Electric Auto Association

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Steal This Car!

General Motors wants to take its pioneering electric automobiles off the road. But the geeks who drive them won't let go of the steering wheel.

By Katharine Mieszkowski
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Sept. 4, 2002 | SAN FRANCISCO — In stop-and-go traffic on Highway 101 here, Ellen Spertus, the 2001 "Sexiest Geek Alive," mock-apologizes for the ambient air pollution: "Sorry about the smog. But it's not our fault. This car doesn't even have a tailpipe."

Spertus' silver-blue, two-door sports car, which does zero to 30 in fewer than three seconds, doesn't have a gas tank or a key either. It's a 1999 EV1, an electric car that Spertus, a computer science professor at Mills College in Oakland, and her husband, Keith Golden, a rocket scientist at NASA Ames Research Center in nearby Mountain View, charge up every night at home in their garage in San Francisco.

For the computer scientist and the rocket scientist, the EV1 is a kind of geek Batmobile. Professor Spertus even uses her EV1 in the lesson plans for her operating-systems course, when her students study computer security. Instead of a key, a numeric code unlocks the door and starts the engine. The students' homework assignment: Break into the prof's car.

An MIT computer science Ph.D. whose geek cred includes having been known to wear a slide rule strapped to her thigh in a holster, Spertus is about to be stripped of her favorite new technology, along with hundreds of other engineers and environmentalists who drive these futuristic zero-emission vehicles.

"They're the cleanest cars ever made, and they want to take them off the road. It just baffles," says Greg Hanssen, an EV1 driver who is co-chairman of the Production Electric Vehicles Drivers Coalition, a group of electric-car drivers lobbying to keep the cars on the road.

In February, General Motors sent a letter to its EV1 drivers, informing them that the car company had decided not to renew the car's three-year leases when they expire, mostly later this year. (In 1997, GM produced 660 first-generation EV1's, followed by 500 more in 1999, according to Spertus, but many of the second generation went to replace the first, which had been recalled because of a safety issue.)

GM and other automakers have long argued that electric cars are not economically feasible or marketable; they maintain that no one, outside of a few technophiles and environmentalists, wants to drive a battery-powered car that needs to be charged about every 100 miles. Just last Friday, Ford announced that it would discontinue its electric car, Th!nk.

Testifying before the California Air Resources Board on Sept. 7, 2000, Sam Leonard, director of the General Motors Public Policy Center, said that the automaker had invested almost a billion dollars in electric-car technology and production, and had expected to manufacture 10 to 20 times the cars that they ended up seeing demand for: "The electric-vehicle market failed to materialize, not for lack of effort but for lack of customers willing to sacrifice the utility of today's gasoline-powered vehicles," he said.

But the EV1 drivers, many of whom sat on waiting lists for months to get an electric car, say that's just so much spin. They claim that the car company says there's no demand, because it wants to prove that it can't possibly meet California's strict emissions regulations. (New York and Massachusetts are also considering similar mandates; combined with California's, they could bring lower emissions requirements to one-fifth of the American auto market.)

At the same time as it is quietly killing off the EV1, General Motors has recently announced that in order to meet the California regulations, it will give away thousands of so-called "neighborhood electric vehicles." EV1 drivers say the neighborhood cars, which have more in common with golf carts than cars, and are only safe at speeds of about 25 mph, just serve to reinforce the public's misconception that electric cars are little more than glorified toys that will never replace gas guzzlers.

"I don't expect that we'll be able to save the EV1," says Spertus, who has helped organize

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IN THIS ISSUE

For end-of-the-year reflection on EVs around the world, the EAA has mailed out the "Preview 2004" issue of the Electrifying Times. Inside are color photos and descriptions of many EVs, present and future, as well as some hybrids and fuel cell vehicles.

One of our frustrations during 2002 has been the lack of availability of EVs for the general public. In 2002, finally a major automaker, Toyota, decided to sell a limited number of RAV4 EVs. None of the automakers, particularly the US automakers, have offered any EVs for sale. In fact, the Honda EV+ and GM EV1s are being taken out of circulation, end of leases. Who is going to fill the gap? What EVs will be available in 2003?

COVER STORY

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Friday August 30, 9:49 am ET

DETROIT (Reuters) - Ford Motor Co. (NYSE:F - News) on Friday said it was pulling the plug on its Think electric vehicle division due to poor customer demand and lack of government support for the environmentally friendly cars.

Ford, which bought Norway-based Think in 1999 for $23 million and invested $100 million in electric vehicle battery technology, will instead focus on developing fuel cell and hybrid gasoline- electric vehicles to meet environmental regulations for cars and trucks, spokesman Tim Holmes told Reuters.

"The bottom line is we don't believe that this is the future of environmental transport for the mass market," Holmes said . . . .

The (lack of) Future of the Ford TH!NK

By Dave Goldstein, EVA/DC Chapter President

Holy Cow! And yet, I am not entirely surprised, either. Last Xmas, we happened to be visiting La Jolla, and on the way up the coast to visit relatives in LA, we stopped off in Carlsbad just to see what the TH!NK facility looked like.

The rather ordinary-looking two-story silver office building with a "TH!NK" sign on the second floor seemed strangely out of place in an office park and was, of course, deserted for the holidays. But what struck me was a big "For Lease" sign in front of the building, listing a real estate management company. I don't recall how many square feet they were advertising, but it appeared to be the entire building.

I sent a note to Bill Moore at EV World the next day, suggesting that there might be a story there. Bill called John Wallace, head of TH!NK, who denied that there were any problems or reductions in the TH!NK program and gave the excuse that they were just "subletting" some unused space on the 2nd floor, or something like that. It did not sit right with me, because the amount of space offered was quite large and seemed to me to represent the entire building. (Why did Ford lease all that space to begin with?)

During that trip I happened to visit a Ford dealership in LA where a friend of mine was having his TH!NK City in for maintenance after his mileage dropped and he got warning messages on the dash at about 2700 miles on the odo.

There were *4 technicians* working on the car when we got there, including two factory reps (one of whom I recognized,) and they were having a HELL of a time figuring out what was wrong with the car. This, despite the fact that they were using a custom "OBD-2" type diagnostic tool designed just for the TH!NK.

To make a long story short, I discovered that there had been *lots* of problems with the NiCad Euro TH!NKs, possibly related to the Battery Management System, and that even in the best of circumstances, these cars required the battery equivalent of a major oil change and tune up every 3,000 miles! (Batteries flushed, refilled with deionized tap water and run through a lengthy charge-discharge procedure that could take up to 2 days.)

My friend, Dennis' TH!NK was kept in the Ford shop for *3 weeks*, during which he was NOT given a loaner. They finally "fixed" it by borrowing a battery pack from another TH!NK.

We knew the long-anticipated "US version" of the City was supposed to have a different battery type — speculation centering on sealed PbA (Lead-Acid) — but the factory techs refused to answer any questions about this. (Not a good sign, in retrospect.) I also knew that the City's steel chassis was fairly heavy compared to the Toyota ecom or Nissan Hypermini (which use NiMH and Lithium-Ion respectively as well as aluminum and other light weight chassis and body materials) and that a PbA pack would represent added weight, reduced range and performance, and poorer ride quality (which was never a strong suite for the TH!NK to begin with!)

Recent announcements of delays in production due to "battery related problems" seemed to confirm my suspicions. And now this.

The real question that this begs is, "Will CARB ever get tough with these auto manufacturers and start handing out fines for noncompliance, or is CARB only a *paper tiger*?" Ford is now betting with GM and DaimlerChrysler — who are doing their worst to make a bonfire of the ZEV regulations in the court system -- that Sacramento is a town built out of *paper mache*, and that sooner or later this will all go up in smoke.

PS. It appears that ZAP and other pro-EV companies have been looking to aquire the TH!NK program from Ford. We hope this effort doesn't die.

CONVERSION WORKSHOP, STEP 13
LOW VOLTAGE AND CONTROL SYSTEM WIRING

By Michael P. Brown, © 2002

In the last two issues we discussed the installation of the EV components in our conversion. Now let's take a look at how to do the wiring that connects them together and provides the interface with the vehicle's existing electrical system.

Note: the following paragraphs describe the wiring circuits and parts used to install a Curtis/PMC controller in an EV. Other manufacturers' controllers may require different methods and parts. Contact the manufacturer or the supplier of your controller for the installation instructions for their product.

For clarity, keep in mind that "traction batteries" refers to the main battery pack that powers the car's motor. The "auxiliary" or "accessory" battery is a separate 12-volt battery to power the low voltage system in the car.

What To Leave Alone & What To Use

Most of the car's 12-volt electrical system is left in place. The headlights, running lights, stop lights, turn signals, horn, and windshield wipers-as well as the switches and wiring supporting them-are not altered. The same is true for accessories like the radio/tape player/CD player, heater blower fan, and even power windows.

The parts of the car's electrical system that are the most affected by the conversion process - the wires and components that operate the engine - are also the parts that are used in making the interface between the two systems.

One of the first steps in the conversion was the removal of the internal combustion engine, and its cooling, exhaust, and fuel systems. All the wires connected to any of the components that were being removed should have been labeled with masking or duct tape with a word or two on the tape telling what the wire was attached to.

The original battery/ignition switch/coil wires and the alternator and oil pressure warning light wires are the only ones I use in my conversions. There are other systems and wires attached to the engine. But the amount of additional work and parts involved to turn them into something usable in an EV does not seem to be worth it. Some people have made electronic circuits to turn the fuel gauge into a voltmeter so it acts as an electric fuel gauge, but it's a lot of work, and isn't as accurate as a purpose-built EV voltmeter.

Warning Lights

Let's start with the two simplest interfaces. The wire from the oil pressure switch to the oil warning light in the dashboard can be used in the conversion as a motor overheat warning light. This is only true if the car has a plain oil pressure warning light. If so, the light is activated by a simple pressure switch which closes a circuit to ground if the oil pressure falls below a preset number.

If the car has a gauge with a needle instead of a warning light, its switch is a sensor that gives a scaled signal which moves the needle on the gauge. This set-up would not be usable for our purposes.

On my conversions, I wire the oil pressure warning light to a normally open temperature-sensitive switch that closes at 120°C (248°F) and then goes to chassis ground. The switch comes factory-installed on the commonly used Advanced D.C. EV motors. If the motor gets too hot, the switch closes and you get a warning light telling you to reduce your amp draw before you damage your motor.

The car's original alternator warning light is wired to a terminal in the alternator that provides a ground only as long as the engine isn't running. When the engine starts, the alternator begins producing electricity, and the terminal's polarity changes from negative to positive, turning off the light.

On my conversions, I use this as a "key on" indicator, since an EV makes no sound sitting still. I wire the alternator warning light wire directly to a convenient chassis ground. When the ignition switch is turned on with the key, the alternator light comes on and stays on, indicating that there is 12-volt power to the control system.

Making It Go

The original ignition wires from the 12-volt battery to the ignition switch, and from there to the ignition coil serve a similar function on an EV. They supply power to turn on the controller through the main contactor. However, there are a couple of additional skips and jumps along the way, which involve adding two small relays to the system.

The most important thing to keep in mind when making the connections between the car's existing 12-volt electrical system and the high voltage traction system is isolation. This means keeping the two systems from coming in direct contact with each other. Isolation is necessary for the operation of the controller and traction battery charger, and is a critical safety factor in eliminating shock hazards and short circuits which could cause dangerous electrical fires.

Since all the components of the 12-volt electrical system rely on the metal chassis of the car for their ground path, no connection should be made between the traction battery pack and the chassis, either on purpose or by accident. (This is one reason you can't tap two of the 6 V batteries in your traction pack to supply power to the accessories.) Proper system design, careful routing of wires and cables, and selection of properly rated components will make contact between the two systems unlikely.

All of the components in the ignition system have one thing in common: they use two sources of electricity. "Control voltage" (usually but not always low voltage) causes the component to turn on, or close its contacts. This allows the component to do its job of channeling electricity from the second source-the actual "traction voltage" that moves the car. In effect, control voltage controls a gate through which the traction

voltage flows.

The ignition system starts at the keyed ignition switch. The original wire from there to the ignition coil now goes to the potbox microswitch. From there, one branch controls the main contactor. A second branch controls the potbox relay, which controls the logic board of the controller. A third branch of the system goes from the keyed ignition switch to the key switch relay, which funnels high voltage from the main contactor to the voltmeter and DC/DC converter. We'll look at each of these branches in detail.

Keyed Ignition to Contactor

The potbox microswitch is, as the name indicates, a microswitch that is mounted on the potbox. The microswitch is open as long as the potbox arm is in the "off" position. When the car's accelerator pedal is depressed, the linkage or cable attached to both the pedal and the potbox arm pulls the arm off the microswitch contact. The microswitch closes, completing the circuit to the main contactor.

The main contactor is a large electromagnetic switch that closes when 12-volt positive control voltage from the microswitch is applied to its positive pull-down coil terminal. When the heavy duty contacts close, high voltage traction electricity flows from the battery pack to the controller.

The opening and closing of the main contactor each time the accelerator pedal is released or depressed acts as "deadman" switch. In the event of a problem with the controller or the motor, releasing the accelerator pedal shuts off the high current traction electricity to the controller.

Potbox Microswitch to Controller

However, the controller is not fully turned on until its logic board receives positive control voltage from the battery pack (not the auxiliary battery). This is applied to the top-most of three small terminals at one side of the end of the controller. This is the key switch input terminal, and its only function is to turn on the logic board.

The logic board, in turn, tells the controller how much traction voltage and amperage to give the motor. This depends on the control signal the controller receives from the potbox via wires to the two remaining small terminals on the controller.

In order for the key switch input circuit to act as another "deadman" switch in case the main contactor fails in a closed position, it must be switched on and off independently of the main contactor. This is done by using a potbox relay.

This relay gets its positive 12-volt control voltage to its pull-down coil from the same potbox microswitch terminal that controls the main contactor. So it closes and opens at the same time as main contactor. The relay gets its high voltage positive electricity from the "positive" (battery pack input) terminal of the main contactor. When the relay closes, this high voltage electricity goes to the key switch input terminal of the controller and turns on the logic board. This is the one example of a high voltage control input.

The high-voltage contacts of both the main

contactor and the potbox relay are isolated from their low-voltage pull-down coils, which are grounded to the chassis. A 12-volt control connection from the potbox microswitch closes the potbox relay whenever the main contactor closes. This allows high voltage to flow, on an isolated path, from the main contactor, through the potbox relay, to the key switch input terminal on the controller, thus turning on the "brain" of the controller.

Main Contactor to High Voltage Accessories

Letting the accelerator pedal control the closing and opening of the main contactor and potbox relay is desirable as a safety feature. But there are some parts of the EV's system where this intermittent off-and-on could be irritating or harmful to components. These components need to stay on continuously while the car is on, and be turned off when the EV is not in use.

A state-of-charge meter or a voltmeter used to measure battery pack voltage should go on or off with the ignition key. The problem of using a grounded 12-volt system to control an isolated high voltage path is solved with the same type of relay used for the potbox relay.

This relay, called the key switch relay, gets its high voltage positive electricity from the "positive" side of the main contactor, just like the potbox relay. The 12-volt positive electricity goes directly from the ignition switch to the pull-down coil of the relay. The pull-down coil is grounded to the chassis.

When the relay's isolated contacts close, the battery pack voltage from the contactor goes to the voltmeter or state-of-charge gauge, and any other high voltage systems it is controlling, such as the DC/DC converter, which we'll talk about in a minute. One relay can control a number of systems as long as the total amperage draw of all the systems doesn't exceed the amperage rating of the relay.

Fuses Are Your Friends; Have Lots of Friends

As an additional safety precaution, I install another fuse block to protect the car's existing electrical system from shorts that might occur in the EV components added to the car. This fuse block gets its electricity from the ignition switch and puts a fuse between the ignition switch and the potbox relay, key switch relay, and any other 12-volt components that might be added during the conversion. Any high voltage accessories such as voltmeters and DC/DC converters should have fuses of the proper rating between them and the battery pack.

Possible Complications & Other 12-Volt Sources

Throughout this article I have been referring to the wire from the ignition switch as the source of 12-volt positive electricity. Some car manufacturers put a resistor or a wire with a built-in resistance between the ignition switch and the ignition coil. Remove the resistor from the car if it is a separate part. If your car's shop manual shows a resistor wire, remove it from the circuit or wire around it.

If it's a diesel car you are converting, your source of key-switched 12-volt positive electricity is probably going to be an electric fuel cut-off valve on the injector pump. Again, refer to your car's shop manual to be sure.

DC to DC Converter

In the old days we used a large heavy deep discharge marine battery as the source of 12-volt power for the cars original electrical system and the EV control system. Since this battery was charged at the same time as the traction battery pack this battery had to last longer than the traction battery pack.

This so-called "total loss" system worked most of the time but there was always a chance that excessive current draw on the auxiliary battery would shut you down before you were out traction pack voltage. In the modern conversion world, we have a device called the DC/DC converter to keep the auxiliary battery charged.

The DC/DC converter is an electronic device that takes the traction battery pack high voltage and converts it to about 14.5 volts at 25 amps. The DC/DC converter carries the car's average 12-volt load and keeps the auxiliary battery charged at the same time.

In times of heavy load, such as driving with the lights and wipers on, both the DC/DC converter and the auxiliary battery carry the load. The fact that there are times when the auxiliary battery has to carry a substantial part of the 12-volt load limits how small you can make the auxiliary battery. This also cancels out any idea of eliminating the auxiliary battery altogether and relying solely on the DC/DC converter.

The circuitry of the DC/DC converter isolates the high voltage battery pack from the 12-volt auxiliary battery, and its output side is fused to protect it. The DC/DC converter is one of the high voltage accessories that is turned on by the key switch relay.

There are four connections to the DC/DC converter. The high voltage most positive terminal of the battery pack is connected in via the key switch relay to the high voltage positive input terminal. The high voltage negative input terminal connects to the most negative side of the battery pack circuit at some point. I pick this up at the battery pack negative terminal of the controller. The low voltage positive output terminal is connected to the positive terminal of the auxiliary battery. The low voltage negative output terminal is connected to chassis ground.

This is an overview of how the high voltage traction system is interfaced with the car's existing 12-volt system. We'll look at how to do the actual physical wiring in another article.

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Typical Charger, sized tor pack.

By Eric Ryan, Director, EV Challenge (www.evchallenge.org)

While at the recent Silicon Valley Electric Auto Rally, I met Ken Hawthorn, the founder of an excellent educational program called Student Racing Partners. In his program, middle school students build and race model remote control racecars as the central theme of a multiyear after-school educational program. I was impressed with his program and asked him to write an article to tell you all about it. His article is below.

Building a scale EV racing car is quite an achievement.

The thrill of victory.

Student Racing Partners

By Ken Hawthorn

Looking around at the vast advances made recently in Electric and Hybrid cars it seems to me that we have won, or are on the verge of winning, most of the major technical challenges in providing the public with a viable option to gasoline based vehicles. The real and immediate battle seems to be one of public acceptance and adoption of these new technologies.

Late in 1999 I started an after-school program that is unique in that is seeks to change the ideas of students who would not naturally be found in a science or robotics club. While these clubs are great, they only address a small fraction of students. To really affect what technologies our society will adopt in the future we must address a much broader range of students. The company I founded is called Student Racing Partners, Inc (SRP).

In the programs offered by SRP, 7th and 8th grade students work in teams of no more than three to build a 1/10 scale electric powered race car. Throughout this 26-week long process, students learn electronic theory and application while testing their ingenuity, boosting their literacy skills, and learning valuable social skills.

To broaden the program's appeal to all students we use spray painting. Each student in the program receives two clear, unpainted plastic car bodies. Students sketch designs of their own creation, have designs critiqued, and then learn the technique of "masking" and painting their designs onto the car bodies. Using this "hook" we then have a large group of students who have a beautiful car body, but no car to place it on!

The entire team with their model EVs, ready to race.

Once the bodies are complete, each team receives a "chassis kit," complete with motor, power train, gears, batteries, and radio control. In approximately 13 weeks, each team has pieced together over 200 intricate parts into a fully functional racing machine. Not the stereotypical "enviro bug" image, but a 4 wheel drive touring car that will pull over 1g on the skid pad, hit 0-30 mph in 1.4 seconds and smoke all 4 tires at any enthusiastic throttle input!

During the second half of the program, students lay out a racetrack and learn the nuances of car control and track strategy. Each team member races individually, placing his/her own body design atop the team-constructed chassis. Prizes are awarded for quickest lap time and overall car control.

Each team of three consists of two 7th grade *Apprentices* and one 8th grade *Team Manager*. Upon successful completion of the program at the end of the school year, the 8th grade student is awarded the completed kit to take home on the condition that he/she return as a 9th grade *Mentor/Coach* to new program participants the following year. The 7th graders then transition to *Team Manager* Posts, creating cycles of students who are giving back in mentorship positions. To ensure a lasting connection throughout their high school careers, SRP students may ultimately become *Instructors* as high school sophomores, juniors, and seniors.

Model building is just the beginning...

Outside of the very real social and academic lessons this program provides, the most important effect is to take the broader audience of students into the hands-on experience of building an electric car before they reach high school. The long-term effect is to increase the student's self-confidence in dealing with new situations and ultimately adopting technology beneficial to their future.

Student Racing Partners, Inc is seeking candidates for both paid and volunteer positions as instructors, possible school sites in the San Francisco Bay Area and any leads on parties wanting to test new battery or fuel cell technology for replacement of "sub C" cells.

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Yugoslavia to Introduce Electric-Powered Yugo

Yugoslavian automobile manufacturers and developers recently announced plans to reintroduce the low-cost Yugo brand vehicle in a new electric-powered format. Those involved in the project said the electric vehicle, known as the Yugo Electra, has been undergoing testing and development for the past two years and will most likely enter production next year.

Automakers said the new Yugo, which can achieve a top speed of 56 miles per hour, features a 140-volt battery that can power the car for 50 miles per charge, as well as a non-synchronic engine. "The more you use the brakes, the longer you can drive," said Jovan Radakovic, director of Yugo Electra co-developer Sever Company. "When using the brakes, the engine becomes a generator and fills the battery." (DAILY TELEGRAPH: 8/17)

IRS Certifies Prius HEV for $2,000 Tax Deduction

Internal Revenue Service (IRS) has certified the Toyota Prius hybrid electric vehicle (HEV) as eligible for a $2,000 tax deduction offered to cleaner-burning vehicles. In a recent letter to Toyota, the agency said it has determined that "a purchaser of this [HEV] may rely on the certification concerning the incremental cost of permitting the use of electricity to propel the vehicle."

The automaker said consumers who purchase Prius HEVs should retain both normal "proof of purchase" documentation and the recent Toyota and IRS correspondence as "further substantiation for the Prius federal tax deduction. (REUTERS: 8/12)

IRS Certifies Two Additional HEVs for Tax Credit

The Internal Revenue Service (IRS) recently announced that it has certified two additional hybrid electric vehicles (HEVs) manufactured by Honda Motor Company for the federal government's $2,000 "clean-burning fuel" tax deduction. IRS said individuals who purchase a new Honda Insight HEV for model year 2001, 2002 or 2003, as well as purchasers of Honda Civic HEVs for model year 2003, will be allowed to claim the deduction in the year that the HEV was first used.

"Federal tax law allows individuals to claim a deduction for the incremental cost of buying a motor vehicle that is propelled by a clean-burning fuel," the agency said. "By combining an electric motor with a gasoline-powered engine, these hybrid vehicles obtain greater fuel efficiency and produce fewer emissions than similar vehicles powered solely by conventional gasoline-powered engines."

According to IRS, HEV owners who are eligible for the tax credit can take the one-time deduction as an adjustment to income and will not have to itemize deductions on their tax returns for claim purposes. Additionally, eligible individuals may claim the deduction for a past year by filing an amended return.

Contact: IRS, phone 202-622-4000, website http://www.irs.gov. (EIN STAFF: 9/6)

NYPA, MEUA to Jointly Promote EVs in NY

The New York Power Authority (NYPA) recently launched a cooperative effort with the state Municipal Electric Utilities Association (MEUA) to promote the use of electric vehicles (EVs) in New York. The utility said it has lent a hybrid electric vehicle to MEUA for one year as part of the effort.

During MEUA's conference, government and municipal electric system officials took part in a "ride and drive" exhibition of EVs, including such vehicles as Ford's Th!nk City EV, Th!nk Neighbor EV and EV Ranger pickup truck; Toyota's RAV4-EV sport-utility vehicle; John Deere's Gator EV utility vehicle; as well as a variety of electric bicycles and scooters.

"[EVs] can help address concerns about air and noise pollution, as well as work to reduce our nation's dependence on imported fuel sources," said MEUA president Karl Lux. "This [EV] initiative is another good example of MEUA and NYPA working together to serve our customers. Our local public power systems hope to demonstrate the day-to-day uses of [EVs]. We also plan to make [EVs] available to schools for educational purposes and to community groups to raise public awareness of the benefits of [EVs]." (BUSINESS WIRE: 8/28)

California City Embraces Alternative Vehicles

Late last year, researchers at the University of California-Davis' Institute of Transportation Studies (ITS) began conducting tests of Nissan's Hypermini electric vehicle (EV). According to ITS researcher and engineer Ken Kurani, a consumer response study to the EV is expected to finish by November, with performance and marketability tests scheduled for completion later in the year.

"We'll report that there likely is a market here," said Kurani. "Physically, economically, I think Davis is an ideal place for these cars." Although Kurani predicted Nissan will need to reduce the vehicle's cost to "create a viable market," he said the institute has developed a video that will educate the public about the Hypermini.

Earlier this year, Davis' Alternative Fuels Task Force also encouraged the use of alternative vehicles, by offering five recommendations for city council consideration. The task force suggested creating additional small vehicle parking spaces, researching car sharing programs, lobbying the California Fuel Cell Partnership for demonstration vehicles, placing electric vehicle chargers in area developments and developing a commission to deal with transportation issues. (DAVIS ENTERPRISE: 8/9)

Georgia Power EVs Reach 5-Million Mile Mark

Georgia Power recently announced that the electric vehicles (EVs) used in its EV program have been driven more than 5 million miles, resulting in the elimination of approximately 13,000 pounds of nitrogen oxide emissions, 22,000 pounds of volatile organic compounds (VOCs), 186,000 pounds of carbon monoxide and 2 million pounds of carbon dioxide (CO2).

Currently, Georgia Power said about 65 of its corporate employees participate in an EV leasing program utilizing GM's EV 1 automobile. The company said it also operates an electric shuttle bus 10 hours a day during the workweek between a rail station and its downtown offices. Additionally, the utility said it has partnered with Emory University and the Georgia State Energy Office to participate in the Ford Th!nk pilot program, which uses the automaker's urban vehicle for short-distance driving needs.

According to Georgia Power, the company has directly replaced more than 80 internal combustion vehicles with EVs for "everyday" business purposes. The utility also said its fleet includes more than 200 light-duty vehicles and 30 neighborhood vehicles, as well as buses, bicycles and non-road vehicles like forklifts and golf carts.

Ford to Withdraw Support for Th!nk Division

Ford Motor Company recently announced that it will not continue to invest in its Th!nk electric vehicle (EV) division in Norway. The automaker purchased the Norwegian company in 1999 for $23 million and invested $100 million in battery technology in an effort to develop all electric "city" EVs. "The bottom line is we don't believe that this

is the future of environmental transport for the mass market," said Ford spokesman Tim Holmes.

Ford officials said the company hopes to sell the Th!nk EV division or develop a plan with the Norwegian government to transform the unit into a "viable business." The automaker plans to announce a decision on the Th!nk unit by the end of the month.

Ford said although the Th!nk division was one of its most "advanced" projects, the automaker was disappointed by the vehicle's performance shortfalls and became frustrated by a lack of consumer interest in the EVs. Holmes said the company will instead focus its EV development efforts on hybrid electric and fuel-cell-powered vehicles. (REUTERS: 8/30)

EVAA to Host ETIC 2002 in Florida

The Electric Vehicle Association of the Americas (EVAA) will host a four-day conference on the electric vehicle (EV) industry December 10 through 13 at the Westin Diplomat Resort and Convention Center in Hollywood Beach, FL. The conference will open on December 10 with three pre-conference workshops focused on hydrogen safety training, the benefits of "plug-in" hybrid electric vehicles (HEVs) and electric-powered buses.

Sessions on December 11 will include sessions on heavy-duty electric transportation; cost-effective technologies for HEVs; battery and charging technologies; state policies impacting electric drive technology; fuel cell initiatives in Canada, Japan and Europe; and hydrogen generation, storage and transportation issues. On December 12, sessions will address such topics as electric-powered transit; electric bus technology; zero-emission vehicle mandates; EV marketing strategies; technology improvements needed to meet the government's FreedomCAR objectives; and commercially available battery EVs.

The final day of ETIC 2002 will feature a "ride and drive" event where conference participants will have the opportunity to test more than 40 all-electric, hybrid and fuel cell-powered vehicles, as well as a post-conference "field trip" to tour the city of Miami Beach, FL's Electrowave bus facility. (EIN STAFF: 9/5)

EV1 to Be Displayed at EV Center in Tennessee

Officials at the Electric Vehicle Information Center (EVIC) in Chattanooga, TN, recently announced that General Motors will donate one of its battery-powered EV1 electric vehicles (EVs) for display at EVIC as part of a GM program to donate 40 of the EVs to institutions nationally. Other institutions receiving the EV1s include the Smithsonian Institution in Washington, D.C., Brigham Young University, the University of Cincinnati and the Henry Ford Museum.

The center, which is operated by the Electric Vehicle Transit Institute and Chattanooga Area Regional Transportation Authority (CARTA), attracts about 30,000 visitors each year and features a variety of displays, including an all-electric 1979 Volkswagen Rabbit, an electric bicycle and an EV battery charging station. "We're ahead of the curve," said CARTA executive director Tom Dugan. "We've got to stay on it."

EVIC chairman Bob Diehl said the EV1 was a "proving ground" for much of the technology that GM plans to use in its future EVs, hybrid electric vehicles and fuel cell-powered vehicles. Although GM produced 500 of the EV1s between 1997 and 1999 and leased them to customers in California and Arizona, the vehicles were considered a relative failure in the marketplace. (CHATTANOOGA TIMES: 8/21)

continued from page 1

EV1 drivers online who are rallying to keep their cars. "I just don't want the car companies to get away with claiming that electric cars are no good and nobody wants them."

Electric car drivers charge that the automakers have spent more money fighting against electric cars, by funding industry lobbying groups such as the Alliance of Automobile Manufacturers, which oppose emissions regulations, than they have marketing electric cars to consumers.

Why would a company try to undermine its own product? Because it didn't want to produce the product in the first place, say electric car advocates.

California state regulators forced automakers to bring electric cars to market. The cars came out in very limited distribution in the late '90s, mostly available only by lease, as a stratagem to win the carmakers credits toward California's zero emission vehicles mandate. That regulation currently requires that by 2003, 2 percent of all new vehicles offered for sale in the state be zero-emission, and another 2 percent be "advanced technology partial ZEVs," such as "hybrid" electric/gas vehicles.

The automakers and dealers currently have state and federal lawsuits pending to prevent the California regulations from going into effect in 2003, even though those requirements represent a significant retreat from California's original zero-emissions vehicle mandate of 1990, which would have required that 2 percent of all vehicles offered for sale in the state be zero-emission by 1998,

5 percent by 2000 and 10 percent in 2003.

"It's been watered down consistently over the years, because the car companies have spent millions to fight it," says Jamie Knapp, a spokesperson for the California ZEV Alliance, a lobbying coalition of environmental and public-health groups. "It's a real shame, since the automakers have already proven that the technology exists, and there are already people who want the cars and can't get them."

But now it looks like even the watered-down regulations won't go into effect, at least not in 2003. "The Air Board has said publicly that it's not going to enforce the 2003 mandate," says Richard Varenchik, deputy communications director for the board.

That's because a federal judge in Fresno issued a preliminary injunction against the mandate two months ago, ordering the California Air Resources Board not to enforce the regulation. The Production Electric Drivers Vehicle Coalition has filed a motion to intervene in the federal case, hoping to give electric-vehicle drivers a chance to appear before the court and make the case that there are drivers who want these cars. The hearing will be held in Fresno on Oct. 30. But a state suit, brought by automakers and dealers, also enjoins the Air Resources Board from enforcing the regulations.

Varenchik from the Air Resources Board says the litigation means the board will likely reconvene to review the whole zero emission vehicle mandate next year.

But what will become of GM's existing EV1s, even if California doesn't find a way to enforce the regulation that they were put on the road to meet?

"The majority of cars are going to get crushed," says Hanssen. "GM wants the program over. They want the cars off the road. They want it out of their hair. They don't want us out there driving these cars, talking about how great they are." GM did not return calls for comment.

"It's a terrible shame, because it's the best zero emissions vehicle out there, and they were first to market with the technology," says Knapp from the California ZEV Alliance.

While electric cars are being snuffed out, automakers are trotting out hybrid vehicles as the answer for fuel-economy-conscious consumers. Nationally, Honda has sold more than 8,000 of its Honda Insight hybrids. The company is projecting sales of 2,000 a month in the first year for its 2003 Honda Civic hybrid. Toyota, claiming 90 percent of the hybrid market worldwide, says it has sold over 100,000 of its various hybrid models. American car companies say they'll follow suit with their own hybrid models.

Unlike electric cars, hybrids do not have to be charged, since they run partially on gasoline. But electric car drivers are reluctant to go back to the fuel pump at all. "I have no intention of going back to gasoline if I can possibly avoid it," says Bob Seldon, a patent attorney in Santa Monica who has been driving an EV1 for five years. "In my electric car, I start with a full 'tank' every morning. I've got the range I need. It has great performance with zero maintenance, and electricity costs me about half as much per mile as gasoline."

General Motors is by no means the only car company that has pulled back from electric vehicles. But the company has displayed a particularly ham-fisted approach all its own. When Honda yanked its EV Plus electric car, drivers persuaded the automaker to keep the existing cars on the road by modifying the lease to a month-to-month lease without warranty.

The EV1 drivers asked GM to do the same. Early this summer, 58 EV1 drivers sent checks to GM as proof that they wanted their leases to continue, petitioning the company to keep the EV1s on the road.

The checks, totaling more than $22,000, came back, uncashed, by registered mail in late June. "We're upset about them taking these working cars away even though we're willing to pay to keep using them," says Spertus. "My husband and I would like to buy ours, since in all likelihood GM is going to destroy these cars although they work great and don't pollute." GM has pledged to contribute some of the cars to museums, but the EV1 drivers are skeptical, since just how many museums out there really want an electric car?

"I can understand GM not wanting to make more EV1s since it's expensive, but why do they have to take away the EV1s that already exist?" says Spertus. She and some of the other EV1 drivers who had their checks sent back by GM are now donating the money to help fund the Production Electric Drivers Vehicle Coalition's legal action in the federal suit in California.

The EV1 drivers find themselves in the odd predicament of defending a vehicle that they don't own from a manufacturer who wants to kill it off. Seldon says of the recall: "It's a tragedy. Everyone I know who has leased it has been totally unwilling to let go of it. I'm convinced that GM didn't want the car to succeed." The EV1 driver points out that electric cars do not require the same kind of routine maintenance that combustion-engine cars and even hybrids do, like replacing mufflers, oil changes and smog checks.

Yet, even as General Motors and other car companies are turning away from the electric zero-emissions vehicles that they've put on the road, they're crowing about their new whiz-bang advances in fuel-cell technology, another zero-emission source that's still off in the misty future.

"These fuel cells that they're so happy about, they're probably only so happy about because they're perpetually 10 years way," says Hanssen, who as of March 2003 will convert from his EV1 to Toyota's Rav4 EV, a small electric SUV that's still available and can actually be purchased, not just leased.

As for Spertus, she's contemplating committing an act of "civil disobedience" to keep her tailpipe-free car cruising the Bay Area freeways. When her lease expires at the end of December this year, she's thinking about just not giving the car back.

But even the Sexiest Geek Alive is reluctant to risk going to jail for auto theft to save her electric car.

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Through contributions of in-kind donations and cash grants, corporations of all kinds and sizes have been instrumental at earlier stages of our existence.

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For further information, please contact: membership@eaaev.org.

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These recognition categories apply to the EAA General Fund, as well as to EAA Special Funds that the EAA Board of Directors may establish.

SPECIAL FUNDS

Donors may contribute to the EAA General Fund, to be used for EAA public benefit purposes as determined by the EAA Board of Directors.

Contributions not otherwise designated will be credited to the EAA General Fund. The General Fund may be used for normal EAA operations, or for other purposes as determined by the EAA Board of Directors.

The EAA Board of Directors may set up Special Funds for specifically identified projects. Such public benefit projects in support of the Association's mission may be limited in scope or geographical area.

However, donations to the General Fund are always strongly encouraged.

Special Funds are established to target specific projects and goals, and donors with a particular interest in these projects and goals are encouraged to contribute to the Special Funds that are available.

Any donor with a particular interest in a goal or project that has not been previously established is encouraged to propose establishment of a new Special Fund in writing to the Board of Directors. Please send your proposal to specialfunds@eaa.org.

EAA Special Funds - Frequently Asked Questions

Q. What kind of Special Fund projects might be approved? Examples?
A. Special Funds projects must be for public benefit Approval is at the discretion of the Board.
- The Board MIGHT approve Special Fund projects to improve, maintain, or upgrade *public* charging infrastructure in some region or area.
- The Board MIGHT approve Special Fund projects to educate students on EV design and benefits.
- The Board MIGHT approve a Special Fund to defray the costs of EAA publications.

Q. What kind of Special Fund projects might NOT be approved? Examples?
A. Again, Special Fund projects must be for public benefit.
- The Board probably would NOT approve a Special Fund that would not be of benefit to the general public.
- The Board probably would NOT approve a Special Fund to improve, maintain, or upgrade charging infrastructure at private residences, or at a business that restricts access to employees of that business, or at a site that benefits only one or a very few EV drivers, especially if project primarily benefits the donor or donors.
- The Board probably would NOT approve a Special Fund that would engage in any kind of political activity. (There are some limited circumstances under which this might be possible, but careful research would be required first, possibly with an attorney.)
- The Board probably would NOT approve a Special Fund to build or repair a privately-owned vehicle of any kind. (Note: the EAA does not own nor encourage donations of vehicles).
- The Board probably would NOT approve a Special Fund unless the purpose appears to be capable of attracting sufficient funds to be accomplished, or if the purpose is very narrowly defined.

For instance, the Board probably would NOT approve a Special Fund specifically designated for a single charger upgrade in one specific location. The purpose should be more broadly stated. A Special Fund designated for charger upgrades in a fairly wide geographical region would be more likely to be approved.

Q. Is there a minimum donation to a Special Fund?
A. No. Any amount is welcome. However, Special Funds should not be established unless there is a good probability that enough donations will be made to accomplish the purpose. The Special Fund must be approved and established before any donations are accepted for that Fund.

Q. What about matching?
A. Special Fund donations can be eligible for various kinds of matching. Employer matching is one good possibility, and should be strongly encouraged. The Board may decide to approve some sort of matching from the EAA General Fund (with restrictions, probably) in order to encourage donations. Individual donors may offer to match other donor's donations. We might attract matching from other organizations, foundations, or government agencies.

Q. Are donations tax deductible?
A. So long as the Special Funds are for public benefit and in general conformity with the EAA charter, donations to Special Funds are deductible in the same way that donations to the General fund are deductible. Please consult your tax advisor.

Q. So I make my Special Fund donation. Who oversees and or performs the work?
A. That depends, of course, on the nature of the project. The Board will designate the appropriate party (or committee) to handle the project.

ELECTRIC AUTO ASSOCIATION (EAA)

A California 501(c)(3) non-profit public benefit corporation

Mailing address for donations:
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This form is to accompany donations by check or money order. For credit card donations, please use the PayPal link at http://eaaev.org/

We welcome your contribution, in any amount. The EAA is sincerely grateful for the generous support of our donors. Your assistance and support will help fulfill our mission.

Your contribution is tax-deductible to the extent allowed by law. Contact your tax consultant for further information on this subject.

See http://eaaev.org/donations for a list of currently open Special Funds, approved by the EAA Board of Directors.

Donors may request that new Special Funds be established. Please send your request in writing to the address above, or by email: SpecialFunds@eaaev.org. Each Special Fund must be approved by the EAA Board of Directors before contributions can be accepted specifically designated for that Special Fund.

SAMPLE FORM

If you wish your contribution to remain anonymous (known only to the EAA Board of Directors), please check here /_/.

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OR — enter the name of the Special Fund for which this donation is earmarked _____.

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PHOENIX EAA, AZ
Web Site: http://www.phoenixeaa.com
Meetings: 4th Sat./mon., 9:00 am, Phoenix

CHICO EAA, CA
Web Site: http://geocities.com/chicoeaa/
Meetings: 2nd Sat./mon., 11:00 am, Chico

EAST (SF) BAY EAA, CA
Web Site: http://geocities.com/ebeaa/
Meetings: 4th Sat./mon., 10:00 am, Alameda

LOS ANGELES EAA, CA
Meetings: 1st Sat./mon., 10:00 am, Pasadena

NORTH BAY EAA, CA
Web Site: http://geocities.com/nbeaa/
Meetings: 2nd Sat./mon., 10:00 am

SAN DIEGO EVA, CA
Web Site: http://home.att.net/~NCSDCA/EVAoSD/
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Web Site: http://geocities.com/sfpeaa/
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SILICON VALLEY EAA, CA
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VENTURA COUNTY EAA, CA
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Meetings: 4th Sat./mon., 10:00 am, Ventura

MID AMERICA EAA, KA/MO
Web Site: http://maeaa.org/
Meetings: 2nd Sat./mon., 1:30 pm, Kansas City

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Web Site: http:/neeaa.org/
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PIONEER VALLEY EAA, MA
Web Site: http://geocities.com/pveaa/
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DMC-EAA DETROIT MOTORCITY CHAPTER, MI
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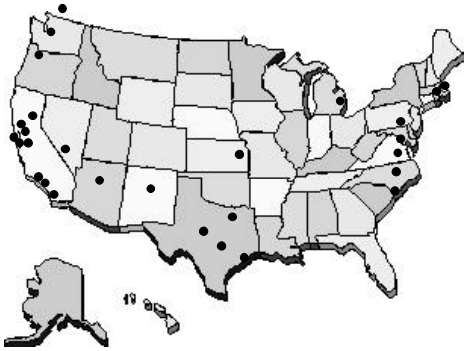

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Web Site: http://www.lveva.org/
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ALBUQUERQUE EAA, NM
Web Site: http://abqev.org/
Meetings: 1st Tues./mon., 7:00 pm, Albuquerque

EAA OF COASTAL CAROLINAS, NC
Location: Southport, NC

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OREGON EVA, OR
Web Site: http://www.oeva.org/
Meetings: 2nd Thur./mon., 7:30 pm, Portland

EASTERN EV CLUB, PA
Web Site: http://members.aol.com/easternev/
Meetings: 2nd Wed./mon., 7:00 pm, Plymouth

AUSTIN AREA EAA, TX
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Meetings: Austin

HOUSTON EAA, TX
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Location: Richardson

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Meetings: 2nd Tues./mon., 7:00 pm, Seattle

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Listing current as of 12/1/02.

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