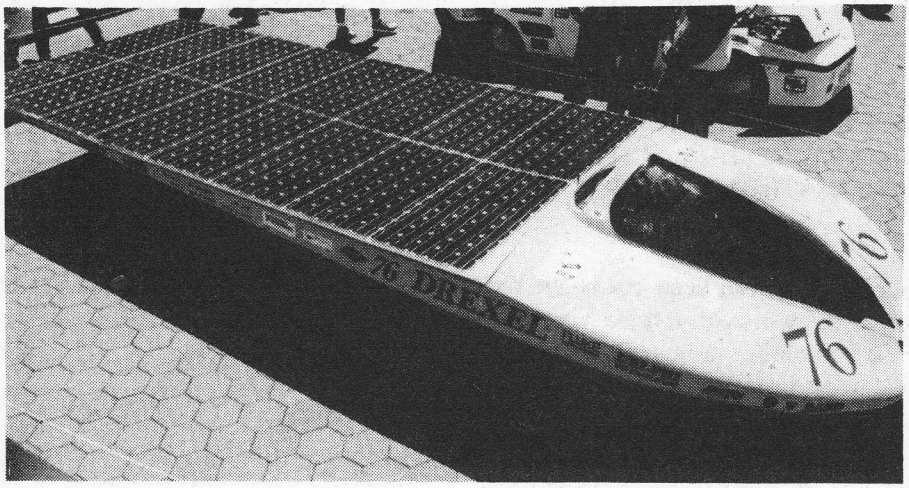
The Main EVent Continued

Sun Cycle II had been out of the race since Tuesday with a broken belt. By Friday the bike was ready to race. They had taken it back to their home outside of Philadelphia and found replacement belts, which required modifying the drive pulleys, exchanged one of the two motors because it had overheated, and added a cooling fan to each of the motors. On Friday, Sun Cycle II completed their run, but on Saturday they appear not to have made it all the way to the Franklin Institute finish line; I don't know why.

Mankato State University (Minnesota) entered the Northern Light II in the Cross Continental class. A chrome-molly frame supports a rectangular Nomex and fiberglass body. The driver's head sticks up out of a field of solar cells, and, in fact, the entire top has to be taken off to get the driver in and out of the car. It finished 16th in Sunrayce '93 and then competed in Japan, where it took 1st place. After this ATdS, this car will be retired and the Northern Light III will built for the next Sunrayce. The front 2 wheels provide steering and brakes, 1 rear wheel provides drive and regenerative braking, and the 4th wheel is just an idler. It is said to handle very well.

PV:	1000 W, Siemens, 736 cells
Batteries:	108 V, 5000 Wh, Pulsar racing batteries
Motor:	Solectria DC brushless, 1.9 kW continuous 5.9 kW peak
Controller:	Solectria

The Envirocycles (I and II) are from Central Connecticut State University's Solar/Electric Research Team. Envirocycle I is a two-wheeled bike with a top speed of 55 MPH and a range of 75 miles, based on a Honda NS 50 motorcycle. This was the 3rd ATdS for this bike. For this year, the bike went from 36 to 48 V, changed



Dragon Wagon — Drexel's solar car.

Photo: Michael Bianchi

to sealed batteries, changed the gear ratio for maximum efficiency at 35 MPH, added a faring, and did a little more testing. One of the drivers really enjoyed the quiet when out on country roads.

Envirocycle II is a three-wheeled trike made from various parts and is in day-to-day use with the New Britain CT Police Department. This is its 2nd ATdS. Last year it was configured for racing with a 72 V system, 8 HP GE motor, could get 85 miles per charge and won in the Open category. This year, it was re-converted for actual police department use. It now only has a 35 mile range, but it is lighter weight, more aesthetically pleasing, and does the job the police department wants; they only needed a 15 mile range.

Lots of police officers along the race route have had many positive comments. It is in the ATdS to demonstrate the practical aspects of electric motor bikes. About 30 people were involved with getting the bikes in the race. (I must say that the Central Connecticut support vehicle is THE one to beat in the ATdS. Last year and this they arrived with what I can only describe as a rolling garage. It comes complete with welding equipment, drill press, and other tools, and the CCSU folks have helped many of the other teams in their (usually late) hour of crisis.))

Envirocycle I (2 wheels)

Batteries: 48 V, 4 GNB EV1180, sealed lead-acid

Motor: 6 inch Advanced DC

Controller: Curtis

Envirocycle II (3 wheels)

Batteries: 72 V, 6 Trojan SCS 225 lead-acid

Motor: Advanced DC

Controller: Curtis

Two of the three cars from New Hampshire Technical Institute dropped out Thursday's race, Hopper EV and Suntech. The Hopper EV suffered a sheared pin in the steering during Wednesday's run. The pin was under-spec (an unfortunate surprise) and therefore just replacing it was not an acceptable option. Since the Suntech car has the identical steering, and presumably an under-spec pin, they decided to not risk it and pulled Suntech from the race. — MB

Sun Dragon IV, Drexel Univ.

Vehicle speicificiations provided by Dr. Kevin Scoles.

Vehicle ID:	SunDragon IV (# 76) Dimensions: Length: 19.2 ft. (5.9 m)
Weight:	550 lbs. (249 kg)
Width:	6.6 ft. (2 m)
Height:	3.3 ft. (1 m)
Solar Array:	1200 W peak; 8 square meters terrestrial grade Solar cells; manuf: BP
Solar Batteries:	5.0 kW capacity lead-acid batteries; manuf: Power
Motor:	10 hp (7.5 kW) brushless DC; manuf: Uniq Mobility
Range:	Approximately 200 miles (at 35 mph on batteries alone)
Max. speed:	40 mph on solar power alone, 80 mph on solar and battery power.
Chassis:	Graphite monocoque (Carbon fiber, structural glass, Nomex)
Wheels:	Three 26S (66 cm) mountain bike, custom hubs
Brakes:	Hydraulic disc brakes, regenerative braking using motor

Eco-Car Challenge

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trailer generator and generator-driven charger.

Trailer — Northern Hydraulics/Long Chi (mail order) Class A - $145

Genset — can deliver 41.7 A at 120V or 20.8 A at 240 V for a total of 5000 watts. Costco SP-5000, model #09528-0 - $500

Tires — Kenda trailer tires, # 480-400-8 inflated to 60 psi

Scott did have to re-wind the motor coils on the generator and do a little coil tapping to get it to perform as he wanted. The 5k generator pumps out enough so that there is no draw on the batteries while driving at 30 mph.

The genset is mounted just slightly behind the trailer wheels so that it is easy to lift the tongue for hitching. If you want one, borrow Scott and go shopping. Clear it with Anna first, though, or she may start filing her teeth.

An upcoming CE will feature a how-to on the SPC LongRanger and a report on how it performed during the run from SF to Sebastopol and up to Ukiah. (Preliminary info says that Scott and family made it to within 8 miles of Ukiah, stopped to recharge the batteries from the genset before climbing up a hill and promptly ran out of gas. Well, that could have happened to an ICE car too. Sounds like the SPC Long Ranger performed reasonably well, although it couldn't quite overcome the human factor. Probably Scott will want to up the output so that the zero-draw point is closer to 45 or 50, if possible.)

The Rev. Noah Moore Smogg (alias Peter Barnes) wasn't there, but his EV truck stood in for him. This time it was rigged as a mobile cemetary, with ominous-looking gravestones bearing the inscriptions "RIP Dirk T. Aire", "Here Lies Noxi S. Fumes" and "RIP A. R. Pollution". Nice work, Rev.

On the more upbeat side was Robert Westman's snappy '72 Fiat 850 conversion. This little EV pocket rocket uses the 6.7 inch Advanced D. C. L91, modified by KTA Services to rotate backwards (the Honda is not the only one whose drivetrain turns in the opposite direction from the rest of the world — Fiats are screwballs too!) 18 U. S. Battery 2300s feed 108 volts to a 1221B Curtis controller.

The cost of the donor car was $200, but CE's editor certainly couldn't tell that it had been a cheapie. Good bodywork and paint, Mr. Westman, and I bet it'll really shine up nicely when buffed. Components were supplied in a kit from Solar Electric (now US Electricar) and Westman worked with them on the project. Total cost was $5 K and the final curb weight was 1600 lb.

An owner-built black ABS airdam makes the Fiat look competitive and has saved Westman from having to do more extensive front-end bodywork. One of the cuter innovations was the use of the ash tray to hold EV business cards.

Students from Shadow Mountain High in Arizona brought their Phoenix baby; #19, a '72 Porsche 914 wearing a stunning deep blue metalflake paint job. This clean, low-slung, little hotshot went 82 miles on a 96 V battery pack of Trojan 125s during the 1994 LA Clean Air Road Rally. The Shadow Mountain Porsche carried the flag for electric 914s, since my #13 (sniffle) didn't get to go to SEER. I'll make it up to her next time.

Hopalong, the WE'RE-IT #6 Rabbit, arrived with a sparkling new silver coat, courtesy of a San Jose body shop and pulled off by Allaire Patterson. Some of the WE'RE-IT team members were interviewed by KFOG radio, including Anna, Clare and Allaire, so EVs will be in the KFOG-gy air around SF.

Electro-Automotive's pride and joy, the Aztec, showed up for the display. The car is now configured as a lightweight sprinter, using the new 12V deep-cycle plate U.S. Battery 1450s. Electro also had information on their upcoming Porsche 914 bolt-in conversion kit.

Other classic EV racers and vehicles were out in the sunshine, including Bob Schneeveis' SnoWhite and supporting EV menagerie (the Palo Alto Land Yacht Club kyak Electrathon, the infamous #8 Anna-eating wheelbarrow, #1 double-motored go-kart etc.) Bob's solar-animated lawn chair inspired a local middle school to do their version of a solar car in the form of The Electric Moose. The Moose was present in all its PVC-pipe frame and solar-panel-antlered glory to inspire other kids who visited the Exploratorium.

The solar vehicle Prominence was fielded by CalSol, a group of UC Berkley students. CalSol, established in 1990, is a student-run non-profit with 20 graduate and undergraduate members. CalSol has hosted the Jr. Solar Sprint competition and is desigining solar cars.

Prominence has a carbon tube spaceframe supporting a body made from carbon-fiber/Kevlar honeycomb composite. A very low drag coefficient (0.096) plus minimal frontal area (1.12 square meters) combine with 14% efficiency solar cells to make this one a good sun-runner. Right now the drive motor is a brushless Solectria unit, but CalSol is designing their own 95% efficient brushless DC drive system for the next evolution of Prominence.—CB

Datsun DMV/Insurance Enduro

By De Clark

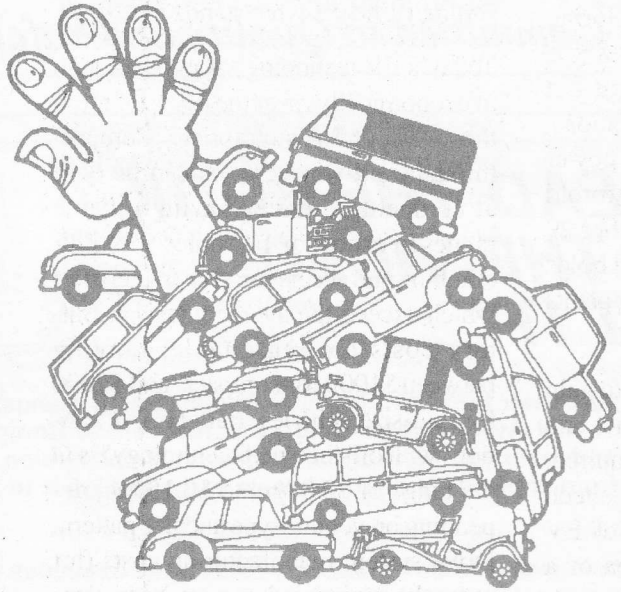
In 1993, I converted an elderly Datsun truck to electric power, and am driving it today. Registration and insurance, however, were a real nuisance, and I ended up with the feeling that the world at large was rather hostile to my little vehicle. As a result of my private conversations with various people, some note was made in this newsletter about the potential difficulties of "making your project car legal," but I was too busy at that tim to contribute these concrete details about the DMV, insurance, and my EV project. I hope they may be of some value.

Since it is strongly rumored that the CSAA actually owns one or more electric cars, I wonder who insures them.

The first surprise was that DMV would not register the vehicle as an electric retrofit without assessing a vehicle value tax based on the cost of the conversion; so registration fees were assessed as if I had bought the vehicle new for the conversion cost. Given the high cost of most practical conversions, and the depressing difference between the resale value of the vehicles and the parts and labor we put into them, this seemed a bit unfriendly at time; and other first-time vehicle-builders might be as surprised as I was.

The next shock was the DMV weight fee schedule, which has an odd little wrinkle when it comes to electricity and commercial vehicles. There is a special schedule for "Electric Powered Commercial Vehicle Weight Fees" according to which all vehicles of less than 6000 lbs must pay $87/year. My truck weighs in at about 3600 lbs, and if it were a gas truck, I would be paying $24/year or just half of what I pay now. It's true that one can register a pickup as a passenger car in CA, but only by weighing it down with another few hundred pounds of permanent camper-top or by never, ever, carrying anything in the bed (which does rather defeat the whole purpose). I appreciate the weird irony of the situation, but even so, I still have to pay the inflated weight fee.

Since a light pickup is a very attractive choice for conversion, the punitive weight fee schedule for an electric light pickup seems counter to CA's avowed support for low-emission vehicles in general. Does anyone have connections in Sacramento? Surely we could make an issue of this.



I also experienced a higher degree of incompetence and confusion at my local DMV than I have ever known. I fancy it was because I was trying to do something "different." Their various incorrect assessments of the fees due to register my truck ranged from $500 to over $600. Although all the amounts were re-calculated and a corrected statement was printed and signed by the office supervisor at the time when I paid the fees and got the temporary permit, all the errors were repeated and I had to go through the whole 2-hr drama again a couple of weeks later when I brought my paperwork and the truck in for inspection and final registration. I would advise other EV builders not to believe a word the DMV says without adding up the entire registration fee schedule for yourself. I received some help and good advice from the CSAA.

However, I would like to mention that the good old CSAA, with whom I have had various insurance policies for years, flatly refused to insure my truck. The telephone rep said, and I quote,"Sorry, we don't do electric vehicles." End of conversation. Since it is strongly rumored that the CSAA actually owns one or more electric cars, I wonder who insures them.

In short, whatever the Feds and the State may say about clean air and transportation reform, in practice both bureaucracy and business seemed just as hostile to the EV as the are to anything else that's in any way out of the routine. (With the notable exception of the nice people at the weigh station, who thought that the e-truck was the cutest thing they'd ever seen — bless their hearts!) Be prepared.

De Clark
151 Dufour St.
Santa Cruz, CA 95060

Wally Rippel's letter to CARB: (Current EVents received this letter with permission to publish. We regret that it did not get into the previous issue, but it is in this one. Apologies to Mr. Rippel and thanks, since it is a very lucid and powerful argument for EVs. —CB)

Dear sirs:

Realizing that you will soon be reviewing the status of the ZEV initiative, I feel it is important that I provide you with some inputs concerning my own experience with EVs. As background, I have been involved with EV technology since 1965 when I was a sophomore at Caltech. During my sophomore and junior years, I converted a VW microbus to electric drive which I used for daily transportation between my home in Hollywood, and Pasadena. My motivation in exploring EVs as an alternative to gas vehicles was simple — air pollution. Carrying out some basic energy balance calculations, I realized that EV emissions via power plants would be roughly a hundred-fold less than gas vehicle emissions (after 29 years the hundred-to-one ratio still holds — both gas vehicles and the power plants have gotten cleaner).

In 1967, I realized that EVs were to gain widespread uses, world-class science and engineering attention would be required. As a means of interesting both Caltech and MIT minds in the problem of EV technology, I conceived the idea of a cross-country EV race between two universities. On the morning of August 26, 1968, after much work, the concept became reality. At exactly 9:00 AM our time, the "Great Electric Car Race" was off. With the help of five fellow Caltech students — and some luck — the Caltech team won. For the first time in history an EV had crossed the continent — and completely on electric power. Our total elapsed time, including a recharge at some 59 scheduled recharge points was 210 hr and 30 min.

Since 1968, I have been involved virtually full-time in the development of EV propulsion technology. Between 1976 and 1990, I was a member of JPL's technical staff and focused on the development of AC drive and sealed recombinant lead-acid batteries. I have 21 US patents and have published over 25 papers dealing with EV technology. I was one of the key consultants involved with the GM Sunraycer and Impact projects. I was also the co-founder and first president of AC Propulsion, Inc.

With this background, I feel I have a unique perspective on the technology. In summary, here's what stands out.

Today's EV technology is good enough to economically meet the needs of more than 10% of LA's motorists. Compact through mid-size vehicles can be built at competitive prices having reliable ranges in excess of 100 miles with hill-climbing and acceleration characteristics which exceed the average gas car. Battery costs are reasonable, ranging between $1000 for compacts and $2000 for mid-size vehicles. Battery depreciation (with off-the-shelf technology) is in the range of $0.07/mi to $0.15/mi., depending on vehicle type and use pattern. Drive system manufacturing costs (for properly engineered systems) are competitive with gas engines — on the order of $10/peak hp in lots of 10K.

Because of the rapid technical progress which is now occurring, successful introduction of EVs seems certain. The real question is whether the EV industry will be centered in Detroit, Los Angeles or Tokyo.

If the Americans step up to the challenge, the result could be a shot in the arm for several key industries including electronics, automotive, energy systems (batteries), high-tech materials, and advanced manufacturing. If we don't step up to the challenge, we may end up losing these industries to Asia and see trade balances worsen.

It is important that the ZEV initiative remain and without modification. If the ZEV initiative is weakened, investment in new EV-related companies will be compromised and the entire process will be set back.

A good deal of the technical progress which has occurred in the last few years is due to the ZEV mandate. The process is working! Any alteration of the initiative will signal weakness on behalf of CARB — and this will likely cause present investors and potential future investors to lose confidence.

Hybrid vehicles may in some cases make sense. However, contrary to conventional wisdom, the technical challenges appear to be greater than for pure EVs. While pure EVs can be in significant production before 1998, hybrid technology which exceeds the ULEV standards will likely not be available until the next century.

While present recombinant lead acid technology is adequate for the 1998 and 2003 ZEV requirements, energy storage technologies are on the horizon which ultimately may surpass the gas engine in all respects. The 1998 mandate can serve as a stepping stone to these technologies.

Sincerely,
Wally E. Rippel

News in Brief . . .

Compiled by Ruth M. Shipley from Environmental Information Network. If this is reprinted, please credit CE and Ruth Shipley.

Transit Station Cars to be Demonstrated

The National Station Car Association has selected 3 EV manufacturers to provide cars that will transport transit riders to and from their boarding points: Solectria of Massachusetts, Suntera of Hawaii, and U.S. Electricar of California. The cars would be rented at transit stops for periods of hours or overnight.

The association hopes to have more than 1,000 cars participating in demonstrations by the 1995-96 season. Demos will start soon in Miami, Long Island, Northeastern Illinois, Sacramento, California, and the San Francisco Bay area. Demonstrations will begin in 1995 in Atlanta, New Jersey, the northern suburbs of New York City, Philadelphia and Southern California.

(QUAD REPORT: 7/94)

California Engineer Develops Charge Stations

James Oros, who operates his two-year-old consulting and engineering firm Electric Vehicle Infrastructure, Inc. out of his garage, has been researching and developing EV charging stations under contracts awarded by the Sacramento (CA) Municipal Utility District (SMUD). His company has designed or installed more than 100 charging stations around Sacramento. The station features an automatic timer to recharge during off-peak times and has enough outlets to charge up to four vehicles.

(Sacramento Bee: 7/2)

Drake Associates' Battery Management System

Drake Associates, Inc. has developed a new BADICHEQ on-board battery management system that can monitor up to 64 individual batteries ranging from 2-24 volts.

During discharge, BADICHEQ monitors all batteries and the discharge indication control is governed by the weakest battery in the pack. When the battery reaches a preprogrammed lower limit, the system warns the driver when driving will be destructive to the batteries. During charge, BADICHEQ also monitors all the batteries and eliminates over charges. As the weakest batteries lag in capacity, BADICHEQ identifies these batteries and supplies them with additional charge equalizing the pack for maximum capacity. It continues to redistribute power to the weak batteries even after the charge cycle has been completed and the charger has been shut off. For more information, call (516) 666-1354.

(DRAKE ASSOCIATES: 7/94)

PG&E To Test Impact, Other EVs

Pacific Gas & Electric (San Francisco) will soon be testing several EVs, including 5 Honda Civics, several Geo Prizm sedans and 10 GM Impacts.

The Impacts are part of the GM PrEView Drive program, which will provide 2 technicians for 6 months to the utility. PG&E is already preparing a service center and training technicians, and recharging stations are ready for use in San Francisco, San Ramon and Concord.

Participants who have signed up to test the Impacts will have a recharging station installed in their garages, receive personal and group instruction on handling the vehicles, and be required to log trips and their reactions to the EVs.

(San Jose Mercury News: 7/1)

EV Charging Stations to be Displayed

Several innovative charging systems will be on display at the National Electric Vehicle Infrastructure Conference in Anaheim, California in December. Auto-docking charging would allow EV owners to park their vehicle at night and return to a fully recharged, pre-heated or -cooled vehicle in the morning.

The Power Bar uses a cylinder that engages a plate on the vehicle when the car is parked over a bar resembling a concrete parking stop. Another system, the PowerPak, lowers a wand from the underside of the vehicle to connect with a charging port in the garage floor. R2D2 is a system that lowers a charging wand from the garage ceiling to connect with a plate on the car's hood.

(Green Car Jounal: 7/94)

University of Maryland Sweeps Hybrid EV Competition

The star of the 1994 Hybrid Electric Vehicle Challenge in Southfield, Michigan this year was the University of Maryland entry. The vehicle was designed to get 70 miles to the gallon and to reduce emissions with no loss of performance. The car won all 10 categories and was recognized as "Best Overall."

Ratings showed the car to be the most efficient, to have the lowest emissions and excellent safety and to be the best user of alternative fuel. Judges also awarded the vehicle best technical report, best range, best engineering design and best alternative fuel performance. More than 60 undergraduate students helped convert the Saturn SL2 sedan.

WASHINGTON TIMES : 7/8)

News in Brief . . .

South Korea's Kia Markets Country's 1st EV

Kia Motor Company will market South Korea's first EV, the "Pride". The car is capable of a speed of 110 km per hour, or up to 116 km per hour with the help of solar energy on a sunny day. The car seats only two people because the rear-seat space is used for eight lead batteries with two more under the hood. The "Pride" costs approximately $22,800, which is greater than three times the price for a standard South Korean gasoline-powered car.

(XINHUA: 7/7)

Building Ordinance to Give EVs a Boost

Sacramento County (CA) has enacted the country's first building ordinance designed specifically for EVs. From now on, any building applications for new single-family dwellings must include installation of a conduit that can be set up to charge EVs. Both the Sacramento Building Industry Association and the Sacramento Municipal Utility District (SMUD) have endorsed the ordinance.

(SACRAMENTO BEE: 7/8)

GM Brings EVs & Emissions Technology to China

General Motors may sell the Impact and other automotive parts to China to help the country curb its atmospheric emissions. China is the world's second-largest producer of carbon dioxide after the U.S.

According to GM president John Smith, China's State Science and Technology Commission will test and evaluate the Impact under a plan unveiled at an international round-table conference that strives to ensure sustainable economic development in China. This is the first time GM has offered the vehicle to any institution or firm outside the U.S.

(UPI/Journal of Commerce: 7/9, 7/11)

Northeast Residents Support California Cars

A poll conducted for the American Lung Association of 816 registered voters in the Northeast found that 74% want tougher air quality regulations and support the marketing of ZEVs to meet this goal.

The survey found that Northeast residents were pessimistic about the future of air quality in the region. Nearly four of five respondents said they believe the air will get worse or stay about the same. Many felt that air pollution impacts negatively on their health and the health of future generations.

For more information, contact ALA's Diane Maple at 202-785-3355.

(AMERICAN LUNG ASSOC. NEWS: 7/13)

UCS Study Emphasizes Benefits of EVs

The use of EVs in the Northeast will substantially reduce motor vehicle emissions in the region, according to a new study by the Union of Concerned Scientists (UCS). The report shows that over its lifetime, every EV introduced will reduce carbon monoxide emissions by 99.8%, nitrogen oxide emissions by 80%, carbon dioxide emissions by 60% and emissions of volatile organic compounds by 90%.

As a result of the study, the UCS said it backs the Northeast Ozone Transport Commission's plan to adopt a program similar to one in California that would require auto manufacturers to sell EVs. The Northeast program would allow states to adopt mandates for zero-emission vehicles and/or economic incentives to increase the sales of ZEVs by 1999.

For more information, contact Jaime Steve or Rich Hayes at (202) 332-0900.

(U.S. NEWSWIRE: 7/8)

EVents Calendar

SEP. 18	**Concours d'Elegance** - Sponsored by San Jose Lion's Club. Located at Guadalupe River Park (near Children's Discovery Museum), 180 Woz Way, San Jose, 10am-5pm. For info, call Jim McCoy (408) 267-9077.
SEP. 24	**EAA Annual Rally** - Hosted by Silicon Valley Chappter. Located at Lockheed parking lot (near the formerly blue cube) at south end of Moffett Field, 9am-5pm. For more info, call Lee Hemstreet (415) 493-5892.
SEP. 23-25	**Second Annual New England Eco Expo** - Boston, MA. Environment-related seminars and exhibits. Call (818) 916-2700.
SEP. 27-29	**WESCON '94 - West Coast Electronics Trade Show**, Anaheim Convention Center, Anaheim, CA. EAA plans to repeat the highly successful EV Showcase. Call (800) 877-2668.
NOV. 18-19	**EV Weekend '94** presented by Phoenix EAA. Rally Ride and Drive & Scrutineering. Questions about it? Call Phil Terry (602) 243-5833 or Fax (602) 243-5812.
OCT 3-5	**S/EV'94. Sustainable Transportation and Solar/Electric Vehicle Symposium.** The NorthEast Sustainable Energy Association (NESEA) will host a series of workshops and a trade show. This is the one that the big three bring cars to! Providence, RI. Contact NESEA for more info. Tel. (413) 774-6051 Fax (413) 774-6053
DEC. 1-7	**EVS 12** at the Disneyland Hotel and Convention Center in Anaheim, CA. Includes a parade, press events, expo, and conference. Contact: SHO 167 South Antonio Road, Suite 10 Los Altos, Cal. 94022 Tel. (415) 949-2050. Also EPRI (415)949-2050.
AUG. 5-7, 1995	**REDI Conference** in Willits, CA. For more info, call (707) 459-1256 or Fax: (707) 459-0366.

Anna Cornell, EVents Co-ordinator 510-685-7580

Why wasn't I converted to electric?

Board Highlights

(from minutes taken by Anna Cornell)

The monthly EAA Board meeting took place at 1:00pm on 6/25 at Stan Skokan's house. Attending were Bruce Brooks, Clare Bell, Anna Cornell, Lee Hemstreet and Stan Skokan. Since there was not a quorum of six, due to some members being out of town, the meeting was made informal.

Bob Wheeler stopped by to let us know that Peninsula chapter recently voted to change its name to San Francisco. Clare Bell made a motion to approve the previous meeting's minutes. They were approved.

Bruce Brooks, reporting for Membership Records, said that the new application form is providing valuable data about EAA members and their vehicles. He is entering the responses into a new database.

Brooks, Hemstreet and Skokan reported on EAA's finances and discussed the present insurance policy, which covers three major EVents per year.

Brooks suggested that a copy of the present bylaws be sent to chapters for review and acceptance. Also that EAA national provide each chapter with a list of their members and/or at-large members in their area.

Anna Cornell reported that she has recognized 45 new members who have joined since she took over answering the 800 number. She has received 581 total calls for information and has sent 236 packages this year. These figures were taken from 1/1/94 to 6/24/94.

Cornell also reported on the SEER/EAA preparations being made by the Activities committee. EAA will have excellent representation by members from the five Bay Area chapters. 18 EAA members have volunteered to staff the booth and participate in the EVents.

This year WESCON '94 will be handled by the L.A. area chapters.

Since Mike Slominski was on a well-deserved vacation, Stan Skokan presented information about the latest EAA budget. Bruce Brooks also discussed the budget and gave an in-depth review of newsletter costs.

Clare Bell requested that the WE'RE-IT women's racing team be granted chapter status (as a special interest chapter). The Board agreed that if WE'RE-IT would approve the EAA bylaws and follow them, the all-women team could be an EAA chapter.

The Board endorsed Bruce Brooks' suggestion to run a special CE issue for SEER, adding four extra pages of material equivalent to the previous EAA brochure. This turns out to be extremely cost-effective — much better than printing a separate handout or flyer. The same four pages can be adapted/ reused in a stand-alone handout without having to generate new text. Only some formatting changes are required. 1000 extra copies of CE are being printed for SEER.

Due to overlapping terms of Board members, 4 members need to stand for re-election this year and 2 for next year. This is being done for the sake of continuity, i.e. we won't be starting off with a new Board every 3 years. Anna and Lee are on the election committee and will handle collecting bios from all candidates and generating the proxy. Both will run in CE before the Board election.

The next Board meeting will be held at Anna's house, 1:00-5:00 PM on July 30th. The address is Anna Cornell, 60 Alan Drive, Pleasant Hill, CA, 95423-1902.

Letters to the Editor

Dear Editor:
I have a 1989 Chevy Spectrum with air conditioning, radio, heater, vacuum brakes and a modified automatic transmission. I drove this car in rain and shine conditions in 1993 for a distance of 102 miles. This car has a 75 to 100 mile range. It also has good acceleration. I use 18 batteries in a 108 volt system with Trojan 125s.

In another test I tried 10 12V Optima batteries and was able to reach a speed of 108 mph in a 2-mile stretch. At 600 amps, this drained the batteries in a total distance of 5 miles.

Gene Cosmano
Phoenix, AZ

Holy burned tires, Gene! Whaddya run in the Formula Lightning for fun? 1 MW silver-zinc missle-silo batteries? —CB

Dear Editor:
I have been interested in EVs for years. In a couple of years, I hope to convert my '87 Colt and give it to my daughter when she is old enough to drive. There are some good reasons and bad reasons to make her first car an electric.

1. She can't take a whole gang of friends.
2. She can't go very fast.
3. She can't go very far.
4. She will come home at night because that's where the battery charger is.
5. She will be home at a reasonable time or she won't be going anywhere the next day.
6. The bad part is that every boy in school will want to take a ride with her.
7. A good point, to offset the bad, is that with all the batteries, there is no back seat.

Hayden Stephens,
Santee, CA

You'd better get that car done soon, or buy an older conversion. With the progress that is happening in EV technology, all those "good reasons" will soon be going away. But thanks for the laugh (it could apply to your SON too!) —CB

Chapter News

Contributions to: Ruth M. Shipley 102 Brighton Rd. #3 Pacifica CA 94044 (415) 359-1541,CompuServe 73043,60 Internet 73043.60@compuserve.com

Sacramento CA

Tony Cygan recently bought a 1973 Porsche 914 and will begin converting it. At a recent meeting, member Jose Baer, who is employed by the Sacramento Municipal Utility District, updated members on the utility's project with a local EV dealership. Drive Electric leases Mini-Els that contain a sensor and PC interface box installed by SMUD that tracks vehicle use.

San Diego CA

At a recent meeting, members heard from Dean Endres, instructor of Automotive Technology at Southwestern College in Chula Vista. He will be adding courses on EV technology to the curriculum. Russ Lemon introduced members to the information on EVs that is travelling on the information superhighway (the Internet). Don Eskridge is road testing his converted Ford Mustang coupe.

Member Ads

FOR SALE: 1980 Renault Lectric Leopard, 72V System, Curtis controller, US 12V batteries, Phasor charger, Goodyear Low Resistance Tires. Good condition. $6,500 or offer. (Oregon) Call eves. (503) 297-6767

FOR SALE: Extra Supplies, including cable; wire, heat shrink and some experienced contactors, motors and circuit breakers. All at 1/2 cost. Call Greg @ (916) 455-5200.

FOR SALE: Electric Moped, 3.5 HP motor, new 30A Todd charger, 30 mph, needs little work. $350. Call John at (415) 961-6798.

FOR SALE: 1981 Jet Electricas (Escorts), refurbished, PMC controller, new USB 2300 batteries on board charger. $7,500-8,500. Call (415) 964-3974.

FOR SALE: 1981 Jet Electrica (Ford Escort), new brakes, wheel bearings, suspension and vacuum system. Good batteries, tires, pain and interior. Motor and controller needs repair. $3000/obo. Call Phoenix Chapter EAA (602) 250-2131.

ORDERING INFORMATION: $7 for the first 25 words. Each additional word, 25 cents.

Please send check payable to Electric Auto Association, 18297 Baylor Avenue, Saratoga, CA 95070.

Want Ads are available to EAA members for the sale of electric vehicles, equiment and parts. The EAA is not responsible for the accuracy of ads. Please see advertising rates on next page for commercial products.

Electric HOT Plates!

Current EVents will show a vanity license plate from one of our members electric vehicles. If you spot your license, send us a picture and brief description of your car for publication in an upcoming issue of CE.

The AUGUST issue plate [SEY WATT] belongs to Kitty Rodden in the Burbank Chapter in Sierra Madre, California.

Advertising Rates

ADVERTISING RATES

QTY AD SIZE		1 AD	3 ADS	12 ADS
Full page	7.25" x 9.25"	$375	$300 ea	$250 ea
1/2 page	7.25" x 4.50"	$175	$125 ea	$100 ea
1/4 page	3.50" x 4.50"	$100	$ 75 ea	$ 65 ea
1/8 page	2.0" x 3.5"	$ 75	$ 65 ea	$ 50 ea

- Ads may be placed for 1, 3 or 12 months. Ads are due and payable at the time of the issue. Full payment for all issues must be received at the initial order along with the camera-ready copy. For 12 ads, an invoice will be billed quarterly. A minimum of 3 ads need to be prepaid per quarter.
- Provide camera-ready copy for each prepaid AD. Ads may be submitted on diskette in TIFF format. An additional discount of 10 %will be provided for ads received electronically.
- For changes to the ad copy, new camera ready copy must be received *before the 1st* of each month for the next issue and must be the same size to qualify for the discounted rate.
- AD size must fall within the sizes listed above. If ad exceeds the size, the next ad size will be charged or a $10 fee will be charged to reduce the ad. Ad rates are for black and white copy only. For additional color, please add $100 per color.
- Deadline for camera-ready copy is the **1st of the month**. Copy received after the 1st will be run in the next issue. Ads will be placed in the priority received. Prepaid ads will receive 1st priority.
- Please contact Susan Hollis, Advertising Manager at (408) 374-8605 or by FAX at (408) 374-8750 for additional information or assistance. Camera-ready copy and payment for the ad should be sent to: Electric Auto Association, Attn: Advertising Mgr., 18297 Baylor Avenue, Saratoga, CA 95070.

Index of Advertisers

EAA Reprints Requests

- ❒ **Discovered: The Perfect EV Battery ($2.00)**
  Facts about the battery that will change the world.
- ❒ ***Flywheel Energy Storage***
  Dr Richard Post **($5.00)**
  Dr. Post updates 1970's thinking and finds a viable solution.
- ❒ ***Team Tucson Land Speed Record Plans***
  Chuck Lemme **($5.00)**
  A wealth of technical considerations and many power and aerodynamic formulas.
- ❒ ***EAA XA-100 Hybrid* ($5.00)**
  Report on the EAA's Hybrid Vehicle Project (all 3 chapters)
  (Includes all tables)
- ❒ **Current EVents ($3.00)**
  Specify month/Year

ORDERING INFORMATION: Please send check payable to EAA along with your order form. Include $2 for postage and handling.

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