

ELECTRIC AUTO



NEWS

October 1990

ASSOCIATION

Vol. XXIII NO. 10

THE AGE OF ELECTRIC CARS IS DAWNING

I have been a member of the EAA since 1971 and I believe in the truth of the above statement now more than ever. Let me tell you why.

Over the years I and other longtime club members have seen the interest in electric cars rise and fall. They did this mostly with the relative price of gasoline, but especially with the availability of gas. In the mid 1970's the attendance at the Santa Clara chapter rose to 50 and then jumped to over 100 at the very next meeting when the gas lines started. People saw the electric car as a way to get to work and keep their jobs. Everyone wanted an electric car right NOW! They were disappointed to find that there were few homebuilts for sale, and even fewer commercially converted cars available.

As they learned how much work was involved in converting a car yourself and as people found that they really could afford to pay the outrageous price of 85 cents a gallon, the interest and attendance waned. Energy independence, conservation, and alternative energy became new words in daily vocabulary. The government started the Energy Research and Development Administration (ERDA). Later changed to the Department of Energy. Several small companies offered converted cars for sale.

Then the Reagan Administration was brought into being by a public that only wanted to hear the message of "Don't worry, be happy". Don't face problems, and deal with them, but ignore them and they will go away. Well we lived an entire decade in that Fantasyland and now the chickens have come home to roost.

In the meantime the environmental issue has grown to major proportions. The public is dimly becoming aware that everybody is breathing everybody's cars' exhaust as a slow form of suicide. Closing the garage door only speeds up the process.

Now comes yet another energy crisis, but this time the issues are price, availability AND the environment. At the same time, the electric car has been proven to be a direct replacement for the gas guzzler. General Motors has proven what we in the club have known all along, and have tried to show the world--that a car designed from the ground up as an electric can match a gasoline car's performance. Indeed the Impact blows the doors off that Nissan 300ZX in their videotaped drag race.

The last stumbling block to wide acceptance of the electric car is the public's perception of the possibility of running out of electricity "in the middle of the block" and being stranded there, unable to walk to the nearest gas station and return with a can of electricity. We of the EAA know that that is not the reality. We always have plenty of forewarning via slower acceleration times, and do NOT just cough, sputter and die as a gas car does. But the public believes that is the case. The remedy is the acceptance that

an onboard generator as a range extender is not a debauchery of the "pure" electric, but is instead a compromise that eliminates the public's fears and allows long distance travel at greatly reduced pollution levels compared with a regular gas car. The hybrid car is the bridge between the gas hog and a future long distance "pure" electric.

The crisis in the Middle East brings all this to the forefront again. But this time there is more to it. The stakes have been raised. The practical capabilities of electrics have been improved. Indeed, with the energy back-up ability of a hybrid the public has more freedom to travel as they are not forced to go to a "service station" as often.

Of course the electric car can help solve the smog and energy problems, but it does not help with traffic congestion. People as mobile animals will always want the freedom of movement, but what is better than ride sharing in an electric? The recent "Beat The Backup" parade showed more than a dozen electrics to the public. Our 18th annual rally demonstrated over 90 miles on a charge at normal street driving conditions for the top two pure electrics.

All these are reasons for the electric to come into its own. Just a reading of the newspapers shows more articles about electrics this year. This company or that is planning actual production of electrics. And on the Sept. 20 Carson show with Jay Leno, Ed Begly Jr. talked for 2-3 minutes about his Bradley electric - straightening out Jay's misconceptions about electrics. A better testimonial we could not have had. And better still he said that he doesn't even use LA Power and Light to charge it. He has solar cells on his house for that.

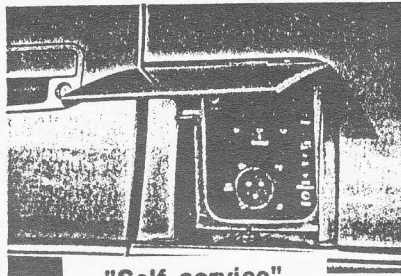
With all this and better batteries also soon to arrive (there is a startup company in Berkeley working on a promising one), the future for electric transportation is bright indeed. Whether charged by solar, wind, or the local power company - using mere lead acid batteries or something better - its going to happen, and it is starting to snowball right NOW. Keep on charging. - Pb - 9/24/90

Next month: an analysis of the 18th SCEAA rally, the good, the bad and the ugly.

How About Owning And Servicing An Electric Car?

Owning or servicing an electric car will not be very different from a gasoline-powered model. However, there will be differences. Generally, there will be more replacing of components than repairing them. There is no exhaust or ignition system. And, the electric motor should last the life of the vehicle.

"In theory EVs are simple and easy to work on," explained Gary Purcell, Project Mgr. for Electric Vehicle Development at the Electric Power Research Institute. "They are reliable



and require less maintenance," he said. In fact, there is a trend in the auto industry to make all auxiliary systems electrically-powered because these components are more efficient than those driven off of an internal combustion engine.

In other words, an EV calls for only 50% of the maintenance required on gasoline-powered cars and can be serviced by existing auto dealers and service stations. The usual periodic maintenance and a visual inspection every six months is all that will be needed. Water will have to be added to batteries periodically—in the case of the lead-acid battery, every 3 weeks. But a sealed battery, such as the one used in the Impact (photo below) would not need any regular water replacement.

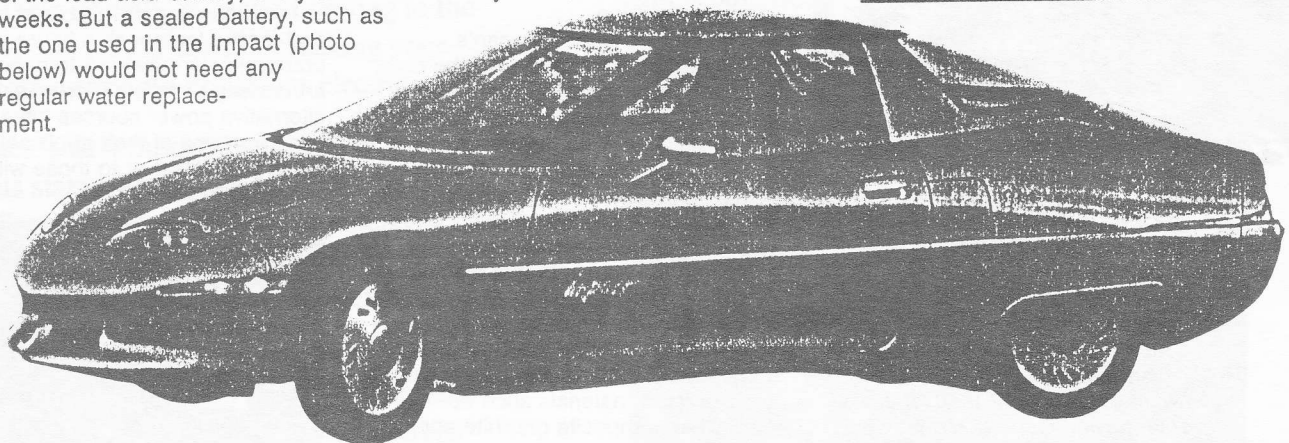
Typically it takes all night to recharge a battery on an EV to its full driving capacity. You simply plug your car into an electrical outlet (as shown) and it's ready to go the full driving range the next morning. In addition, the brakes on an EV have regenerative capability. That is, when the driver applies the brakes he or she will slow the car and recharge the batteries simultaneously.

Since the battery plays such a crucial role in determining the driving range of the car, it's hardly surprising that there was such excitement in the industry, when an article appeared saying Isuzu Motors Ltd. had developed a power storage unit that could be recharged in 30 seconds!

According to Brown and Purcell, what they were really talking about was a capacitor and not a traction battery. A capacitor, unlike a battery, according to Purcell, "cannot hold its state of charge." It is only capable of power surges and therefore is a good augmentor. So it can be used in conjunction with the main battery, for example during acceleration, but it cannot replace a traction battery.

Given all the benefits, what market need can EVs fill? According to Purcell, in these earlier stages we have to match the technology to the market we have. If EVs, with their limited range and capability, can only serve the fleet van market, then so be it.

Referring to the Impact, David Sloan, Spokesman for GM's Advanced Engineering Staff, said, "the range of the vehicle suggests that it won't be a primary car for customers." It will be marketed as a second family car.

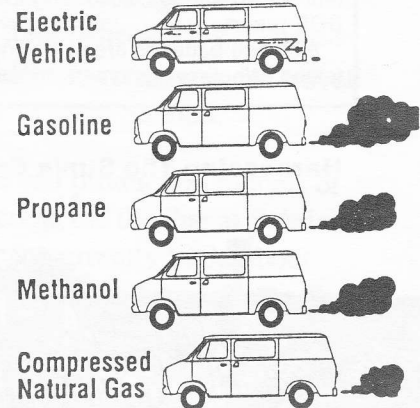


A Matter Of Choice...

In the alternative fuels race, methanol has been leading the pack in recent years. Numerous flexible fuel test programs are underway, using vehicles with both methanol and gasoline use capability. Yet, when GM recently decided to mass produce a vehicle with an alternative power source, the fuel turned out to be electricity! Why so? Because EVs have a clear advantage over any other alternative fuel, emphasized Purcell. They are, by far, the only vehicles on the road with zero tailpipe emissions.

While researchers are still wrestling with formaldehyde and other emissions from methanol, CNG and ethanol, EVs are 97% cleaner, even when emissions from power generating plants are taken into consideration, said Schweinberg. EVs would decrease the air pollution of HC, CO and NOX that are emitted by gasoline-powered cars.

Comparison of Vehicle Emissions



ELECTRIC CARS

continued

Power Source

Despite advances in battery technology, it is still a challenge to get as much range and energy as that from a regular gasoline-powered car.

For practical EVs, a high level of battery performance is required to provide an adequate driving range. A new design concept, the forced electrolyte lead-acid battery, has greater energy, less sensitivity to discharge rates and retains more power at all discharge levels than standard batteries. But an acceptable life cycle is a major hurdle in its development.

In terms of technical feasibility and commercial development, the sodium/sulphur battery invented by Ford, and now powering their ETX II van, holds promise as a potential for EVs, due to its 200-mile driving range and 5-year life cycle.

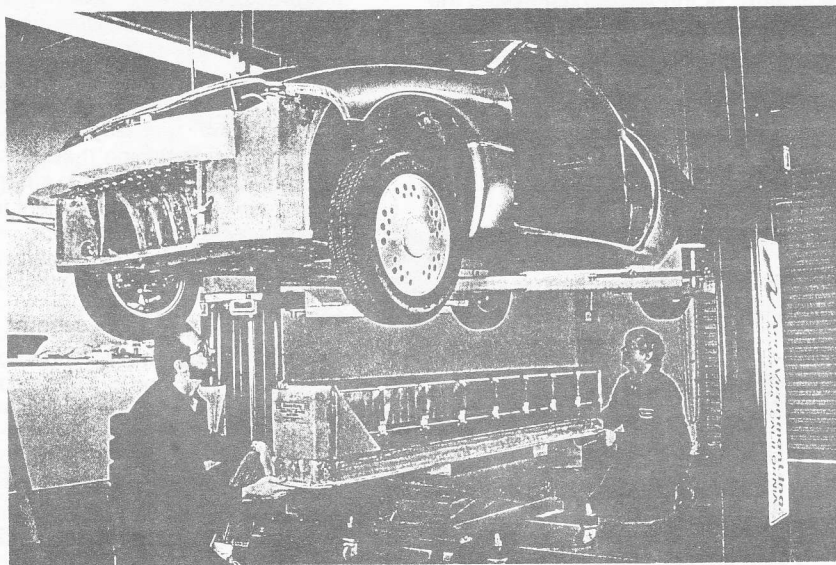
The nickel/iron battery in Chrysler's TEVan, is extremely rugged and has the longest life cycle among the potential EV batteries, according to a US DOE report.

All these batteries are still being tested. Whether customers will be of-

fered one kind or a variety of choices, we are yet to know.

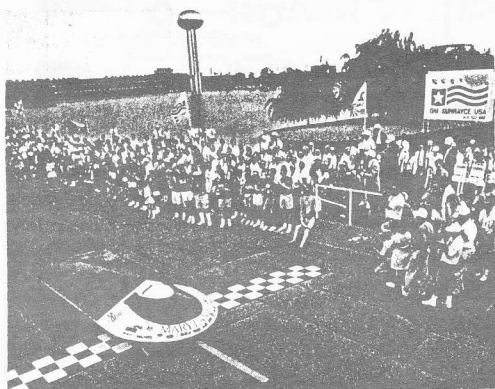
However, what we *do* know is that with the issue of energy indepen-

dence rearing its head once again and clean air becoming a luxury, electric cars may be on the verge of a comeback!



(photo: GM Impact)

Harnessing The Sun's Energy: Solar Vehicles



The idea of a vehicle powered by the free and unlimited energy available from the sun has great appeal. You need not be an environmentalist to appreciate the scenario of millions of commuters whizzing along in virtually silent, pollution-free cars.

Aware of the potential advantages of solar power, General Motors sponsored the GM SUNRAYCE from July 9-19, 1990, covering some 1800 miles

from Lake Buena Vista, FL, to Warren, MI. The purpose of the event was to test the durability and perhaps even the feasibility of using solar power for personal transportation. The SUNRAYCE was sponsored by GM and its Chevrolet Div., the Society of Automotive Engineers, and the US DOE. Some 32 institutes of higher learning entered the contest with all entrants finishing.

The University of Michigan's *Sunrunner* (below right) won the race. They crossed the finish line in 72 hours plus change. Place and show positions were filled by Western Washington University and the University of Maryland respectively.

These vehicles use relatively large photovoltaic panels (solar panels) which convert sunlight into electricity which, in turn, is used to power a small motor. In the case of the Solar Flair, constructed by the Calif. State Polytechnic Institute, the construction incorporated materials such as Kevlar—a composite graphite epoxy.

Sunlight was the only power source allowed for the vehicles during the

race. Batteries could be charged from the solar panels for two hours every day before the start and finish of the race and during the 10-min. stops along the route.

This race made several solar-powered personal vehicle deficiencies apparent—the average speed of these vehicles, the cost of materials, and the fragile nature of the materials.

The technology available at present and for the foreseeable future, makes practical solar-powered transportation an unlikely prospect. For now, other alternative power sources have the edge in terms of their applicability to current vehicles, or to those with reasonable modifications.



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State Legislator Campaigns In EV, Supporting Local EV Industry

Fran Bohnsack, a candidate for Florida's state legislature, is taking her environmental concerns on the road. "Electric cars will play an important part in reducing the level of air pollution," she says, and to prove it she is campaigning door-to-door in a 10-year-old Commuta-Van.

Bohnsack is running for the District 14 seat (Coral Gables and South Miami) in Florida's House of Representatives. Her interest in EVs stems not only from improving air quality, but also from an ever-greater concentration of oil tankers off Florida's shores.

CONTACT YOUR CONGRESSIONAL REPRESENTATIVE

C.A.F.E.

(Corporate Average Fuel Efficiency) clause should be contained in the Clean Air Act.

Be sure that he/she includes credits for electric cars.

"I encourage everyone who is concerned about the presence of oil tankers off our coasts to remember that it is our driving and demand for gasoline that created the circumstances that led to the Alaskan oil spill," she points out. "If you can bicycle or walk instead of driving to the store, please do it. And consider making your family's second car a no-emissions electric car."

Bohnsack's first outings with the EV met with curious stares, according to her media coordinator, Steve McCrea. After prominently marking the EV as being powered by electricity, however, more and more people have expressed interest in finding out about electric vehicles.

Bohnsack notes that even though EVs create 98 percent less smog-related gases than conventional vehicles, Florida state law does not mention EVs as an additional measure to improve air quality in metropolitan areas. The energy conservation plank in her campaign will include the use of EVs to decrease air pollution and consumption of fossil fuels.

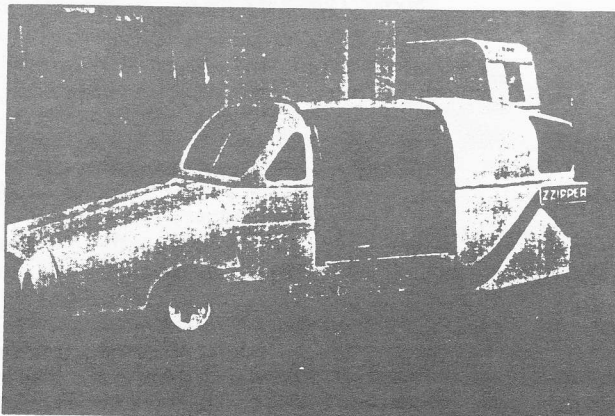
Local EV Dealer Helps Out

The Commuta-Van was loaned to Bohnsack's campaign by Albert Navarro, owner of Pro Electric Vehicles. "I am a strong believer in electric vehicles," says Navarro. "I support any candidate who takes a risk and makes the public more aware of electric cars. Detroit wants people to wait until 1992 for their electric vehicles. Anybody can drive the car of the future today — and I applaud Fran Bohnsack for taking an interest in these no-pollution vehicles."

The Miramar, FL-based golf cart and industrial truck dealer has already sold three reconditioned Commuta-Vans and has 19 more available. About 360 of the vehicles were built in 1980 and 1981 by Commuter Vehicles (Sebring, FL) for the U.S. Postal Service.

Commuter Vehicles has since reorganized under the name Sebring Auto-Cycle and is building Zipper, a three-wheeled EV. The distinctively designed electric commuter can travel 60 miles on a charge at up to 55 mph.

Navarro hopes to sell production models of the Zipper as they come off the line at Sebring Auto-Cycle, which can currently build about one Zipper per week. According to James Ter-vort, director of Sebring Auto-Cycle, the company hopes to build at least 35 Zippers by the end of the year. "We want to finish the year with production at four units per week," he says.



Sebring Auto-Cycle's Zipper is a modernized and improved version of the Commuta-Van.

Students seek to build winning solar-powered vehicle

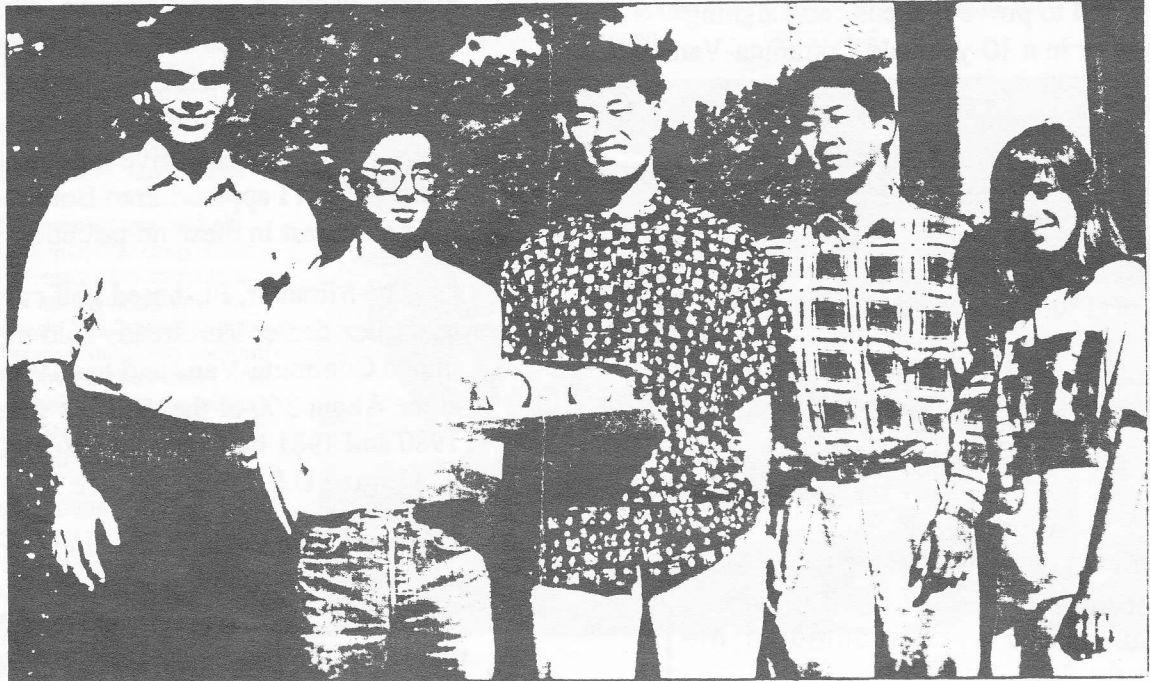


PHOTO BY JENNIFER SANDERS

Jonathan Beck, Jim Park, Joe Choe with car model, Spencer Quong and Debbie Kelsey.

Three-year project to cost \$1 million

By T. Christian Miller
Staff Writer

In their quest to make a cleaner, more environmentally sound automobile, two UC Berkeley undergraduates believe they have seen the light.

Spencer Quong and Jim Park, both seniors in material science engineering, are heading a team of 100 UC Berkeley students to design and build a solar-powered car to race in the 1993 World Solar Challenge in Australia.

"It's a huge project," Quong said. "We want to design and manufacture a solar-powered vehicle (and) develop innovative technology to promote the use of solar energy in the future."

The contest, held every three years to showcase the latest developments in solar energy, pits about 40 solar-powered cars against each other in a contest that Quong described as both "an endurance race and a long sprint."

Quong said the teams will race from 8 a.m. to 5 p.m. each day, and that the fastest vehicles take about 5 days to complete the 1,867-mile course through the rugged Australian Outback.

Quong and Park are trying to raise \$1 million to fund the massive project, which they have dubbed Calsol, and are seeking \$10,000 from the university for seed money to begin the project.

The duo have sent a project proposal to Chancellor Chang-Lin Tien, Quong said, adding, "The chances (of getting the money) look pretty good. We've had a lot of support from department heads."

Park said the project, begun over the summer, has attracted students from a variety of fields.

"We're pulling in a lot of different people, and it's a good way to learn from each other," said Park, noting that students from mechanical and electrical engineering, computer science and business administration majors were participating.

Quong said three cars will be developed over the next three years, with the first working prototype ready to hit the track in August, 1991. He said the group plans to test two of the cars in other solar-powered vehicle races before the big competition in Australia.

"You have to keep an open mind in developing the cars," said Quong, adding that one person suggested building a steam engine to power the car.

"It's pretty archaic, but efficient,"

Quong said. "You can't turn down any options."

Park said that although the project has already enlisted the help of 100 students, more are needed.

"The biggest thing about this that interest me is meeting people and getting students involved in the project," he said.

The project also is a chance for engineering students to make valuable business and industry contacts and at the same time become involved with other members of the student body, Park said.

"The one thing people forget is that this project's going to be a lot of fun," he said.

Both Quong and Park believe that with enough research and support, they will be able to win the race.

"We're coming from Berkeley, one of the best engineering schools in the nation," Quong said. "There's nothing we can't do."

"I believe that if we go through enough trial and error, the ultimate goal (of winning the race) will be achieved," Park said.

The group will host a meeting for interested students and professors today at 5:10 p.m. at 310 Hearst Mining Hall.

Rally Results East Bay (CA) Chapter

On August 11th of this year, The East Bay Chapter held their annual road rally at Lake Merritt in Oakland, California. Eight cars ran the 3.9 lap course with Lloyd Wenzel's Honda taking first place in milage with 46.8 miles. John Waslina's Renault took a first place with 47.34 mph per ton of battery and Scott Cornell's VW Rabbit captured a first with 89.57 miles per ton of battery. Congratulations to the other entrants for their good work: Carl Shaffer, M. Milton, Van Scyoc, Dave Cole and Lou McMillin.

from Southern California EVA

Solar Airplane Completes Transcontinental Flight

Eric Raymond, designer and builder of the SunSeeker, a solar-powered airplane, has piloted his craft successfully across the United States. Because of high winds and a dismal weather forecast, Eric concluded the flight 9 miles short of Kitty Hawk on September 4th and caravanned the plane the remaining distance.

While the Sunseeker started the flight nearly a month before, most of the time was spent on the ground enroute, including one 9-day stretch, waiting for good weather.

Once Eric is back and rested, we'll try to get him over to the club to talk about his experiences!

If you recall, the SunSeeker takes off under its own power, using an electric motor powered by D-size Sanyo NiCads to climb to altitude. At this point, the motor is shut off and Eric relies on the aerodynamic efficiency of his craft to work thermals (which are solar-generated) to stay up and fly toward his next evenings roost. During flight, the battery bank is recharged from solar cells that cover the wing and tail surfaces.

Eric, we salute your efforts, vision, and courage.

EVS • Electric Vehicle Systems, Inc.
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With these features the charger pays for itself with increased battery life and decreased power costs.

SPECIFICATIONS

Input:	110 V AC, 15 Amps
Output:	0-145 V D.C., 0 - 14 Amps
Efficiency:	90%
Size:	10" x 12" x 4"
Weight:	11 pounds
Price:	\$525/1 \$475/5
Guarantee:	1 year
Availability:	October 1, 1990

DC TO DC CONVERTER

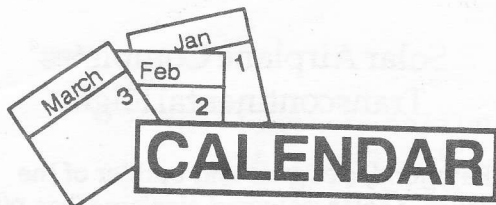
This newly designed converter is totally electrically isolated from the main battery pack. It replaces a 12 volt accessory battery totally, with a net weight savings of almost 50 pounds. With this converter you can drive safely at night or in the rain. No longer will you have the worry of charging your accessory battery. All the 12 volt power you need -- at the turn of your key switch.

SPECIFICATIONS

Input:	50 - 120 V D.C.
Output:	0 - 30 Amps @ 14.5 V D.C.
Efficiency:	85%
Cooling:	1.2 watt fan, integral
Size:	10" x 7.5" x 3.1"
Weight:	4.2 pounds
Guarantee:	1 year
Price:	\$400/1 \$350/5 or more
Availability:	October 1, 1990

FOR SALE - 96V PRESTOLITE DC MOTOR

I have for sale a 96V Prestolite DC motor, which includes a Bill Palmer mounting assembly and is fitted with crank hub for mounting to a Courier or Mazda transmission. It also includes mounting assembly for mounting to a frame. PMC controller with fan and documentation. Lester 96V/12V charger. 2CM 76 Aircraft series motor (generator). 600A and 1000A power relays. 50mv/600A shunt. 52-2/90 solder lugs. 1-4/0 and 1-2/0 quick disconnect flexible neoprene welding cable; 40 ft of 4/0 and 130 ft of 2/0. Would rather sell all as a package deal. Make a profit on unused parts. \$1,600 or best offer. Call 916/961-6892 after 2:00 PM.



November 11, 1990, 2nd Annual Solar EV Symposium, sponsored by American Tour de Sol of the Northeast Sustainable Energy Assn, Manchester, NH. Contact NSEA, 413/774-6051

November 25, 1990, World Solar Challenge Darwin-Adelaide, Australia, Energy Promotions, P.O. Box 290 Bribie Island, Qld 4057

December 3-5, 1990, 10th International Electric Vehicle Symposium. BDG Mgmt, Ltd. Ste 705, East Town Bldg., 41, Lockhart Rd., Hong Kong

Please do NOT contact Trojan Battery Co. They do not sell single cell batteries. Thanks.

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Desert Research Institute
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WASHINGTON Seattle

Ray Nadreau 206/542-5612
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Seattle, WA 98177

WISCONSIN Milwaukee

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NEW JERSEY Hackensack

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NEW ENGLAND

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