ELECTRIC AUTO ASSOCIATION

CURRENT EVENTS

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Breathe Deeply CARB Mandate Stands

By Clare Bell

ZEV advocates at the May 12 1994 California Air Resources Board review hearing in Los Angeles ceremonially removed their dust masks (worn all morning) at the instant the the noon sun shone down on their electric cars. The moment symbolized California's transition from a smog-choked giant to a state seriously committed to clean air and alternative transportation — a commitment that oil and auto industry opposition has been unable to weaken.

DEMAND CLEAN AIR was the name of the event, organized by Drive Clean '94 in association with the Coalition for Clean Air. It was also the cry of those who refused to allow special interests to turn the air into a toxic stew that robs Southern California children of 15% of their lung capacity.

Dennis Zane of the Coalition for Clean Air said that the ZEV rules "represent new jobs for Californians as well as energy independence for America."

"This isn't just about markets and technology," said Peter Quinn Hackes, Executive Director of Drive Clean '94, in a press release. " It's about kids who are growing up with lung damage." He pointed out that ZEVs are 97% cleaner, cost 1/4 to 1/2 as much to fuel, and consume 1/3 the resources per mile as gasoline cars.

The Air Board heard their voices. After two days of marathon hearings and 20 hours of testimony, Chair Jaqueline Schaefer announced that CARB would stand firm on the mandate that 2% of cars sold in the state by 1998 be zero-emission vehicles. CARB members

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Tour de Sol Winners

Solectria said they were going to do it again and they did. Their Force RS powered with Ovonics metal-hydride batteries took the NESEA's Tour de Sol American Commuter Category with a range performance of 214 miles and overall mileage of 659. Second in the American Commuter was UC Davis' Zinc-Flow "Endura" Prizm, racking up 572 miles with a per-charge range of 175. The prize for the best lead-acid powered car went to the 3rd placer, Bolton High School's Solar Bolt, from Bolton CT, with 464 miles completed and a 142 mile range.

Final standings as determined by the Northeast Sustainable Energy Association were based on a combination of rally times, range, total mileage and in some cases, efficiency in watt-hrs/mile. The combination of vehicle and driver made a winner, not just the car alone.

Top three in the Tour de Sol Commuter Category were the MIT Solar EV

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Features

Editor's Note

By Clare Bell

Internet Report on Tour de Sol

The news came flashing across the information highway to Current Events' computer via the lane called the Internet EV Discussion Group (EV@SJSUVM1.SJSU.EDU or EV@SJSUVM1.BITNET). Discussion Group on-site correspondent Mike Bianchi posted daily race reports, commentary and interviews as last week's American Tour de Sol progressed, giving EV netcruisers and CE a "virtual presence" at the exciting EVent.

CE already receives columns and stories via Internet, but the Tour de Sol marks another step up in our use of electronic resources. In the next few issues we will be presenting the highlights of Mike's reports plus comments from other EVDGers and EAA members present at the race. We'll also have technical information, including a look at the PowerCell Zinc-Flow Battery.

For those EAA Internet-cruisers who want to access the EV Discussion Group, send an e-mail subscription request to the EV listserver. The listserver address is LISTSERV@SJSUVM1.SJSU.EDU or LISTSERV@SJSU.BITNET. You subscribe to the list by sending the following message.

SUBSCRIBE EV (firstname) (lastname)

Example: SUBSCRIBE EV JOSEPHINE MEMBER

That should do it. Please note that the subscribe request should go to the listserve address (LISTSERV), not the list itself (EV). You will start receiving messages from "Electric Vehicle Discussion List". Be forewarned that this is an extremely active list; you can end up with 100 backlogged messages in several days. On the other hand, the list has invaluable information about EVs parts, sources, problems, hardware, etc. EAA members on Internet have used the list to round up cars for shows, get help on technical problems and even circulate electronic petitions in support of the California Air Resources Board.

Contributions sent by the list are automatically archived and you can get these by sending an "INDEX EV" and "GET EV" command to the listserver. The list can also be received in digest form (one big file once daily instead of a bunch of little ones dribbling in during the day). More information on LISTSERV commands is available by sending an "INFO REFCARD" command to LISTSERV@sjsuvm1.sjsu.edu.

Upon subscribing, you will receive a message with introductory information, including how to access the EV FAQ (Frequently Asked Questions). Also how to bail out if you get overwhelmed (UNSUBSCRIBE EV). Internet itself can be accessed via computer services such as Delphi, America Online, Compuserve and others. Most companies also have Internet access.

Go for a Netcruise on the Infoway (Information Super-Highway) — I'll see you in the EV lane! —CB (CBCE@delphi.com)

Front cover photo:
LA Road Rally and Tour de Sol performer — UCD's Endura.

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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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Membership/Address Changes
For information on new membership or change of address, please send your requests to:

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

Electrathon Competition News

By Steve Van Ronk

Rollover In Tehachapi Race

Electrathon America hosted races in conjunction with the Tehachapi Wind Fair on the weekend of May 21st and 22nd. During the Sunday race a two car accident occurred resulting in damage to both vehicles and a 360 degree roll over. The track was on a street with a large steel plate in a part of the course. On one lap the a vehicle driven by Allaire Paterson was making a corner inside of the steel plate while Jim Ludiker was rounding the outside. Clark Beasley had been drafting Lidiker and had taken the moment to make his run around Ludiker by following Paterson through the inside of the plate. In the passing, Beasley and Paterson vehicles collided, sending Paterson bouncing off the inside track while Beasley rolled. Reports say there were bruises but no serious injuries. Both vehicles suffered damage. Discussion following the competition reportedly agreed that the accident could have been avoided with better attention to the track set-up. Information from Electrathon America, P.O. Box 1722, Thousand Oaks, CA 91358

Clean Air Revival Quitting The Electrathon?

After four years of Electrathon racing Clean Air Revival(CAR) will probably cease to be active in the competition. This strong pioneer worked with Clark Beasley to introduce the first U.S. series, then went on to produce over 25 races between 1991 and 1993. CAR was the first to organize, Electrathon in schools, track workers training through SCCA, and vehicle builders workshops. They introduced the sport to California Industrial Technical Educators Association, Vocational Industrial Clubs of America, Explorer Scouts and many independent schools and clubs.

Lack of membership to organize competitions has prompted the decision to withdraw. This is unfortunate for enthusiasts everywhere. CAR is the only Electrathon group with a legal entity to provide for sanctioning, organization, and sponsorship open to all participants. CAR is a non-profit 501(c) corporation with other air quality projects ongoing and will only remain involved in Electrathon if new membership steps forth to help. Call (510) 486-8993, or write to Clean Air Revival, P.O. Box 6097, Albany CA. 94706.

High School Lesson Plan Based On Electrathon

The popularity of Electrathon in high schools is increasing through workshops where the students produce operating vehicles in as little as one week. An approach to teaching EV technology has been designed resulting in an inexpensive and fun way for schools with small budgets to create their own electric vehicle program. For less than $4,000.00 and one to two weeks of instruction students learn basic principals of electric vehicles by actually assembling an Electrathon. The sponsoring group then owns the vehicle built which can be used to exhibit or reproduce similar workshops in other schools in their region. Within three to six months local competitions between schools can be organized.

More information is available from SolarEVolution, 105 N. 1st Ave. No. 125, Sandpoint, ID 83865.

Tour de Sol

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Club's Aztec, with a 122 mile range and 402 miles total; the NHTI Solar Car Team from Concord, NH, with 95 mile range and 364 miles total on their Sungo; and a Vortex from SETS Racing Team, Enosberg Falls, VT, with 206 miles and 44 miles range.

Two Ford Ecostars and a Solectria Force GT took the leading slots in the Production Vehicle category. The first-placing Ecostar was fielded by Pennsylvania ElecTrans Council, Greensburg, PA and its sodium-sulfur powerplant took it 182 miles/charge for 599 total, with an adjusted time of 2:30, putting it over EcoStar #2 from Ford Motor Company, which had a range of 189 and total mileage of 612, with an adjusted time of 2:53. The Force NiCad GT did 162 range, 548 total. A Solectria E-10 out of NAVC, Boston, picked up the award for best lead-acid powered car in the category.

In the T de S Racing group, Salisbury School's Photon went 257 miles with an efficiency of 29 watt-hrs/mile (Salisbury, CT). Sunvox IV (Dartmouth University, NH) followed with 272 total miles, and Liberty Belle from U. of PA rang out 151 miles with 28 watt-hrs/mile. In Cross-Continental Racing, it was Drexel U.'s Sundragon IV (Philadelphia, PA), roaring (quietly) to a total of 217 miles, winning on an adjusted time of 11:26. Northern Light, shining out of Manko State, Mankato MN took second, with 260 miles and a watt-hr/mile efficiency of 36. SpiRIT IV, RIT, Rochester NY, took third and showed the highest efficiency in the group of 43 watt-hrs/mile.

Open class; Schiller Power Group's (Germany) CityCat clawed in first place with a 16:20 and 264 miles. Second place went to Team New England's TNE II, 107 range, best for the class, and 299 miles, adjusted time 18:19. 3rd was TIE-2 with 18:59, 286 and a range of 91.

(Thanks to Mike Bianchi of the Internet EV Discussion Group and Nancy Hazard of NESEA for final results)

New Product Announcements

K & W Engineering Model TD-100 Tachometer Drive

The TD-100 Tachometer Drive develops a 0-10 ma analog output proportional to the RPM of an EV's drive motor. Compatible with all 6.70, 8.00 and 9.13 Advanced DC series-wound motors, the unit's optical pickup detects the passing of a motor's fan blades. The signal goes to a processor box where an internal switch selects either a 19 or 21-bladed fan such as those used in Advanced DC models K91-4003, X91-4001, L91-4003, 203-06-4001, 203-06-4001A, FB1-4001, FB1-4001A. The output of the processor bus sends an analog display signal to the vehicle's tachometer, displaying motor RPM.

The TD-100 has a built-in calibrator and internal adjustments compatible with nearly all standard automotive tachometer movements.It will send a pulse train to drive a commercial aftermarket tachometer that is switch-selectable for 4-cylinder engines.

The TD-100 can also save your series motor-wound from being accidentally overspun. If the motor is "revved up" unloaded — in neutral or with the clutch depressed — the armature can be damaged, and the commutator can explode! The TD-100 can be programmed to activate its internal relay at 5000, 6000, 7000, or 8000 RPM, activating a warning device or cutting off power to the motor. The relay contacts are brought out to an external terminal strip and are rated up to 5 amps at 28 V DC. Internal power for the TD-100 is supplied by a vehicle's 12 VDC auxiliary system.

Projected price for the TD-100 — $219.00

K & W Engineering Model AH-100 Ampere-Hour Meter

The AH-100 Ampere-Hour Meter measures EV energy consumption as well as energy replaced in the battery pack during recharging. Incorporating a bi-directional current measuring capability, the meter will totalize ampere-hours, whether flowing into or out of a current shunt in series with the battery's bus lead.

A reset button is used to zero the AH-100 before driving or after charging. Zeroing is also done prior to operating the vehicle over a chosen driving segment, when experimenting with operating parameters, or when investigating the effect of vehicle modifications on energy consumption.

The AH-100 is internally-strappable for use with 150, 300, 400 and 500 amp standard current shunts. Basic meter accuracy will depend on shunt accuracy. Meter accuracy is maintained up to 650 amps, and is not degraded by current ripple caused by PWM motor controllers. Nonvolatile memory retains the count while the vehicle is shut off. Internal power for the AH-100 is supplied by a vehicle's 12 VDC auxiliary system. The front panel readout section is isolated from the main battery pack voltage for safety.

Projected price for AH-100 —— $219.00

Both items available June 1994. For more information, contact KTA Services at 909/949-7914.

Product information provided is not an endorsement by the Electric Auto Association. This announcement is provided as informational only. Current EVents may provide space for new product descriptions as space permits. Please contact the Editor for additional information.

EVs Prove "Right Stuff" in LA

"Fun Bun Run" — WE'RE-IT Rabbits in LA Clean Air Rally. Sandy Kapteyn, driver. **Photo: Allaire Peterson**

Top Finishers

Car No.	Laps	Car Description	Fast lap Spd-mph	Final Order
11	6	EX-11	1:25.783 66.727	1
3	4	EX-13	1:31.485 62.568	2
10	6	EX-10 midget	1:36.231 59.482	3
22	7	Lemans GTP	1:37.032 58.991	4
5	3	GE Formula EV	1:38.234 58.269	5
2	6	Lightning	2:12.886 43.075	6

US Energy Secretary Hazel O'Leary waved the green flag and dozens of EVs plus propane and natural gas-powered vehicles lunged across the starting line. It was the beginning of Drive Clean '94's week of alternative energy EVents, beginning on 4/9/94 with the Circuit City-sponsored World Clean Air Road Rally to Disneyland and finishing on 4/17 with the 1994 Exide Electric Grand Prix. The idea was to showcase a variety of energy alternatives in the world's number one market for clean air technology, smog-plagued Southern California.

To keep the eager Clean Air ralliers in line, two black-and-whites of their own breed led the way with flashing lights — one electric police car from Willits, CA and its natural gas counterpart from Long Beach.

Carrying resourceful drivers and quick-thinking navigators, the ralliers launched themselves into the maze of freeways and surface streets. Showing that EVs can take the most challenging traffic that LA can dish out, they climbed steep hills and daunting bridges, mixed it up with the semis, low-riders and Corvettes while popping spectator eyeballs all the way along the route; from the LA Convention Center to the Santa Monica Pier to the Queen Mary in Long Beach to the finish at Disneyland.

Clean Air Road Rally entries ranged in size from the Dutch Mini-Mouse, flown in on KLM (probably tucked under the seat) to a huge natural gas-powered garbage truck that could probably have picked up the Mini-Mouse with its dumpster-catching horns and taken it to Pasadena. There were enough electric Porsche 914s to stage an impromptu Porsche race down Santa Monica Boulevard and enough Rabbits to make a bunny hutch at the mobile charging station.

Points were awarded based on acceleration capability, course time and extra endurance laps completed. Classes included Electric Commuter, Alternative Fuels, Student Electric, Student Solar, Open, Bus and Electrathon. Winner of the Electric Commuter, the largest category, was the UC Davis "Endura", racking up a record 160-plus miles on a single charge (see UC "Endura" Wins Clean Air Road Rally, Current Events, June 1994). Second in the electric commuter class was driver John Dunning of Monrovia, CA in #16, Delco-Remy's Geo Metro. Third went to 1992 Rally winner Jesse James of Sunbelt Battery in Tempe, AZ in #84 Karmann Ghia.

Top winners were feted with a parade down Disneyland's Main Street USA, complete with rooftop confetti-cannons and cavorting cartoon characters driving Disneyland's own EVs. Actor Leslie Nielsen led the way in his US Electricar GTP convertible sports coupe, followed by the top electric commuters, hybrids, alternate-fuel vehicles and Electrathon vehicles.

On the following Saturday, April 16, at 2:00 PM electric formula race cars gunned their motors on the Long Beach Toyota Grand Prix track for the 1994 Exide Grand Prix. This year's race marked the debut of the Exide-12 racer, driven by Jim Hall and capable of speeds over 150 mph. Billy Roe in the Brawner MotorSports/Exide EX-11 took the race. SnoWhite, Bob Schneeveis' ground-up built/designed fast battery swapping terror, which has been the EX-11's closest competitor in the APS Phoenix Electric 500 Open class, had to drop out when a wheel hub broke during practice.

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Right Stuff

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The field of six also included Richard Zimmerman in the Optima Battery/GE Formula EV designed and built by John Gross of Oceanside, CA; the Circatree EAV-2 LeMans GTP designed and driven by Rex Ramsey of Glen Ellen, CA; the Carl Hayden High School Falcon Formula Lightning driven by Gene Cosmano of Phoenix, AZ; and the Exide EX-10 midget racer driven by Tim Considine.

Race sponsor Exide Corporation (founded by Thomas Edison) sees the 1994 Electric Grand Prix as a technological proving ground. "Racing has historically been the place to test the very latest in vehicle technology. We feel that the Electric Grand Prix will set the standard for emerging electric vehicle enhancements," said Mike Shaw, Director of Market Development.

Breathe Deeply

Continued from page 1

cited the rally outside as an example of public support for ZEV.

In listing reasons for upholding the ZEV mandate, Schaefer mentioned the recent advances in battery technology as demonstrated by recent EV competitions. James Worden's recent APS Phoenix Electric Stock A win in a Solectria RS using Ovonics nickel-metal hydride batteries was one example. Other encouragements include the Horizon lead-on-fiberglass technology, fast-charge methods pioneered by Norvik Technology, EPTI, American Monarch and others, battery swapping distance records by Diversified Technical Services, and the recent Clean Air Road Rally 160+ mile performance of the UC Davis Endura on PowerCell Zinc-flow batteries.

CARB did indicate it may allow hybrids in future, provided that their emissions did not exceed those equal to an EV recharge. This essentially restricts hybrids to fuel-cell or hydrogen vehicles.

Rally speakers included LA City Council member Ruth Galanter, who announced that the Council had declared the day of the rally to be "ZEV Day." In a letter to the rally organizers, Senator Barbara Boxer stated she was introducing legislation to repeal the luxury tax (for cars costing more than $30K) on EVs. This should help to ease the burden of high prices on late-model high-tech EVs.

Cars from Electric Auto Association of Southern California (EVOSC) and Electric Auto Association's Los Angeles Chapter provided additional hardware to back up the pro-ZEV arguments. Bob Sandoval's classic Peugeot conversion showed well beside US Electricar's late-model Prizm, a Ford Escort and CALSTART's "rolling chassis" component demo. PBS' Nightly Business Report carried coverage, as did CNN. Associated Press posted a wirephoto.

The EVs outside weren't just for show. Hector Carreon turned his electric Cobra into a 2-person carpool vehicle that commuted 30 miles into LA before car and driver charmed the socks off the TV camera crowd.

Drive Clean '94 was an effort of the Seal Beach-based International Electric Grand Prix Association which recently held the Disneyland Clean Air Road Rally and Exide Electric Grand Prix (See "EVs Show Right Stuff in LA"). In only three weeks, Drive Clean '94 managed to pull together a coalition composed of such unlikely bedfellows as Greenpeace, the American Lung Association, Union of Concerned Scientists, California Coalition of Machinists and the League of Women Voters. But all agreed to shelve their differences in order to support the endangered mandate.

The powerful lobbying and campaign effort launched by the oil and auto interests attempted to disguise itself as a coalition of "grass roots organizations". However it rebounded when Michael Parrish of the Los Angeles Times reported that the effort was almost entirely funded by the Western States Petroleum Association (see "Trying to Pull the Plug" - page D1, Los Angeles Times, 4/14/94).

In contrast to a spokesman for General Motors, who claimed that getting prototype high-energy batteries ready would take seven years, Ovonics Battery vice president Michael Fetcenko said he was confident that Ovonics could meet cost and performance goals. Nickel-metal-hydride batteries for laptops are already in high volume production and Fetcenko feels that the timetable will be 3-4 years. "We have no intention of waiting until 1998 to produce these batteries," he said.

(From Drive Clean '94 press release and Michael Parrish's LA Times article —CB).

CARB Recommendations

"In view of the rapid pace in the development of technology to meet the LEV and ULEV emission categories.... the ARB staff recommends that no changes to the ZEV implementation schedule be made._ Tremendous technological progress has been made over the last few years, and the staff believes that the ZEV mandate is the reason....

Changing the mandate would remove the main incentive for continued technological progress, potentially penalizing the companies which have already invested heavily in the development of future technologies as a result of this mandate. The gradual phase-in of zero-emission technology is the mechanism needed to help California progress toward a clean transportation future."

(from ARB Mail-out 94-17)

ESR-1 Challenges Gas Cars

By Shari Prange

The ESR-1 Prototype has made its first track demo at the San Francisco Region SCCA Season Opener at Sears Point Raceway. It had previously been track tested in January at Thunder Hill Park in Willows, CA. The car is the prototype for what will be the first production electric road racer.

The car's designers and builders were delighted with the results. "This is going to be one fast car," said driver Dan Sullivan of Electric Sports Racing. "I haven't begun to reach its limits." The car performed well on the hills at both tracks as well as on the flat. Its 85 hp motor powered by 120 volts of batteries, the ESR tested three times for 15 min durations at Thunder Hill, at average lap speeds of 62 mph. The tests went smoothly with no failures or unexpected problems. At Sears, the car turned in several demo laps. Once the battery packs are fully broken in and the car's performance limits are tested, it is expected to run a 25 min race at speeds up to 110 mph, with average laps speeds in the 75 mph range at Sears Point. In its final form, the car will have a 144 volt system, for 100 hp.

The ESR-1 is a joint project between Dan and Mark Sullivan of Electric Sports Racing (Sunnyvale, CA) and Michael Brown of Electro Automotive (Felton, CA). The Sullivans have designed, built and raced cars through the Sports Car Club of America (SCCA) for many years. Brown has 14 years of professional experience in converting gas cars to run on electricity for daily driving.

Together they plan to spend the year testing and demonstrating the ESR-1 for the membership and officials of the SCCA as well as the general public. "We're going to broaden a few horizons," said Brown with a smile. "By next race season, they hope to have a sanctioned spec class for the car, which will be in production. "Initial response from SCCA officials and members has been very positive. Everyone is interested in it and very supportive," said Dan Sullivan.

The car has a fendered fiberglass body with an open cockpit, and weighs 1,900 lbs. The chassis and body are modified versions of the successful "D" Sports Racing class of SCCA. The motor is a series brushed DC type, powered by flooded lead acid batteries. All components are in production from major manufacturers. The class is intented to be exciting and affordable, because the rules will keep the cars evenly matched. The deciding factor will be the ability of the driver. The cars will also be clean and quiet, a big plus for race tracks that are coming under fire over environmental and noise issues.

For more information, contact Dan Sullivan at Electric Sports Racing, (408) 739-ESR1.

(Electro Automotive, P.O. Box 113, Felton, CA 95018-1113, (408) 429-1989)

Weber State University & the HEV Challenge

By David A. Erb

We've all heard horror stories about college students: they're lazy, they don't solve relevant problems in their classes, they don't care, etc. Balderdash! I know a group of students who sweated blood for a year and a half for a measly six quarter-hours of college credit, and loved every minute of it! They're the Weber State University Hybrid Electric Vehicle (HEV) team and they speak well for the future of EVs and the country.

A little background is in order here. The HEV Challenge was announced in Fall 1991 as a student contest run by Ford Motor Company, the Society of Automotive Engineers (SAE), and the Department of Energy (DOE). College teams submitted proposals of their approach to creating an HEV, either by converting a Ford Escort station wagon or by building a vehicle from the ground up. Thirty teams were chosen. Ford donated new 1992 Escort wagons to 18 teams and checks for $10,000 to twelve ground-up design teams. The event was set for June 1993, with judging in emissions, range, acceleration, cost and other areas.

The rules included significant incentives for maximum pure-electric (ZEV) range, effectively dictating the design of a range-extended EV. No restrictions were placed on the choice of parallel vs. series configurations. Three fuels were allowed: unleaded gasoline, neat ethanol (E100), and a mixture of 85 % methanol and 15 % gasoline (M85). Separate conversion and ground-up classes were established, with equal prize funds.

The Weber State team, led by Mechanical Engineering Technology senior Kory Yelderman, adopted a motto of "Keep It Sweet and Simple" in converting its Escort. With a severely limited budget, the energy storage system (a 72-volt pack of twelve 12-V lead-acid Trojan batteries from Standard Battery in Salt Lake City) selected itself. The chopper-controlled DC motor was another Hobson's choice. Time limitations and the small team size dictated the use of gasoline and the removal of the back seat to accommodate the battery box with minimal structural redesign.

With no money for high-tech hardware, the team had to be creative. Already committed to a parallel system (for efficiency) integration became the key. The Escort transaxle has four speeds inside the case, with a fifth located under a sheet metal cover on the outside. In a stroke of elegant genius, the students tied the electric motor to the input shaft by replacing the fifth gear with a chain-driven sprocket. The stock shifter is used to select among first through fourth gears in either gasoline or electric mode.

The Weber State car first ran in mid-April of 1993. About 500 test miles were run before heading to Dearborn. Though limited, this shakedown proved crucial. The teams arrived at the contest to find most of the other teams hard at work on their HEVs, some still constructing, others trying to find glitches. Kory backed the car off the trailer (in ZEV mode, since it's much easier to control), and the team went back to the motel for some much-needed sleep.

The contest week was: exhausting, exhilarating, frustrating, fun, entertaining, educational, and worth all of the work it took to get there. Weber State placed a close second overall in the conversion class, winning the following awards:

1st in Cost Effectiveness, 1st in Emissions, 1st in Oral Presentation, 2nd in Range, 3rd in Commuter Challenge, Most Manufacturable Vehicle, Most Environmentally Friendly Vehicle, and SAE Design Excellence in Engineering Safety.

The University of Alberta won the class with an intelligently-designed, beautifully built, expensive vehicle. They also won a lot of new friends with great friendliness and sportsmanship!

Among the other things, energy usage was measured for all HEVs in both liquid fuel and electric modes. Weber's HEV achieved 28.5 mpg (2.44 miles per 10,000 BTU) on gasoline. In similar, though not perfectly comparable electric driving, the car went 8.47 miles per 10,000 BTU, equivalent to 98.9 mpg. How's that for a demo of the inherent suitability of electric power to traction applications?

For 1994, DOE will run the contest. A new class will use Saturn sedans as the basis for engine-electric HEVs. These will have minimal ZEV range, using the batteries mainly to smooth out the power flows and recapture braking energy. DOE plans to create new classes on a regular basis, phasing out old ones after a three-year life. The new class for 1995 will be engine-electric Chrysler Neons, with compressed natural gas engines. The 1994 contest will be held 14-19 June at Lawrence Technological University at Southfield, MI. Weber State's efforts will consist of improving electric range and acceleration, plus a few other tasks dictated by minor rule changes. The biggest challenge, as always, is finding money.

In closing, I would like to thank Ford, SAE, and DOE for having the foresight to start such a relevant and enjoyable event. If I've piqued your interest in the HEV Challenge, please feel free to contact me: Prof. David A. Erb, Manufacturing and Mechanical Engineering Technology, Weber State University, Ogden, UT, 84408-1802, tel. (810) 626-7025, or fax (801) 626-7531. Sponsorship checks are particularly welcome! —DAE

News in Brief . . .

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

SCAQMD Plans 50% ZEV by 2010

The draft version of the South Coast Air Quality Management District's 1994 management plan proposes that half of all new car sales be zero-emission vehicles by the year 2010. SCAQMD officials believe they underestimated the contribution of mobile emissions to air pollution in their 1991 plan. The 2010 goal is considered "a very aggressive target," according to Barry Wallerstein, SCAQMD deputy executive director, "but we have more confidence than ever in it now."

(KNIGHT RIDDER FINANCIAL NEWS: 4/28)

New GE EV Control System

General Electric DC Motors will market GE's new state of the art shunt motor automotive control system with on-board diagnostics through their master distributor for North America, Pro Electric Vehicles, Inc. (Pro EV).

The system is an integrated package including a shunt wound motor rated at 50 peak horsepower, fully enclosed IGBT based controller with finned heat sink, built in main contractor, dash display meter, and accelerator control box. Standard features such as variable regenerative braking, input voltage range of 72-144 VDC, on-board diagnostics, battery state of charge indicator, and hour meter are incorporated into the system, which has been in development for over 3 years. For more information, contact Pro Electric Vehicles at 916-432-5244.

(PRO EV NEWS: 4/94)

Tomoe Electric to Offer Affordable EV

Tomoe Electric Manufacturing Company, Ltd. (Japan) will offer an electric customized Toyota Corolla van for sale before the year's end. Equipped with a 192-volt zinc battery, the van can travel 80-100 km between charges and reach a maximum speed of 100 kilometers per hour. The motor, the battery and the body are all mass produced, keeping costs to 1.5 to 2.0 million yen ($14,700 -$19,600) each. Comparable EVs are being offered for 2.4 million yen ($23,500).

(COMLINE TRANSPORTATION WIRE: 5/2)

Supercapacitators May Advance EVs

Auburn University's Space Power Institute has signed a license agreement with Maxwell Laboratories, Inc. to develop and market double-layer supercapacitators. Supercapacitor technology could improve an EV's range and acceleration. The capacitor would be used when the car needs a short burst of energy during periods of acceleration. This would increase its range by reducing power demands on the battery.

Maxwell has opened a research facility at the City of Auburn's Center for Developing Industries business incubator program, and two Maxwell scientists will work at Auburn's SPI to make and evaluate prototypes. Depending on research results, the company will then build a plant to make supercapacitators at Auburn.

For more information, contact Maxwell Laboratories at 619-279-1554.

(BATTERY & EV TECHNOLOGY: 4/94)

CA Utils To Buy 1,850 EVs by 1998

Four major California utilities plan to buy approximately 1,850 EVs for fleet use before 1998, when major automakers will be required to sell zero-emission vehicles in the state. Southern California Edison and the Los Angeles Department of Water and Power hope to place 1,000 EVs in their fleets and with their customers in the Southern California area. Pacific Gas & Electric and the Sacramento Municipal Utility District plan to place 850 EVs in their service areas. The proposal is part of a plan by EV America, a national electric utility-led program to accelerate the introduction of EVs in private and government fleets by the end of 1997. For more information, call Bernard Peters of Southern California Edison at 818-302-2255 or Mindy Berman of LADWP at 213-367-1344.

(SOUTHERN CALIFORNIA EDISON NEWS: 5/9)

CA Poll Shows Support for EVs

The Zero Emission Vehicle Environmental Alliance recently released results of a poll showing that 60% of the 800 registered Sacramento, CA, voters polled support California's 1998 ZEV mandate. In the survey conducted by Fairbank, Maslin, Maullin & Associates, 28% also said they would be likely to buy an EV if the cost were below $30,000. The data were released just a week before the California Air Resources Board (CARB) reviewed its clean air mandate. The 1990 law says manufacturers must have 30,000 EVs on sale in the state by 1998 and 150,000 by 2003.

(UNITED PRESS INTERNATIONAL: 5/6)

News in Brief . . .

Union of Concerned Scientists Backs EVs

California could be stuck with a pollution control bill of $370 million if the state's ZEV mandate is overturned, according to a new report by the Union of Concerned Scientists (UCS).

In the report, "Driving Out Pollution: The Benefits of Electric Vehicles," UCS scientists found that replacing a gasoline vehicle with an electric vehicle in Los Angeles would be worth over $17,000 in avoided pollution control costs.

Using advanced modeling and the latest technical data available, the UCS study found the environmental benefits of EVs to be considerably greater than previously expected. Report authors said their work incorporated several key factors that were underestimated in previous research, including the number of vehicle trips and cold engine starts, acceleration rates, vehicle speeds and the emission levels of the dirtiest vehicles on the road. For more information, contact Roland Hwang, Deborah Gordon or Michelle Robinson at 510-843-1872.

(UNION OF CONCERNED SCIENTISTS NEWS: 5/9)

Electricar Sets Up Shop in Los Angeles

U.S. Electricar, Inc. (Sebastopol, CA) has received two grants from the City of Los Angeles and a third from the City of Anaheim, totaling $210,950 in funding, for an on-the-job training program at the company's new facility in Los Angeles.

Electricar Los Angeles is part of the company's efforts to expand production of its line of electric cars and pickup trucks. Located in South Central Los Angeles' "Watts Enterprise Zone," the facility will use the money to provide employment opportunities and retrain local workers. For more information, contact Alex Campbell at 707-829-4545.

(BUSINESS WIRE: 5/6)

SEI Offers EV Conversion Workshop

Solar Energy International (SEI) will sponsor a one-week hands-on workshop on EV conversions in Carbondale CO, August 1-5. Guest instructors Mike Brown and Shari Prange of Electro Automotive (Felton, CA) will teach participants how to install a commercially available EV conversion kit in a conventional gasoline car. Brown and Prange, authors of the step-by-step conversion manual Convert It, have been converting cars to electric power for 15 years.

The workshop costs $400. For more information, contact Laurie Stone at 303-963-8855.

(SOLAR ENERGY INTERNATIONAL: 5/94)

Moerman Develops EV Charging System

The Moerman Company (San Luis Obispo, CA) has developed a Bifronic Power Pedestal Charging System to meet current and future EV charging needs. Installing the prewired 110-pound charging station, which offers a standard 36-, 108-, 120-, or 144-volt DC off-board capability, takes approximately 30 minutes. The station can be moved by removing the Power Pedestal and replacing the vault lid.

A 36-volt, 220 AH battery pack can be recharged in 9 hours; a 50% charge takes about 3 hours for a deeply discharged battery. The unit has 120 and 240 volt plug-in receptables and can charge 4 vehicles at a time. The Electric Power Research Institute gave the Moerman Bifronic Power Pedestal a "market ready" award in its 1993 Curbside Charging Awards program.

For more information, contact Moerman at 805-544-6104.

(GREEN CAR JOURNAL: 5/94)

Calendar of EVents

JUNE 29-JULY 1	Fueling the Future: A Clean Air Transportation & Engine Show in Milwaukee, Wisconsin. Dept. of Energy is sponsoring this trade show. Call (414) 273-3070 for information.
JULY 4	Chevrolet Pike's Peak Hill Climb, Manitou Springs, CO (719) 685-4400
JULY 4-5	SCCA Solo 2 Divisionals at Candlestick Park, SF. EVs will be autocrossing with the gas cars. Contact Sports Car Club of America, San Francisco Region, (510) 373-7222
JULY 8-10	Formula Lightning support race to IndyCar Cleveland Grand Prix. Burke Lakefront Airport, Cleveland, OH. Collegiate teams competing, including battery exchange pit stops. Contact Kevon Makell, Centerior Energy, Cleveland, OH. Tel.447-3552
JULY 15-17	SEER is happening again! This year's SEER promises to be the biggest ever! New location: Redwood Empire State Fairgrounds in Ukiah, CA. Off of hwy 101 and appr. 100 miles north of San Francisco. Electric Vehicles, Human Powered Vehicles, Electrathons and Solar and Electric Boats. Call (707) 459-1256 Fax (707) 459-0366
AUG. 4	Carolina Vehicle Systems Consortium is having their second E.V. Conference. Guest Speakers and EV displays on University of North Carolina & Charlotte campus. Call the Transportation Studies Center for further details. (704) 547-3082
AUG. 7-21	Ener-Run III. This rally begins in Hardy, Arkansas and goes through 12 states before returning to Hardy, AR. Maybe the Clintons should enter a car. Contact Ener-Run Inc. for more information at P.O. Box 665 Hardy, AR. 72542 (501) 856-3877
AUG. 13	East Bay EAA Chapter will have a mini-SEER Ride and Drive EVent at North Berkeley BART station. EVs and Electrathon vehicles are welcome. Public hours are 9-4. Booths are available, first comers to arrive get first choice of spots (shady trees). Call Anna Cornell for info.
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	Phoenix EAA Presents EV Weekend '94. 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.

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

Activities Coordinator Anna Cornell has complete SEER information and registration forms. The E.A.A. will have a booth at the event, and Anna would like those of you who are interested in going to SEER to volunteer some of your time at the booth. Call Anna at (510) 685-7580 for booth sign-ups and information.

Electric Auto Association

CHAPTER CONTACTS AND MEETING LOCATIONS (3/29/94)

Arizona

Phoenix
Dan Merritt (602) 250-2131
POB 40153, Phoenix, AZ 85067-0153
Meetings: 4th Sat @ 8:30 AM - 11 AM
APS Public Service Center 400 N. 5th St., Phoenix, AZ

California

East Bay
Scott Cornell (510) 685-7580
60 Alan Dr. Pleasant Hill, CA 95423-1902
Meetings: 2nd Sat. @ 10 AM, PG&E Service Center 4801 Oakport St. Oakland, CA (off 880)

Los Angeles
Irving L. Weiss (818) 841-5994
2034 N. Brighton "C", Burbank, CA 91504
Meetings: 1st Sat. 11-1 PM, Pasadena City College, Rm C306, 1507 E. Colorado Blvd. Pasadena, CA

North Bay
Preston McCoy (415) 499-0601
750 Pine Lane, San Rafael, CA 94903
Meetings: 3rd Sat, 9:45-12 noon, PG&E Business Center 111 Stony Circle, Santa Rosa, CA

Peninsula
Ben Compton (415) 221-3413 300
2nd Ave. San Francisco, CA 94118
Meetings: 1st Sat 10 AM San Bruno Public Library El Camino Real and Angus St. San Bruno Downstairs meeting room

San Jose
Don Gillis (408) 225-5446
5820 Herma St. San Jose, CA 95123
Meetings: 2nd Sat. 10 AM-Noon, PG&E Service Center 111 Amaden Ave San Jose, CA

Sacramento
Mark Bahlke (916) 356-6767
Meetings: 2nd Sat. SMUD, 6201 S St. Sacramento, CA

San Diego EVA
Ron Larrea (619) 443-3017
9011 Los Coches Rd. Lakeside, CA 92040
Meetings: 4th Tues, 7 PM, San Diego Auto Museum 2080 Pan American Plaza, San Diego, CA 92101-1636

Silicon Valley
Chuck Olson
Address not available.
Meetings: 3rd Sat. 10 AM-1PM
Call for temporary location

San Luis Obispo
James Donnell
P.O. Box 1000, Morro Bay, CA 93443
Meetings: Contact James for time and location

Florida

Florida EAA
Bill Young (407) 269-4609
P.O. Box 156, Titusville, FL 32781-0156
Meetings: No meeting information

South Florida EAA
Steve McCrea (305) 463-0158
1402 E. Las Olas Blvd. #904
Ft. Lauderdale, FL 33301
Meetings: No meetings; just advises people on meeting locations and subscriptions

Nevada

Las Vegas
Gail Lucas (702) 736-1910
P.O. Box 19040, Las Vegas NV 89132-0040
Meetings: 3rd Thus. 7:30 PM, Desert Research Inst. Flamingo and Swenson, Las Vegas, NV

New England

New England EAA
Bob Batson (508) 897-8828
1 Fletcher St. Maynard, MA 01754
Meetings: 1st Sat, 1 PM in March, June, Sept, Dec.

New Jersey

TriState EAA
Kasmir Wysocki (201) 343-1252
293 Hudson St. Hackensack, NJ 07601
Meetings: Meets quarterly. Contact Kasmir for location.

New Mexico

Las Cruces
Dr. Jack Hedger (505) 546-0288
P.O. Box 1077, Deming, NM 88031
Meetings: 1st Wed., 7 PM, Engineering Assoc. Rm at El Paso Electric Div.

North Carolina

Southeastern EVA
Lawson Huntley (704) 283-1025
P.O. Box 1025, Monroe, NC 28111
Meetings: Contact Lawson for time and location

Ohio

Ohio EAA
Pete Gall
6875 Oakland Road, Loveland OH 45140-9723
Meetings: Now forming

Texas

Austin
Lewis Koiner (512) 990-9760
1413 Quail Run Rd., Pflugerville, TX 78660
Meetings: Call for location

Houston
Ken Bancroft (713) 729-8668
4301 Kingfisher St., Houston, TX 77035
Meetings: 3rd Sat. 12-5 PM, at above address

Virginia

Central Virginia
Jim Robb (804) 367-8907
1620 Grove St. #1, Richmond, VA 23220
Meetings: 3rd Sat. @ Science Museum 2500 W. Broad St. Richmond, VA

Washington (State)

Seattle EAA
Ray Nadreau (206) 542-5612
19547 23rd N.W., Seattle, WA 98177
Meetings: 2nd Tues, call for location

Northern Olympic Peninsula Electric Car Club (NOPEC)
Burton Gabriel (206) 437-2136

Washington DC

EVA of Greater Washington DC
David Goldstein (301) 213-3990
(301) 869-4954
9140 Centerway Rd. Gaithersburg MD. 20879
Meetings: 2nd Tues, 7 PM, Marocco's Restaurant 1120 20th St. Washington, DC

For chapter information and a chapter startup package, call Anna Cornell (415) 685-7580 or (800) 537-2882.

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

San Francisco Peninsula CA

Mike Slominski discussed his participation in the Clean Air Road Rally in Los Angeles at a recent meeting. He displayed EV charging signs he picked up from Dale Riddle of the Albuquerque chapter. The featured speaker at the meeting was Paul Brasch, who discussed his Precision DC Energy Monitor. Paul said the unit has been tested rigorously at various EVents. He even sold one to GM!

Sacramento CA

Tony Cygan related his experience at the Long Beach Grand Prix in the chapter newsletter. Mark Bahlke has been elected chapter president. He and Steve Smith made several trips to the state capitol to testify against two bills that would severely impact EV development. Assembly bill 2495 would have stalled the state's EV mandate while automakers caught up. It was mercifully euthanized in committee. Senate bill 1895 would prohibit the Public Utilities Commission from allowing electric utilities to pass their EV R&D costs on to ratepayers.

San Diego CA

Larry Emerson attended a Clean Air Week Luncheon sponsored in part by Commuter Computer. He took plenty of membership applications and reports that the event was well-attended. Chapter members have exhibited EVs at various environmental fairs and report that the public was very responsive. Several members testified at the biannual CARB review of the state's EV mandate in Los Angeles in March.

Vancouver BC

The guest speaker at a recent meeting was Richard L. McKie of Gamma Star Power International, Seattle. McKie discussed the company's Power On Demand Module, or POD MOD. The POD MOD is a solid state electric power supply system that allegedly produces more energy than it uses. Members could not confirm this apparent violation of the laws of physics because McKie did not bring the unit to the meeting. Bill Glazier will resign as newsletter editor effective June, 1994. His efforts will be missed. The May newsletter includes a copy of a 1912 advertisement from The Literary Digest for the Detroit Electric. The chapter has restored one of these vehicles and is looking for places to exhibit it.

Member Ads

FOR SALE: 1981 Lectra Centurian, (Datsun 200SX hatchback), 20hp Prestolite w/experimental regeneration, 114v, PMC transistor controller, gas heater, full equipped. Needs batteries & minor body work. $2,500. Call (415) 388-0838.

FOR SALE: 1981 Jet Courier Pickup with optional camper shell, 30hp GE, 120v, PMC Mosfet controller, batteries under bed, gas heater, runs well. $6,500. Call (415) 388-0838.

FOR SALE: 1981 VW Rabbit, professional conversion, 108V Siemens 21hp motor, EHV Systems controller, Lester onboard charger, Sevcon DC/DC converter, fresh batteries. Cars is like new with only 2500 miles. $9000. Call Brad (216) 734-4309.

FOR SALE: Copper Wire 3/0 gasoline-Oil Resistant 192 feet. $1/per ft or offer. Call (408) 739-6808.

FOR SALE: Jet Electrica, 96v, Curtis Controller, middle-aged batteries, low miles, excellent interior and good paint. Will deliver. $5000. Call Dale, Albq, NM (505) 260-0070.

FOR SALE: Excellent new conversion Electric Pickup, show quality, tilt bed, 120v, speed 85mph+, range 75 miles. 9th place at L.A. Disney Road Rally. Will deliver. Call Dale, Albq, NM (505) 260-0070.

WANTED: Parts (Any EV components), unfinished project car, or EV needing restoration. Call Dale, Albq, NM (505) 260-0070.

WANTED: Ford Pinto converted to electric, semi-finished project car OK, or reasonably priced finished car. Call (201) 839-9053 - NJ

Rates for Want Ads

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

Want Ads are available to EAA members for the sale of electric vehicles and related products. For display ads of commercial products, please see the Advertising Rates on page 15.

Send your Want Ads to EAA/Want Ads, 18297 Baylor Avenue, Saratoga, CA 95070. The check should be payable to EAA and included with your ad. The EAA is not responsible for the accuracy of ads.

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

Advertisers

EAA Reprints

- ❒ **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.

EAA/Reprints
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