Electric Auto Association

CURRENT EVENTS

July-August 2004 Promoting the use of electric vehicles since 1967 Vol. 36 No. 7 & 68

THE 3RD EVer CHAPTERS CONFERENCE VANCOUVER BC, CANADA

EAA Members who attended the Conference.

1st Row: Alan Cumberlidge (VEVA), Gave Goldstein (EVA/DC)
2nd Row: John Foster (VEVA), Russ Ashworth (VEVA), Haakon MacCallum (VEVA), Ed Thorpe (EBEAA)
3rd Row: *, *, Mark Farver, (AAEAA), Roger Stockton (VEVA), Dave Koehn (VEVA), Terry Wilson (SJEAA)
4th Row: * (VEVA), Frank Donnelly (VEVA), Chris Robinson (AAEAA), Phil Dayson (VEVA), Mario (VEVA), Walter Wardrop (VEVA)
5th Row: Robert Shaw (VEVA), Aaron Choate (AAEAA), Don Chandler (VEVA), *, *, Ron Burton (VEVA), Jim Stack (PEAA), Jan Engstron (VEVA)
6th Row: Bob Rice (NEEAA), Ron Fruend (SJEAA), Jerry Asher (PEAA & EVA/DC)
(note: * = attendees not recorded at the time of the photo)

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COVER STORY

Photo courtesy of Gordon Wong

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COMMENTARY: AN UNUSUAL FUNERAL TURNS SOME HEADS

© 2004- Santa Rosa Press-Democrat
By Chris Coursey

Nick Carter's send-off for his little friend included a wake, black armbands, a funeral procession and a bagpiper, but no burial or cremation. The guest of honor at this funeral will be crushed and recycled.

Carter said farewell Wednesday to his Think City, a two-seat electric car that has been his and his wife Georgia's main transportation for 2 1/2 years. Though the couple didn't own the car, they didn't let go easily.

"I think it is just madness what Ford is doing," said Carter, referring to the automaker that owns the Norwegian-built Think.

Ford — which along with other carmakers got into the electric car business only because California mandated "zero-emission vehicles" in the 1990s — is pulling its 300 or so leased Think Citys off the road. Like every other major manufacturer, Ford says the future is in hybrid or fuel cell technology, not electric. The first hybrid (electric and gasoline) Ford Escape SUV was scheduled to roll off the assembly line this week.

"Sure, hybrid is a step in the right direction," Carter said. "But it's a small step. With this car (the Think), we're already there."

Ford has refused to sell any of the cute little cars, which use more than 500 pounds of batteries to reach freeway speeds and have a range of about 50 miles. Carter has rented or leased several of the vehicles since 2002, putting a combined 25,000 miles on them and becoming a tenacious advocate for zero-emission vehicles.

"We've known they would take it away from the day we signed the lease, but they can't take away the experience," Carter said Wednesday. "We know it works. We know we can drive without depending on oil."

But the Carters expect to be back "on gas" soon. Though other electric vehicles are available, Nick Carter said he doesn't want to "settle" for a converted gasoline vehicle or a custom-made specialty car.

"I like that the Think came off an assembly line," he said. "I want to support that."

In Norway, Think no longer builds its City model, concentrating instead on the "Neighbor," a golf-cart-style vehicle that can't be driven legally on the highway. And Ford says its existing Citys must be taken off the road because they don't meet federal safety standards.

So Carter, along with other members of the North Bay Electric Auto Association, planned a funeral..

They gathered at his house, toasted the plucky, molded-plastic Think and formed up for a procession that included a three-wheeled Sparrow electric, a Ford Ranger converted to batteries, a tiny electric motorcycle, an electric bicycle and an electric scooter. The bicycle and scooter went into the back of the pickup, and off they went.

The unusual procession turned heads. A CHP officer pulled them all over in a motel parking lot on Santa Rosa Avenue, right under a streetlight banner encouraging drivers to "Spare the Air." The officer told Steve Muskarelli his tiny motorcycle isn't street legal. He told her it was, and cited the section of the vehicle code. She threatened to confiscate the bike. He decided to go home.

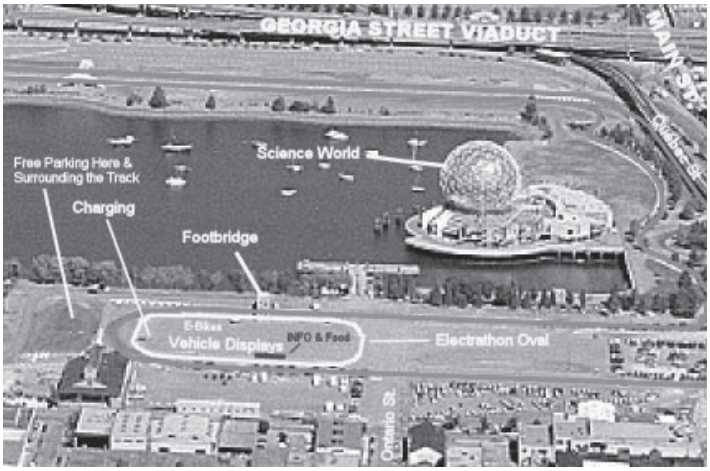
Peter Bettendorff stood at the entrance to Hansel Ford on Corby Avenue, squeezing a dirge from his bagpipes. He said it was a traditional tune, played as the innocent man climbs the steps to the gallows.

The Carters pulled in, a Norwegian flag flapping out the window of the little car. A Hansel manager came out to meet them, saying he didn't have anything to do with Ford's decision, he was just there to accept the car.

Nick Carter handed over the keys and the manager turned the ignition. Nothing happened. He tried again. Carter assured him that the car had started; it just makes no noise. The man drove silently away.

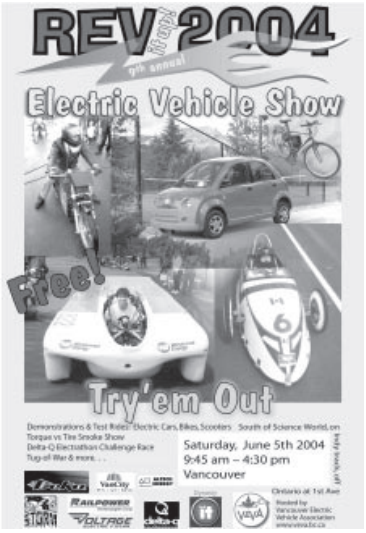
Carter hugged his wife. Someone asked, "Want a ride home?"****

Panarama of the main vehicle display area, looking north towards downtown Vancouver - left half



Aerial view of the EVent layout.

Randy Holmquist of Canadian Electric Vehicles Ltd.



The REV!2004 poster

Additional photosat http://www.veva.bc.ca/rev/2004/photos/index.htm

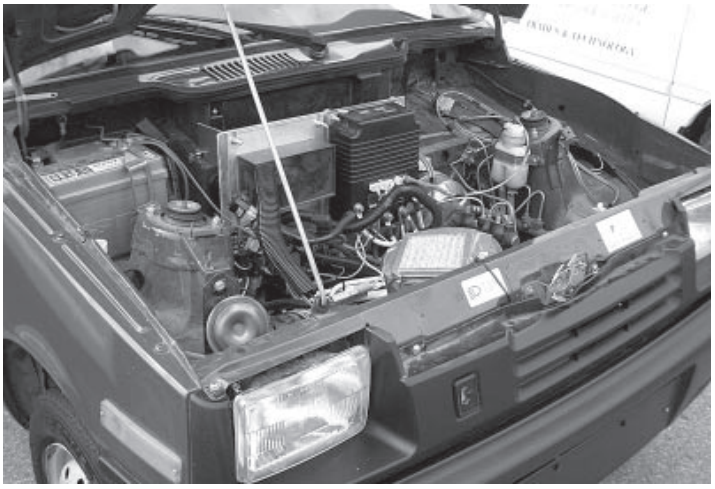
All photos by Gordon Wong.

Some of the Canadian Electric tubs and haulers.

Panarama of the EV bicycle area - left half

Panarama of the main vehicle display area, looking north towards downtown Vancouver - right half

Al Godfrey's gentleman's EV Porsche.



Dynasty's e-oka motor bay.

Under the hood to Al's Porsche - super clean.

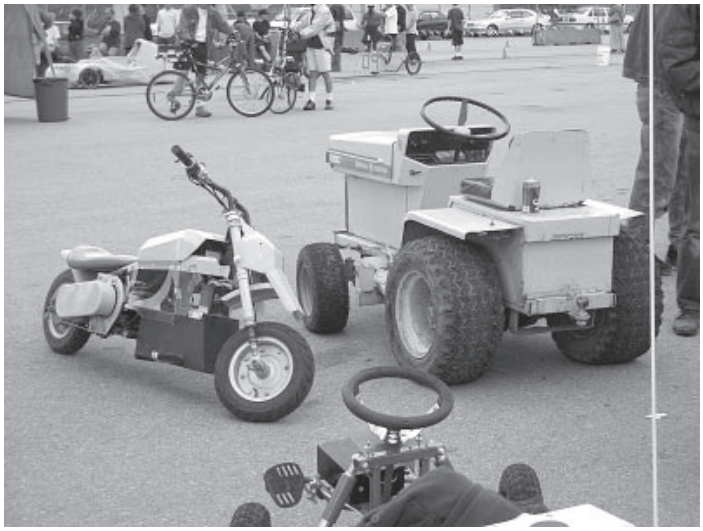
Dynasty's e-oka, Eastern European conversion car.

Panarama of the EV bicycle area - right half

Panarama of the main vehicle display area, looking south - left half

Marko Mongillo fiamp Fiat 600, up from Oregon.

Ed Thorpe's Sparrow up from California.

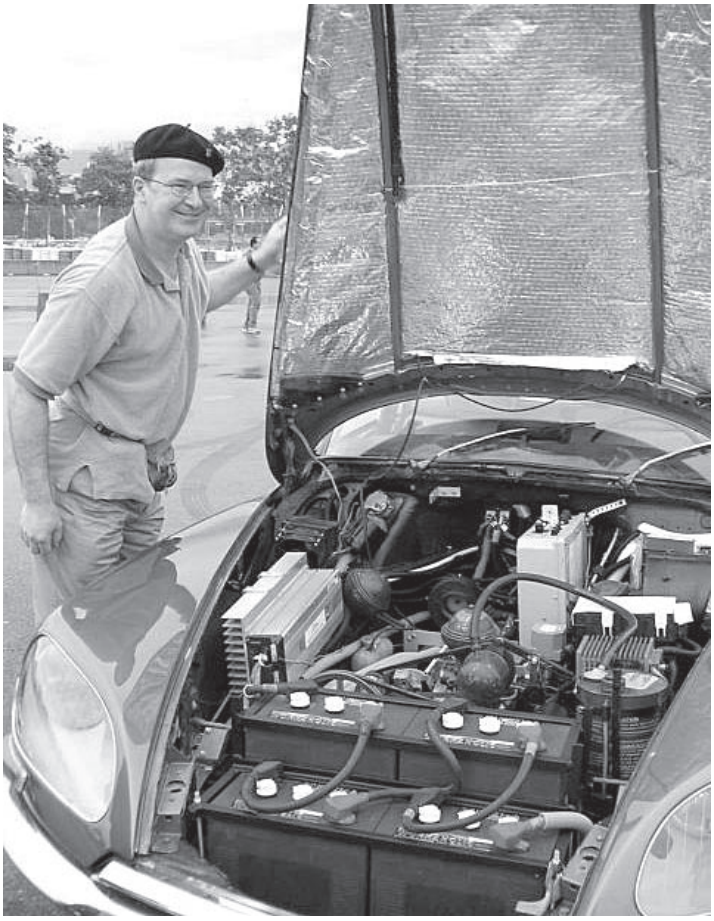


Some of Father Time's EV creations.

Rich Rudman fits into a small EV cart for a spin.

ITs a lot of them - many Dynasty ITs on display, to show the wide variations.

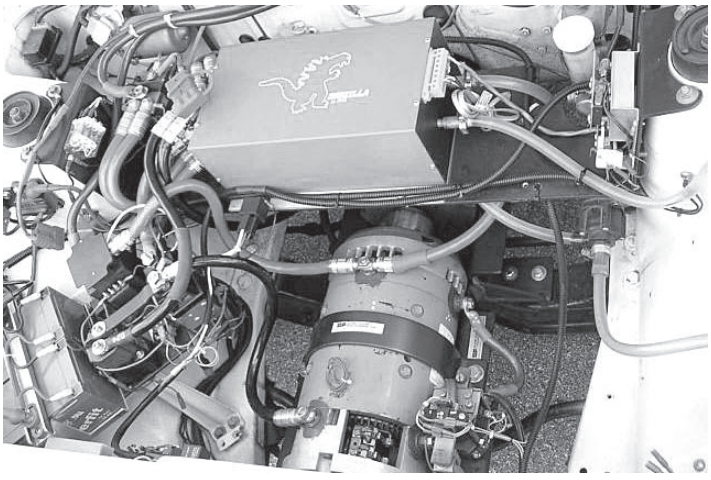
Panarama of the main vehicle display area, looking south - right half



Proud EV owner Mike Hoskinson displaying his handiwork.

VEVA's president Haakon MacCallum gave lifts in a vintage EV.

Mike Hoskinson's Citroen conversion.



The modern components of John Wayland's White Zambie.

TOUR VANCOUVER IN AN nEV

Looking to do an auto tour of Vancouver this summer without having to search for gas stations or contribute to summer smog? The British Columbia Automobile Association (BCAA) has a way you can do both – a Vancouver summer sightseeing tour in an electric car, debuting July 1.

From $180.00 plus GST per person, the "Electric Green" self-guided tour package includes two nights' accommodations in one of three Vancouver hotels, a sightseeing discount book, and, of course, the use of a Dynasty 'IT' electric car provided by Electra City, which will be dropped off and picked up at the hotel daily.

The Dynasty 'IT' (Innovative Transportation) is an electric vehicle manufactured in Delta. The vehicle's top speed of 40 km/h is legal on roads posted at 60 km/h or less. The car, which comes in a sedan or a convertible, has a range of up to 50 km per charge and can be recharged by plugging into any standard 110V outlet. Electrical plug-in points are located at designated parking lots at such attractions as Science World, Gastown and Yaletown.

In addition to the self-guided tour packages available through BCAA, stand alone rentals of the electric vehicles are also available for $149.00 plus GST per vehicle for the day. Visitors or Vancouver residents interested in purchasing the package tour or renting the vehicle can call toll-free 310-2345 for bookings.

BCAA is the province's largest member services association, working on behalf of its 730,000 members to represent their interests and connect them with a team of automotive, travel and insurance professionals dedicated to serving their needs. To learn more about BCAA's products and services, advocacy programs, or about the BCAA Traffic Safety Foundation, visit www.bcaa.com.

Editor's note: *If you would like to receive a picture of the Dynasty "IT" car, please call Tatiana Jovic at (604) 268-5342 or e-mail tatiana.jovic@bcaa.com For further information: David Shawcross, Product Manager, CANescapes, Tel: (604) 268-5072, E-mail: dshawcross@canescapes.com; Tatiana Jovic, Coordinator, BCAA Media Relations, Tel: (604) 268-5342, E-mail: tatiana.jovic@bcaa.com*

Lineup of several Dynasty ITs at the VEVA event.

Various rear ends of Dynasty IT vehicles.

Dynasty's pickup version, ready to carry a load.

Dynasty 4-door sedan, with open area for hot weather.

BYD to Drive In to China In Electric Cars

By JANE LANHEE LEE Dow Jones Newswires BEIJING-

BYD Co. wants to leave its mark on China's auto market with its battery-run cars. One of the world's largest rechargeable-battery makers, BYD plans in the second half of this year to put 50 to 200 taxis on the streets of Shenzhen, where it is based. The taxis will be the first electric cars to hit the streets of mainland China.

"We hope to be able to mass market the cars in three to five years," Wang Chuanfu, chairman of BYD, said on the sidelines of the Beijing auto show. "We will set up a joint-venture taxi company in Shenzhen with the Shenzhen city government and test the cars on the street." The electric taxis cost about $25,000 each to make, but Mr. Wang said the price could be cut to $20,000. At the auto show, BYD displayed an electric concept car it dubbed ET, which it said could run as far as 186 miles before needing a charge. It also displayed the electric taxi, which can run up to 124 miles with air conditioning and five passengers.

BYD entered the auto industry last year when it took over a state-owned minicar maker in the northwestern city of Xi'an. It then set up BYD Auto Co., a fully owned unit that produces electric and conventional cars. "It will be five years before we can make money with electric cars," Mr. Wang said. "We need to rely on gasoline cars until then. The margins on our cars aren't great, but we will be launching new models so our margins will increase."

With China's passenger-car market booming during the past two years, cash rich handset and air-conditioner makers have entered the market, raising concerns about further fragmentation. To stop such newcomers, the Chinese government this month banned companies not already in the auto-assembly business from taking over local auto makers. The new policy also supports the bigger auto groups in China, all of which are state-owned. While Mr. Wang is happy no new small competitors will enter the market, he said the big auto groups are merely joint ventures with foreign auto makers and lack research-and-development capabilities.

"The auto industry is big, but there are almost no local brands," he said. "The state-owned firms, they don't pay enough attention to R&D." BYD's main model is the Flyer minicar. Last year, it sold about 25,000 of them, Mr. Wang said, and the car business brought in profit of about 10 million yuan, or $1.2 million. This year, he hopes to sell more than 35,000 vehicles, including BYD's midsize F6 sedan, which goes on sale this year.

Established in 1993, the EV Challenge has grown to become the largest high school and middle school academic electric vehicle competition in the United States. The Final Events of the EV Challenge 2003-2004 school year took place on Friday and Saturday April 2-3, 2004. Students from four states and thirty schools converged near Raleigh, NC to compete in the event.

Team entries are placed in one of three vehicle classes and are judged by several metrics including vehicle design, range, autocross performance, oral presentations, website, troubleshooting, and school initiative.

Overall Winners in High School Division

1st Place Overall
This year Hampstead, North Carolina's Topsail High School lived up to their slogan of "KICKNGAS" and earned both 1st and 2nd place in the overall standings with two vehicles: A '92 Toyota Paseo and a '96 Ford Ranger.

The sprightly '92 Toyota Paseo, placed 1st in the modified car design category. Energy storage is provided by thirteen 12V Trojan 30XHS batteries for a system voltage of 156V. The 9" ADC motor makes big torque thanks to a DCP Raptor 1200A controller. The design implements a clutch-less transmission to reduce spun weight, and the car has a top speed of 100+ mph and a usable range of 75mi @ 35mph. Sweet!

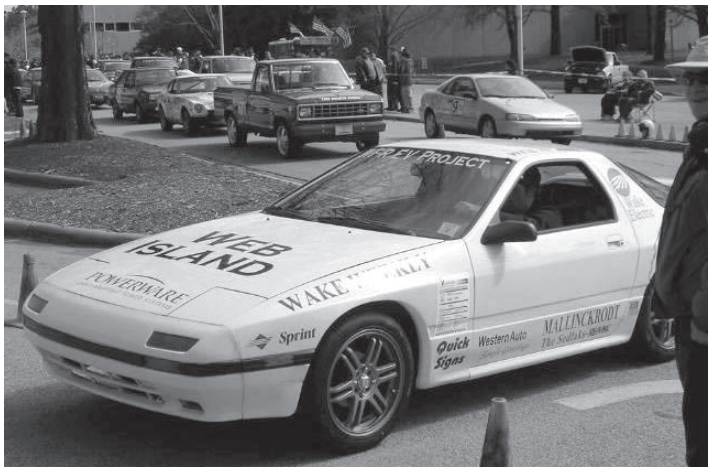
2nd Place Overall
Topsail's beautiful '96 Ranger took home 2nd place overall and 1st place in the truck design category. It is powered by a 9" ADC motor and a 96V pack of beefy Trojan T-145 batteries. Motor control is maintained by a 96V 500A Zapi controller. This truck also had clutch-less design. It has a top speed of 75 mph and a usable range of 80 miles @45mph.

3rd Place Overall
Moongalia County Technical Education Center of Morgantown, West Virginia did great with their snazzy '93 Mazda MX3. The 'Trons are stored in 13 NAPA Orbital 12V batteries for a peppy 156V system. The motor is an ADC 9" spun up by a DCP Raptor 600 with a clutch-less design..

4th Place Overall
Henderson, NC was represented in the winner's circle thanks to Northern Vance High School's S-10. It nailed 4th place to the wall with 96V and a 23Hp GE fork lift motor. A Raptor 600 supplied control while the electricity rushed from 16 chunky Trojan T-145 batteries. Top speed: 70 mph. Range: 80 miles @ 35-45 mph.

5th Place Overall
The Monongalia County Technical Education Center took home 5th with their '91 Ford Ranger XLT, which runs at 96V using sixteen 6V Trojans, a 9" ADC, and a DCP Raptor 600 controller and a clutch-less transmission.

Autocross - Truck Class
Lincoln County School of Technology.
A 19.942 run with their Ford Ranger. Quick!



1st Place Winners by Category

Autocross - Car Class
Wake Forest/Rolesville High School's Shockwave
The car ran 18.453 seconds with a 156V pack of Optima Yellow Tops, a DCP 1200A Raptor controller, and a 5 speed manual transmission. A Manzanita Micro PFC-20 charger "fed the lead" for race time.

Autocross - Modified Class
Union County Career Center Future Shock
Its 16.896 seconds was the quickest autocross car at the event. This baby spanked the competition with 13 Optima model 34 yellow tops, a 9" DC motor, and a 1200A DCP Raptor controller.

Vehicle Design Car Class
The oh-so-gorgeous Crimson Shocker, Southern Durham's '93 Ford Probe entry, uses an ADC 9", Curtis 1231 controller, and 12 8V Trojans for a system voltage of 96V nominal. Top speed: 85mph. Actual range: 44 miles. Total fun: Unlimited!

Vehicle Design Truck Class
Topsail High School Ranger

Vehicle Design Modified Class
Topsail High School Paseo

Range Car Class
Northern Vance High School's EXP avoided the outlet tether for 63.9 miles. Great job!

Range Truck Class
Western Harnett's Blue Thunder evaded the range police for 55.1 miles. The base vehicle is a Chevy S10. The main components are an ADC 9" motor, a Curtis 1231 controller, and Trojan T-145 batteries.

Range Modified Class
The coolest Escort ever! The one and only Shocker III from Northampton-East High School destroyed the competition with a 79.4 miles.

ADVENTURES AT THE BATTERY RECYCLING DEPOT
By Mike Hoskinson

Here is the full story of my trip to the recycling depot about a year ago. It was worth the trip just to see the guy's face...

Had a couple of old batteries to take to the city "Eco Centre" recycle place. I heard that scrap dealers pay a few $ for them but I wanted to get one of those big containers for waste oil so I could consolidate all the old engine oil that is kicking around the garage. They take the oil, the empty oil containers, the old oil filters and even oily rags for recycling.

Anyway, I pulled up to the booth where they charge you for some stuff, said "I've just got a couple of batteries to drop off." The guy looks down into the car, where 12 of the wired-up floodies are in plain view, and his eyes pop. "Not those," I quickly explain, "Those make the car go." "Eh?" he says, this being Canada. "Yeah, it is an electric car." "No kidding?" he says. "Well just go around and into the building over there," and hands me a receipt for $0.00.

I pull around and the door opens. "What's this?" the guy says. "Electric car" says I. "Wow, Let me see! Hey guys, come and see this!" The four guys working inside the building come over, and the guy from the booth has put up the closed sign and come in too, and I give them all a tour of the car.

"How long does it take to charge?" is the main how-well-does-it-work question. "About an hour and a half for 50 km, thanks to this 75 amp charger." (I went with the PFC-50 just so I could say that.)

"What about putting a generator on the wheel so you can charge up as you drive?" is the obligatory over-unity question. "It already has that - it's called regenerative braking, but you can only get energy back when you want to slow down." I explain the concept of TANSTAFL ('there ain't no such thing as a free lunch'). "It has regular brakes, but I don't use them much." (I went with Randy Holmquist's sepex system, just so I could say <that>.)

If the car can be this popular when it looks like a refugee from the scrap yard (which, in fact, it is), imagine what it will look like when the interior is done and the final paint is on, to say nothing of the newly polished stainless steel trim that isn't on yet. It may not be a tire-burner, but it is a head-turner.

(editor note: Since then the Citroen D-EV has been painted and finished. It was a big hit at the REV!2004 EV show on page 7 and continues to deliver EV grins.)

EDISON BATTERIES
By John De Armond

Edison's batteries were made from about 1903 to 1940 if I recall correctly. They were quite profitable for the company. Edison was disappointed that his battery was not adopted for starting ICEs and that electric vehicles went out of production only a few years after his battery was introduced. The battery enjoyed wide use for railroad signaling and standby power applications.

I just returned from a couple of weeks in Dearborn, Mi. While I was there I took in the Henry Ford Museum and the adjacent Automotive Hall of Fame. While mostly immemorial, the Hall of Fame did have one thing of interest — a salesman's cutaway sample of the Edison NiFe battery, CA 1909. The battery has a very sophisticated construction for it time.

The Henry Ford museum is worth whatever it takes to get to Dearborn. Best museum I've ever been to.

by Lee Hart

Saturday, May 22nd: Students from eight Minneapolis MN area schools whizzed around the Cooper High School athletic track in their electric vehicles at this year's BEST electric car race. The 7th annual event was sponsored by BEST (Bridging Engineers Science and Teaching), http://www.bestoutreach.com, a grass-roots group of engineers and teachers to promote science, math, and life skills for 4th-6th grade students (who just think they're having fun building things)!

The BEST program begins in the fall, with students learning to use tools such as hammers, saws, and screwdrivers. They generally meet 1 hour a week, honing their skills by building tabletop cars out of recycled materials like cardboard boxes, plastic bottles, coat hangers, and jar lids. Their goal is to find out what rolls the best; heavy or light, how many wheels, what shape, etc. The core idea is to have them tackle a real problem where the "best" solution is unknown; without books, kits, or adult help.

Next, they motorize their models with small electric motors and batteries provided by BEST. In the process, they learn about about friction, gearing, wiring, balance, and other facets of vehicle design. They test and race their small cars to find the "best" overall design.

Then, they enlarge their model to become a real vehicle that they can actually drive. BEST provides a 12v gearmotor, battery, and circuit breaker, but everything else is up to the students themselves. The cars are therefore amazing contraptions made of recycled materials; scrap lumber, old bicycles, broken classroom chairs, etc.

In theory, the teams have the entire school year to prepare, meeting about an hour a week. But as every parent and teacher knows, the kids actually build and test their cars in a frantic few week period just before the race.

For example, the Sartell team started on their car in early May. They had to meet after school several days a week to get it ready in time, and worked until after midnite the night before the race. This also meant they had essentially no time to practice driving or sort out problems.

The Cars

#1 – **"No.1 Raccoon"** from Riverview School. The frame was an aluminum ladder, with a plywood floor added. The front wheel was a large industrial caster, with a steering rope on a spool on a shaft connected to a real steering wheel. The rear axle had two garden tractor tires. A pair of 6" pulleys and v-belt connected the gearmotor to the rear wheel. They discovered this gearing was fast, but the motor got hot. So, they mounted it in a 2-gallon ice cream bucket and filled it with ice. The seat was a plastic chair.

#2 – **"King of Harts"** by Sartell Middle School. The frame was an "A" made of 2"x4", with the seat support as the center bar and the rear axle at the base of the "A". A broken classroom chair provided the seat, with the battery hung under it for balance. The single rear wheel was a huge SUV truck tire on a homemade wooden rim (salvaged from last year's car). It had a chain drive, using a 5-sprocket hub from a 10-speed bike rear wheel pinned onto the motor, and the crank sprocket bolted to the rear wheel. The front axle was a 2"x4" and 3/8" steel rod, with lawnmower wheels. They steered with their feet.

#3 – **"Car-3"** by Sonnesyn School. The frame was angle iron, about 2' x 4', with a plywood floor on top. Two bike wheels poked up in the rear through slots in the plywood. The front half of a 20" bike provided the front wheel, steering, and brakes. The clever friction drive system had a wide inverted "U" made of threaded water pipe over the back wheels, with a long piece of pipe that rotated around the horizontal portion. This pipe was spun by the motor with a v-belt and pulley. The weight of the vehicle was carried by this pipe, which pressed it tightly against the tires to provide a friction drive. The seat was a plastic milk crate, which also held the battery.

#4 – **"Jenine"** by New Hope Elementary was similar to car #3, but larger. It used a bicycle chain drive, and since they had time to test, had picked a ratio that really made it fly.

#5 – **"Red Dragon"** from W. Harry Davis School. This was an all-wood platform with bike wheels; 1 in front for steering, 2 smaller ones in back. The seat was a plastic lawn chair. This team had cool shirts that they designed with a red dragon on it.

#6 – **"Wayzata"** by Plymouth Creek School. This car was very light, with a space frame of soldered and bolted copper pipe. The rear half of a 27" bike provided the rear wheel and frame, with its chain and sprocket connecting it to the motor. The front end was quite involved, and features true Ackerman steering, just like a real car. The team reported spending a *lot* of time trying to get it to steer right.

#7 – **"Supersonic Bears"** from North Star School. This one was much like an adult tricycle, but with a rear frame made out of wood. It used a bicycle frame and fork assembly for seat, steering, and brakes. The two rear wheels were bolted to the wood frame at one end. A v-belt drove one back wheel.

#8 – **"Jr. Flame Racers"** by Shingle Creek School. This had another wood platform frame, but with two wheelchair wheels bolted in back. A riding lawn mower seat was mounted on top of the battery. The front wheels and steering wheel assembly were also taken from a riding lawn mower. A chain drove a back wheel, with wooden chain guards.

The rainy weather could not dampen the enthusiasm as the teams gathered to show off and test their go-kart-sized vehicles that they had designed and built from scratch.

Inspection

The first requirement is that all cars pass inspection. We make sure they have adequate steering, brakes, that sharp edges are covered, etc. Teams can use any motors and batteries they want for testing, but for the race itself, they must use the motor, battery, and 20-amp circuit breaker we supply so all teams have the same power. Some teams had two batteries and a second motor, so you could tell they were doing some speed runs on their own!

All drivers must also have a BEST driver's license. This means they have practiced before the race, and know how to safely start, stop, steer, and brake their car. It also means they have taken a written test to show that they know the rules for the races.

The Drag Race

The first event is a 100-yard drag race to see which car is the fastest. Car #4 "Jenine" did well because they had finished their car early and had time to optimize their gear ratio for speed. Car #2 from Sartell demonstrated the consequences of inadequate practice; their driver forgot to turn on the circuit breaker and was left at the starting line!

The winner was #6 "Wayzata" from New Hope, whose light weight really paid off. #4 "Jenine" was right behind, followed by the "Jr. Flame Racers" in #8. #1 "Raccoon" was coming on fast, but had been geared too high and took too long to get up to speed.

The Slalom

The next event was a slalom, where the teams had to zig-zag around a tight course laid out with traffic cones. This was a test of steering and handling.

Fast *and* maneuverable, it was #4 "Jenine" in first place. Car #8, the "Jr. Flame Racers" was second, followed by "No.1 Raccoon" in third. Car #5 "Red Dragon" with its low center of gravity and expert driving came in fourth. The other cars also did well, except "Car-3" was having trouble with its friction drive slipping due to the wet track.

The Endurance Race

The goal here was to complete as many laps as possible in 45 minutes. Teams had to change drivers after every lap, to give everyone a chance to drive.

At the start, #8 "Jr. Flame Racer" took the lead, followed by car #5, the "Red Dragon" and #6 "Wayzata" close behind. You could tell that teamwork paid off, as the fastest cars could easily lose their lead from being slow to change drivers.

After a few laps, #6 "Wazata" managed to pass #, but then the driver lost control by trying to cut too far inside on the north turn. The car veered off into the muddy infield and got stuck. Team members rushed to get it back on the track.

A few laps later car #4 "Jenine" coasted to a stop. Something had failed! Their team pushed it back into the pits and began frantically working to fix it.

#2 "King of Harts" was also having drive problems. The chain fell off a couple times. It was easily put back on, but cost valuable time. They decided to pit, and fashioned a chain guide from cardboard and duct tape. That did the trick; there were no further problems with it.

"Car-3", the only car with a friction drive, was having continual trouble with slippage due to the wet track. A light misting rain only made matters worse. But they kept going, slow but sure!

It seems that #4 "Jenine"s high gear ratio was overheating the motor. Apparently it has a thermal protector inside, which opens when hot, and resets when it cools. So, they copied car #1's ice-pack for the motor, and got back in the race.

#2 "King of Hearts" had to pit again when they noticed that the wood to which their rear sprocket was bolted was splitting in half. They drilled a hole crosswise through the wood, and stuck a bolt through to hold it together. Then, back in the race.

In the end, it was car #6 "Wayzata" with the most laps, closely followed by car #4 "Jenine" in second and "No.1 Raccoon" in third place. Car #5 "Red Dragon" was 4th, with the rest following.

Then it was pizza-time! We order pizza for all the contestants, and if you want to see something fast, watch how quickly it disappears!

We also presented the Judges' Awards. Our panel of judges consists of a student member from each team. They examine the cars, and then decide what is "best" about each one. The award categories are chosen by the students on race day, so no one knows in advance what categories they will be judged on.

It was a great success. Everyone got to drive, and had a wonderful time. And, all the cars finished every event, which is quite an accomplishment for these vehicles!

Convert to Electric Vehicles

Electric Auto Association (EAA) **August 2003**

Why Build an EV?

Today there are limited production electric vehicles (EVs) available, so converting an existing internal combustion engine (ICE) vehicle to an electric vehicle (EV) might be the best choice available to obtain an EV.

Building your own electric vehicle (EV) can be a rewarding and challenging experience. Not only will you be a pioneer in the EV movement, but you will also be recycling a car that may be headed for the junk yard. Donít wait for Detroit. Custom build an EV yourself[1].

A typical EV conversion will achieve a range of 30-60 miles for each charge. Studies have shown that 80% of commuters travel less than 40 miles per day, and 50% of commuters travel 20 miles (or less) per day. An EV conversion can meet those daily driving needs.

EVs are a clean, efficient alternative to conventional vehicles – using technology that is readily available today! EVs produce zero emissions, and when you consider the full fuel cycle to generate electricity, are up to 99% cleaner than gasoline and diesel vehicles. EV owners enjoy the financial benefits of significantly lower fuel and maintenance expenses. Finally, EVs help reduce our dependence on oil.

What steps are involved?

This overview provides a high level framework for performing a conversion. Please review the references and other links (in the next section) for more complete information.

1. Determine your driving needs: range – the distance you travel in a single day; type of vehicle – family car, commuter, utility vehicle, or racing car.
2. Look for an EV kit for the vehicle you choose. Kits will make the conversion significantly easier – they include all of the parts, except batteries. A conversion kit will cost about $4,000-$6,000, and the batteries, depending on how many you need, can cost another $700-$1,200.
3. Make sure you have access to the proper tools and supplies, and a place to do the conversion. You may need to rent equipment like engine hoists and contract out welding work. Contact EV veterans for advice and assistance.
4. Familiarize yourself with the EV components that will be installed. The most common batteries for EV conversions are lead-acid batteries, specifically, 12-volt sealed batteries.
5. Safety. Any project involving automobiles and tools has inherent risks. Be aware of these possible hazards to prevent damage to the vehicle and serious injury to you.
6. Remove the ICE components, making room for the EV components.
7. Install the motor, components, battery box, and batteries.
8. Install the wiring for propulsion (traction pack), auxiliary power system (12-volt system), traction pack charging system, and displays and controls.
9. Safety testing. Test the battery charger; check the wiring and fuses, connections. Then take it out for a spin and notice the quiet, smooth ride. Be sure to show it off!

"Promoting the use of electric vehicles since 1967"

Electro Automotive VoltsRabbit

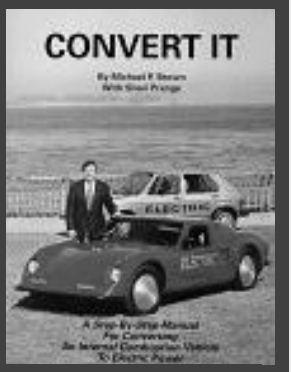
Acterra EV Conversion Project

DC Motor

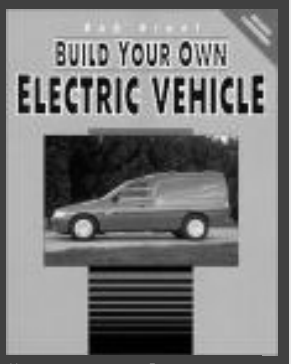
Example components

[1] http://www.evadc.org/build_an_ev.html. In addition, this excellent web site is the source for much of the information included here.

"EAA EV drivers have logged over 3 million clean miles"



"Your notes should be required reading for all members before starting construction." – Satisfied reader (posted on amazon.com)



"An exceptional book for anyone looking to get the initial know-how on how to convert a gas vehicle to an electric vehicle (EV)." – Satisfied reader (posted on amazon.com)

E-mail: info@eaaev.org
Web: www.eaaev.org

Rev: 20030806

More Resources and Links

- Seek out the nearest Electric Auto Association (EAA) chapter http://www.eaaev.org and attend a local meeting. The links page has information about conversions and components (http://eaaev.org/eaalinks.html)
- Electric Vehicle Association of Greater Washington DC has an excellent overview "Build an EV" at http://www.evadc.org/build_an_ev.html. Much of the material presented here comes from this web site.
- Probably the definitive book on conversions, "Convert It" by Michael Brown & Shari Prange (ISBN 1879857944), provides a step-by-step guide through the entire conversion process. From Electro Automotive http://www.electroauto.com.
- "Build Your Own Electric Vehicle" by Bob Brant (ISBN 0830642315), features in-depth descriptions of battery, motor, controller technology, with formulas, photos, and diagrams.
- "The New Electric Vehicles: A Clean and Quiet Revolution" by Michael Hackelman (ISBN 096295887). Features EVs including conversions, solar cars, electrathon racers, boats, and even planes. Includes color photos and helpful construction tips.
- DC Power Systems is a component supplier (http://www.dcpowersystems.com).
- AC Propulsion offers many EV technologies (http://www.acpropulsion.com).
- EV Parts, Inc is a component supplier (http://www.evparts.com/firstpage.php).
- Manzanita Micro EV components (http://www.manzanitamicro.com).
- Café Electric EV controllers (http://www.cafeelectric.com).
- KTA Services provides EV components and kits (http://www.kta-ev.com).
- http://www.metricmind.com/ , Victor Tikhonov imports Siemens AC drives.
- EV World has information about conversions, conversion supplier, and a list of popular EV conversion vehicles (http://www.evworld.com/archives/hobbyists.html).
- EV discussion group http://geocities.com/ev_list.
- Grassroots Electric Vehicle Company supplies EV components and has a video series on EV conversions at http://www.grassrootsev.com
- The Electric Drive Transportation Association http://www.evaa.org/evaa/pages/ele_product_conversion.htm.
- An EV conversion diary http://www.evsupersite.net/pages/807953/index.htm.
- Acterra's EV conversion project http://www.acterra.org/ev.
- National Electric Drag Racing Association (http://www.nedra.com).

About the EAA

The EAA is a non-profit educational organization that promotes the advancement and widespread adoption of electric vehicles; organizes public exhibits and events of electric vehicles to educate the public on the progress and benefits of electric vehicle technology.

Electric Auto Association

The Truth About Auto Emissions

Electric Auto Association (EAA) **August 2003**

What are emissions and why are they bad?

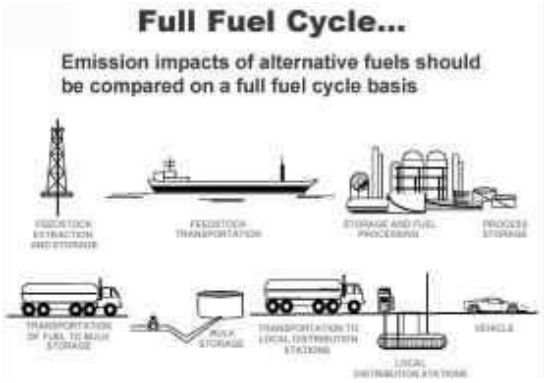
Components of air pollution include[1]: Carbon Monoxide (CO) — reduces the bloodís ability to carry oxygen, aggravates lung and heart disease, and causes headaches, fatigue, and dizziness. Sulfur Dioxides (SOx) — when combined with water vapor in the air become the major contributor to acid rain. Nitrogen Oxides (NOx) — cause the yellowish-brown haze over dirty cities, and when combined with oxygen becomes a poisonous gas that can damage lung tissue. Hydrocarbons (HC) are a group of pollutants that react to form ozone (O_3), some HCs cause cancer and others can irritate mucous membranes. Ozone (O_3) is the white haze or smog seen over many cities. Ozone can irritate the respiratory system, decrease lung function, and aggravate chronic lung diseases (such as asthma). Carbon Dioxide (CO_2), although naturally occurring, can cause problems. In large quantities it allows more sunlight to enter the atmosphere than can escape — trapping excess heat that can lead to the "greenhouse effect" and cause global warming.

Ozone is a toxic gas, but it´s not emitted directly from tailpipes. Ground-level ozone is formed by a chemical reaction between VOCs (volatile organic compounds) and NOx, released from fuel combustion, in the presence of sunlight. Ground-level ozone concentrations can reach unhealthful levels when the weather is hot and sunny with little or no wind[2]. Gasoline and diesel powered cars, trucks, and buses are the major sources of NOx and VOCs.

According to the American Lung Association[3], ozone is a serious threat to public health. Exposure to high levels of ozone causes significantly higher rates of asthma in children. In pregnant women, it can cause a significantly higher rate of babies with birth defects.

Where do the emissions come from?

Before comparing the emissions associated with vehicles and fuel types, consider the full fuel cycle. Emissions are generated at each step in this cycle—extraction of raw fuel (feedstock), transportation, storage, processing, and distribution to the vehicle itself, or "well-to-tank" emissions; emissions are also generated by the vehicle itself, "tank-to-wheels". The full cycle is referred to as "well-to-wheels".



Vehicles are defined by the level of emissions (tank-to-wheels) they produce: low-emissions (LEV), ultra-low emissions (ULEV), super low-emissions (SULEV), partial zero emissions (PZEV), and zero emissions (ZEV). Basically, LEVs, ULEVs, SULEVs, and PZEVs produce lower vehicle emissions than vehicles built prior to 1972, but do little to reduce CO_2 emissions. PZEVs go a step further than SULEVs by eliminating emissions from the vaporization of fuel in the gas tank and fuel system. Lower emissions levels are achieved by control systems installed on these vehicles. However, these systems degrade over time, which reduces their effectiveness in controlling emissions. ZEVs, on the other hand, produce no emissions and so have no need for emissions systems!

"Promoting the use of electric vehicles since 1967"

Every Day is a Spare the Air Day in an electric vehicle!

"Vehicle emissions pose a serious threat to public health" — American Lung Association

"EVs could yet prove to be the future of clean transportation." — Union of Concerned Scientists

"Even if EVs are recharged using fossil fuels, they can cut global warming emissions by as much as 70 percent." — Union of Concerned Scientists

[1] http://www.evadc.org/pwrplnt.pdf
[2] http://www.epa.gov/oar/oaqps/gooduphigh/
[3] http://www.californialung.org/spotlight/smog_02ss.html

"EAA EV drivers have logged over 3 million clean miles"

"Zero and near-zero emission vehicles are essential for achieving and maintaining clean air." – Union of Concerned Scientists

"Trucks (SUVs) and cars certified as LEVs, actually meet different standards. A LEV truck (SUV) is allowed to emit up to 3 times more smog-forming pollution than a LEV car." – Union of Concerned Scientists

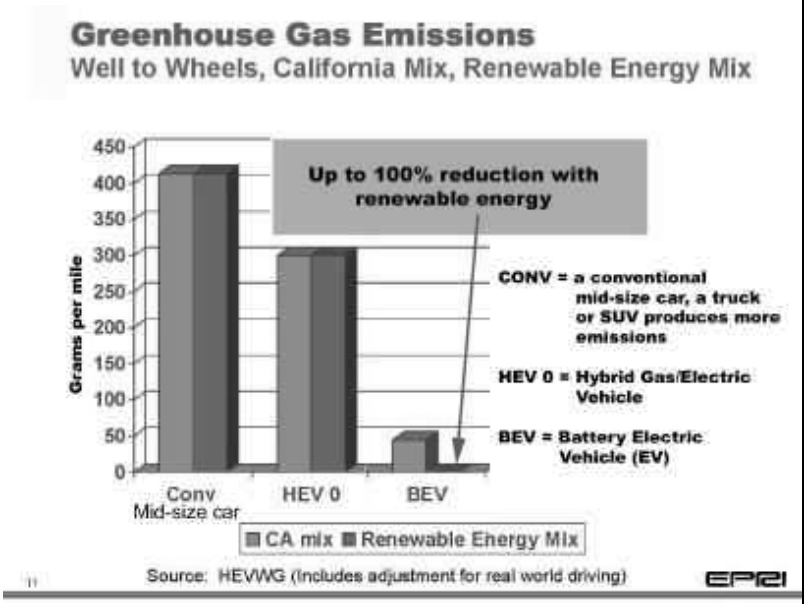
"Even if 10,000 EVs plugged in at the same time, they would only need 50 megawatts, less than 0.06% of Californiaís total power demand." – California Air Resources Board

E-mail: info@eaaev.org
Web: www.eaaev.org

Rev: 20030814

Electric vehicles (EVs) produce zero emissions from the vehicle itself – and are classified as ZEVs. The only emissions are those released during the generation of electricity (from coal, natural gas, etc.). However, even those emissions can be eliminated if the electricity is generated from renewable sources, such as solar or wind!

The "Greenhouse Gas Emissions" graph compares the overall emissions for vehicles available today. The graph clearly shows that EVs really do reduce emissions. And, switching to renewable sources for electricity generation can reduce **all** emissions associated with EVs.



According to the Union of Concerned Scientists, "**Despite decades of air pollution control efforts, at least 92 million Americans still live in areas with chronic smog problems**."[4] "Americans are driving more miles each year, partially offsetting the environmental benefits of individual vehicle emissions reductions."[5] And the mix of vehicles on the road includes a greater number of higher emissions vehicles (trucks and SUVs), making the problem worse.

According to the California Air Resources Board (CARB)[6], even when taking into account power plant emissions, **ZEVs are 98% cleaner than the average 2002 vehicle and 95% cleaner than the lowest emitting conventional vehicle** (not including the well-to-tank emissions for gas powered vehicles). Emissions from central power plants are easier to control than emissions generated by millions of cars on the road. Future power plants will be more efficient and even cleaner. When they utilize renewable energy sources, such as wind and solar energy, the full "well-to-wheels" emissions for EVs will be zero! It is not possible to achieve zero "well-to-wheels" emissions for a vehicle that uses a gasoline or diesel engine.

Many EV drivers have not waited for central power plants to switch to renewable electricity generation. They have installed photovoltaic cells on their homes to generate clean electricity from the sun today! With EVs you actually have an option for fuel sources (for electric generation) – including renewable sources – with gasoline-powered vehicles there are no other options – only gasoline.

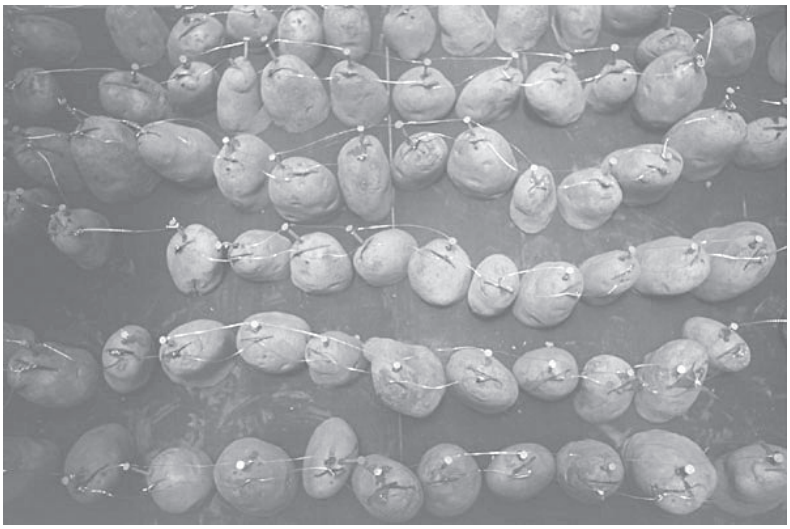
About the EAA

The EAA is a non-profit educational organization that promotes the advancement and widespread adoption of electric vehicles; organizes public exhibits and events of electric vehicles to educate the public on the progress and benefits of electric vehicle technology.

Electric Auto Association

[4] http://www.ucsusa.org/clean_vehicles/cars_and_suvs/page.cfm?pageID=231
[5] http://www.ucsusa.org/clean_vehicles/cars_and_suvs/page.cfm?pageID=247
[6] http://www.zevinfo.com/background.html

Closeup of "cable connections" between spud cells.



Battery box view of the potato cell arrangements, in parallel/series..

The pack takes up less space than expected in the "battery box".

By Amos Latteier
Created for Performance 2000, Portland, OR.

I built a potato battery out of 500 pounds of potatoes. It powered a small sound system. With the help of the Red 76 crew I installed the battery and sound system in the back of a U-Haul truck and drove it around town inviting people to enter the truck and take a listen.

Batteries work by allowing electrons to pass from one electrode to another. In this case the potato provides phosphoric acid, which enables a chemical reaction causing electrons flow from copper to zinc. The zinc came from galvanized nails and copper came from small pieces of copper. You don't have to use potatoes; any acidic medium such as citrus fruit will work. I chose potatoes because they are traditional and cheap.

Each potato generates about 0.5 volts and 0.2 milliamperes. I connected groups of potatoes together in series to increase voltage and then connected these groups together in parallel to increase amperage. The entire 500 lb battery generated around 5 volts and 4 milliamperes.

Don't eat the potatoes after using them for a battery.

Website: http://latteier.com/potato/

NEDRA RACING ANNOUNCEMENT

We're having our **Wicked Watts** race August 20 and 21 at the Las Vegas Motor Speedway. Racing will start Friday, August 20th at 6pm for the door slammers, dragsters and bikes. Then Saturday morning, August 21st at 8am for the Jr. dragsters.

For further information, contact Richard furniss at rfurniss1@cox.net
Hope to see you there!!
And join us for Woodburn September 25

Evader Launches New Line of Electric Bikes in Turkey

Bellevue,WA-based electric vehicle developer and manufacturer Evader, Inc. launched its new line of 200 series electric motorcycles during the 2004 International Motorcycle Show, held in March in Istanbul, Turkey.

"The Turkish market is going to be big," said Evader director of international distribution Rob Stoneham. "With a population of more than 70 million and gasoline priced at almost seven dollars per gallon, the Turkish people are looking for an affordable, quiet and environmentally friendly solution for their transportation needs."

The recent motorcycle show also marked the debut of the company's 200 series of police-styled electric motorcycles. Capable of speeds of up to 55 miles per hour, Evader said the all-electric EV200S Police Cruiser was built for the Istanbul "Trafik Polis."

Global Electric, R-Electric to Debut New Vehicles

Global Electric Corporation and R-Electric Car Company will showcase prototype electric vehicles at this week's GLOBE 2004 Conference in Vancouver, British Columbia. R-Electric Car Company will unveil its R-CAR, which can travel 200 miles on a single charge and reach speeds of up to 90 miles per hour, and a two-person, lithium ion battery-powered all-terrain vehicle.

Global Electric, meanwhile, will debut its converted bicycle and motorcycle, both also powered by lithium ion technology.

NESEA Announces 2004 Tour de Sol Festival

The Northeast Sustainable Energy Association (NESEA)'s 2004 Tour de Sol: The Great American Green Transportation Festival will be held May 21 through 25 in New York and New Jersey.

According to NESEA, a variety of electric, hybrid electric and experimental advanced vehicles will be on display at the event, as well as available for test drives, with major manufacturers represented at this year's festival including Allison Transmission, Ford, General Motors, Honda and Toyota.

Over the course of the event's five days, NESEA said vehicles will compete for cash prizes and Tour de Sol trophies, with "green" prizes recognizing vehicles with reduced greenhouse gas emissions and higher fuel efficiency and "consumer satisfaction" prizes awarded for handling, acceleration, reliability and range.

Additionally, prizes will be presented to the best-performing vehicles using biodiesel fuel and lead-acid batteries.

The Tour de Sol festival opens to the public in Burlington City, NJ on Saturday, May 22, while on May 24, vehicles will be on display in downtown Trenton, NJ. A final display and awards ceremony is planned for New York City on May 25.

MC Electric Vehicles Opens New Location in Seattle

MC Electric Vehicles recently opened a new dealership in Seattle, WA, offering vehicles from Reedsburg, WI-based Columbia ParCar Corporation; Delta, British Columbia-based Dynasty Motorcars; and Dallas, TX-based Tiger Truck. The company will sell, service and repair Columbia ParCar's personnel carriers, burden carriers, utility vehicles and specialty products; Dynasty Motorcars' "it" sedan and sport vehicles; and Tiger Truck's utility vehicles.

Bonita Springs, FL to Host 'SegwayFest! 2004'

Innovations, Inc. is presenting the "SegwayFest! 2004" conference October 8 through 10 at the Hyatt Regency Coconut Point Resort & Spa in Bonita Springs, FL.

The event will open the morning of Friday, October 8 with sessions offered in two separate tracks, including case studies of Segway Human Transporter (HT) use in Chicago and Seattle and discussions of HT rental and regulatory issues. In the evening, a presentation will be made by SEG America, the national Segway enthusiasts group.

The conference's second day will offer such activities as the "Agility Games" and the "Segway Picture Rally/Scavenger Hunt," while the event's final day will offer sessions addressing intermodal mobility as well as a variety of outdoor activities.

Whistler to Develop EV for British Embassy in Mexico

Whistler Investments, Inc. subsidiary R-Electric Car Corporation will work with the British government to develop and deploy a lithium ion (Li-ion) battery-powered BMW Mini-Cooper Type S for use in the fleet at the British Embassy in Mexico City, Mexico. The Li-ion-powered BMW Mini-Cooper Type S is scheduled to be delivered to the embassy later this year.

Marines Operate Electric-powered Bicycles

The Jacksonville, North Carolina, Daily News recently reported that the 24th Marine Expeditionary Unit (MEU) has begun operating four TidalForce M-750 electric mountain bicycles developed by Wave Crest Laboratories.

The bicycles, which feature a DC direct drive 750- to 1,000-watt motor system in the rear hub and a NiCad battery pack in the front wheel, are capable of reaching speeds between 25 and 30 miles per hour and traveling approximately 15 miles per charge, with that range further increased with "light pedaling." (JACKSONVILLE DAILY NEWS: 4/19)

ZAP Acquires Electric Transportation Company

Santa Rosa, CA-based electric vehicle company ZAP has acquired the Electric Transportation Company, LLC (ETC) of Santa Barbara, CA.

Specific terms of ZAP's agreement to purchase ETC have not been disclosed but include ZAP stock and warrants in exchange for all assets of ETC, including designs, blueprints, test reports, manufacturing equipment, products and parts inventory, and intellectual property.

The acquisition includes ETC's customer database. ZAP has also transferred all ETC vehicle components from its manufacturing operations to ZAP's raw materials warehouse for final assembly.

NY Measure Could Ban Sale, Use of Segway HT

The New York City Council is considering a measure that would extend the ban on motorized scooters, including Segway, LLC's two-wheeled, battery-powered Human Transporter (HT), to include the point of sale, lease, rental and use in private spaces. Currently, the law prohibits the use of such devices only in public places.

"Originally, motorized scooters were introduced to society as an alternate mode of transportation," said council member and transportation committee chairman John Liu. "However, while these scooters look harmless, they are extremely dangerous, make unpredictable moves and sudden turns, and often travel up to 40 miles per hour."

The New York Daily News reported that the measure would introduce a maximum penalty comprising a $1,000 fine and a 15-day jail sentence for individuals who continue to sell or rent scooters as well as a $500 fine and confiscation for riders who illegally operate the devices.

The newspaper noted that Segway proponents have already testified before legislators for HT exemption from the measure. Council officials said a vote on the legislation is expected this summer.

continued on page 22

Pontikos to Distribute Evader EVs in Greece

Electric vehicle manufacturer Evader, Inc. has reached an agreement for the Pontikos Group of Companies to distribute Evader electric vehicles (EVs) in Greece to coincide with the 2004 Olympic Summer Games.

"There has been enormous interest in anticipation of Evader's arrival in Greece for providing quiet, clean transportation while the eyes of the entire world are on this country," said Pontikos president Peter Pontikos.

Local TX Agency Purchases Segway HTs

The Southlake Department of Public Safety has purchased two of Segway, LLC's two-wheeled, battery-powered human transporters (HTs) with funds from a half-cent Crime Control tax.

Lt. Ashleigh Douglas said police officers plan to operate the HTs, which cost approximately $5,000 each, for "special patrols" in local neighborhoods. Douglas noted that the HTs will also be utilized by area paramedics and firefighters. (DALLAS MORNING NEWS: 4/22)

EDTA Appoints New President

The Electric Drive Transportation Association (EDTA) has named Brian Wynne to serve as the association's new president.

Wynne, who formerly managed a consulting company, has previously held such positions as senior vice president of business and trade for the Intelligent Transportation Society of America and CEO of Automatic Identification Manufacturers International.

"I am confident that with Brian Wynne at the helm, EDTA will continue and expand its pivotal role in promoting battery, hybrid and fuel cell vehicles and supporting infrastructure during this critical time in the electric drive industry," said EDTA co-chairman Eugene Zeltmann.

Greek Municipality Selects Evader EVs for Olympic Use

Bellevue, WA-based electric vehicle developer and manufacturer Evader, Inc. recently announced that the mayor and council of the Greek municipality of Filothei have selected the company's line of all-electric vehicles (EVs) to serve as the municipality's means of transportation for the 2004 Summer Olympics.

"We are situated only two kilometers from the main Olympics Stadium," said Filothei mayor Theophrastus Economides. "We are very impressed with the Evader and will be replacing all of our official vehicles with Evader units as we switch our gas-powered fleet to [EVs]."

Peter Pontikos, head of Greek Evaders distributor the Pontikos Group, noted that additional Greek towns and municipalities are expected "to follow suit."

ZAP Introduces Electric Mini Dirt Bike

Santa Rosa, CA-based ZAP recently announced it is producing a new all-wheel-drive, electric mini dirt bike.

The ZAP MBZ features electric motors on both wheels and direct drive technology.

The MBZ has a top speed of 25 miles per hour and can travel about 30 miles on a single charge. The bike will retail for just under $900.

9th European Lead Battery Conference, Berlin, 21-24 September 2004

I would like to invite you to register for the 9th EUROPEAN LEAD BATTERY CONFERENCE to be held in Berlin, Germany, 21-24 September 2004. This world class conference provides an excellent opportunity to learn about and exchange facts and views on lead-acid batteries, especially advances in battery use, technology, and manufacture.

9ELBC features many top-class presentations on:

- The challenges and markets for lead-acid batteries worldwide
- Developments in valve regulated batteries
- Battery power systems for automotive and hybrid vehicles
- Update on manufacturing equipment and materials
- Advances in battery science
- High priority topics on technology and new markets
- New and emerging battery applications.

Full details of 9ELBC, including how to register and make hotel reservations in Berlin at preferential rates and be found on our website www.ldaint.org/9elbc

As at previous "ELBCs" this 9th conference will bring together many battery experts and those interested in the industry from Europe and overseas. A two-day exhibition highlighting new and improved battery manufacturing technology, materials and supplies will be held during the Conference. This will provide an excellent opportunity for commercial and other discussions between delegates and suppliers. Please see our website link: www.ldaint.org/9elbc/indexe.htm

Now is the time to put details of 9ELBC in your diary and to register for this valuable conference. Special conference fees apply for early registration. If you have any questions do please contact me.

We look forward to meeting you this September in Berlin.

Yours sincerely

Maura McDermott
Conference Co-ordinator
Lead Development Association International
42 Weymouth Street, London W1G 6NP, United Kingdom

Tel: 00 44 20 7499 8422;
Fax: 00 44 20 7493 1555
Email: mcdermott@ldaint.org

2004 SOLFEST SOUTH WEST

By Jim Stack, PEAA

Our Phoenix EAA just got back from the 2004 SolFest South West where we were showing our Clean Air EV's and Hybrids. We had production EV's with 1 Solectria E10, 1 GM-Hughes S-10 Electrics, a '93 Chrysler TEV and home conversions of a '86 Fiero, an '80 Mustang convertible, a Ford Ranger and an EV bike. Our Hybrids were the 2004 Toyota Prius and a 2003 Honda CIVIC. The EVs use a wide variety of battery types - wet cell lead acid, sealed lead acid and wet cell Nicad.

We got to hear and meet actor Ed Begley Jr, who lives in a solar powered house, personally drives a Toyota RAV4 EV and his wife drives a 2004 Toyota Prius. I offered him membership in our club and National and he gladly signed up. His talk was very down to earth telling all the simple ways people can reduce their use of energy in the home and transportation.

We also got to meet a reporter for Electrifying Times, who took some pictures of Ed Begley Jr, our cars, and us. There may be a few posted on the Phoneix EAA webpage soon. The reporter also gave us the new copy of their magazine that just came out.

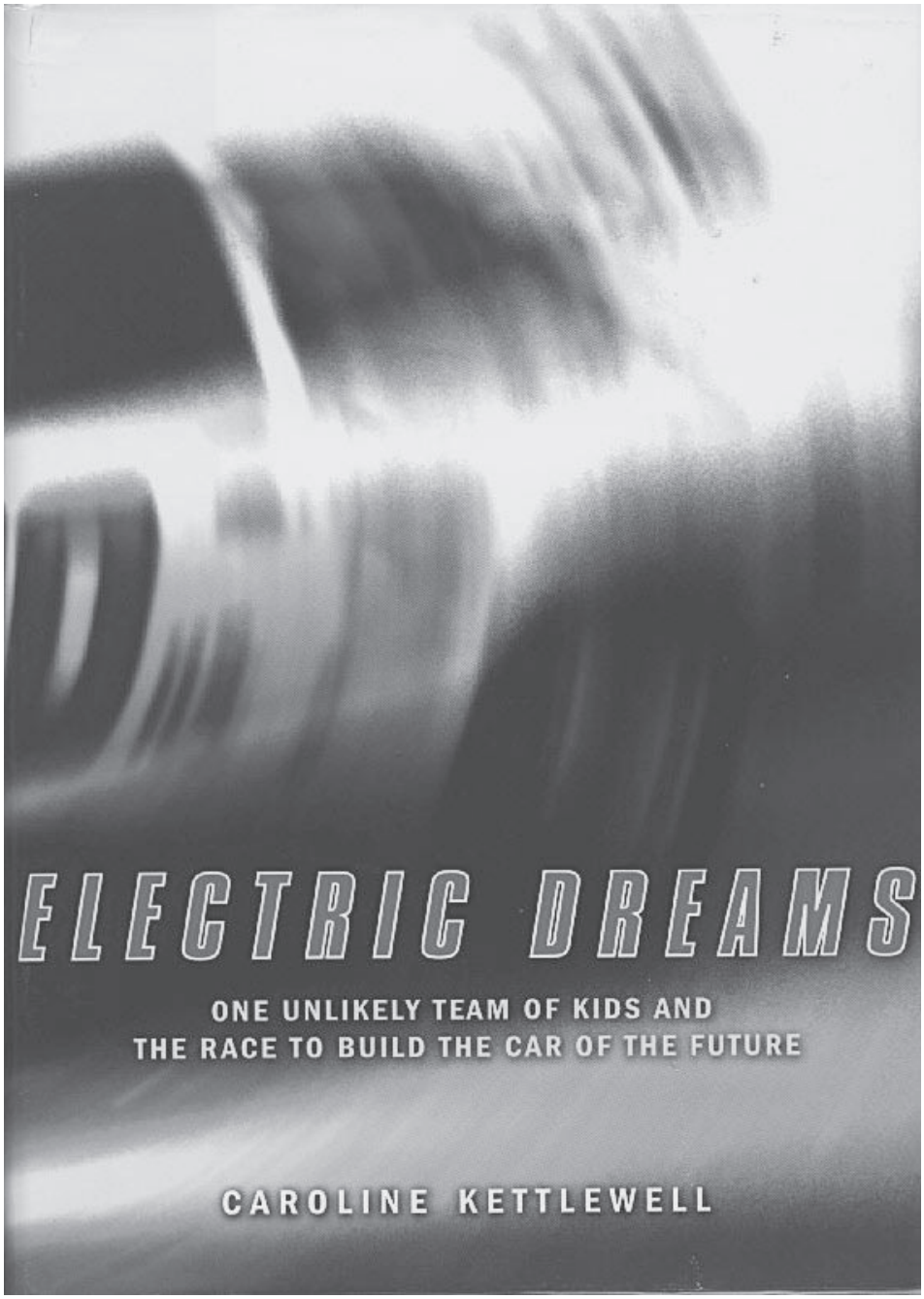
The events were held at West World in Scottsdale AZ on April 17th and 18th. I went early on the 15th to be there for a special Kids Fest on the 16th. At the site there was even a Solar PV array for us to charge from. There were many other exhibitors from Green building to Wind and Solar power, Hydrogen, bio-diesel as well as many other groups. This was the first annual Solfest in Arizona with many more to come in the future just like Hopland California.

See www.solfestsouthwest.org for more details.

Top: *Ed's wife's new Toyota Prius.*

Center: *Ed Begley Jr shares about his EV and solar experiences.*

Bottom: *Lineup of EVs and Hybrids by PEAA members.*



Reviewed by Bob Oldham, VEAA

Electric Dreams
One unlikely team of kids and the race to build the car of the future
Caroline Kettlewell
New York: Carroll & Graf, Publishers, 2004, $25.00

Start with a young, idealistic Californian, sent on assignment by Teach for America to be the new science teacher at a small, rural, seriously-economically-challenged high school in one of North Carolina's poorest northeastern counties. Follow that with a former dirt-track stock-car racer turned automotive shop teacher, with two decades of teaching at that same school under his substantial belt. Pull a bunch of high school kids into the mix, largely against their wills, and stir in an incipient electric vehicle competition, the organizers of which hadn't even been going to ask if anyone from rural northeastern North Carolina wanted to enter.

Caroline Kettlewell takes these ingredients and folds them together with skill and humor to produce a delightful tale of hard work, high and low expectations, demanding standards, half a year of intense preparation, and ultimate triumph by Northampton East High School's converted electric Ford Escort, Shocker, at the first running of the EV Grand Prix.

From the disappointing search for a vehicle (resulting in a sad-looking cast-off donation of a car that needed a lot of work) to the nickel-and-dime search for funds, the tense waiting for the arrival of the necessary special parts, anxiety over whether the car would run, much less meet weight and safety requirements, to the moment when the NASCAR-certified driver took the checkered flag in the final event, the narrative holds the reader's attention. At the same time, the technical information included, as explanation for the actions needed and taken by the team, helps the reader more clearly understand the problems associated with gasoline-burning energy-inefficient modern cars and the environmental consequences of their use, as well as the relative simplicity and workings of an electric car.

This book can serve several purposes simultaneously: as a history of one team's preparation for the first running of a premier electric vehicle competition for high school students, as a saga of boot-strap-pulling par excellence, as an example and inspiration for educators looking for alternatives to conventional classroom education, and as a fascinating portrayal of success in overcoming immense odds to triumph over social and economic disadvantage.

For anyone with an interest in electric vehicles, in public education, in human interest, this book belongs on your shelf.

Conference Program:

9:30 - 9:45 AM

Ron Freund, EAA Chair
Haakon McCallum, VEVA President
Introduction for Webcam Audience, General Introductions

9:45 - 12:00 noon
Panel on Grid-Pluggable Hybrids:
Presentations followed by Q & A session
- Slide Presentation with remote (phone-in) presentation by Dr Andy Franks of University of California Davis Campus
- With Ron Freund and Dave "Goldie" Goldstein President of EVA DC

12:00 - 1:00 PM
Lunch Break

1:00 - 1:45
Walter Wardrop
CME/IRAP
Further Q & A for Plug-In Hybrids
"H2 Leader- a Plug-in H2 ICE hybrid"

1:45 - 2:30
Frank Donnelly
CTO, RailPower Technologies
Green Goat Hybrid Switcher Locomotive
(presentation and video)

2:30 - 3:15
Dave Miller
Senior HW Engineer
Mountain Power Labs
Modular Lithium Ion Battery Management Systems

3:15 - 4:00
Philip Dayson
Dynasty Electric Car Corp
An EV manufacturer's Perspective

4:00 - 4:45
Roger Stockton
Delta Q Technologies
PFC Chargers

Conference Review:
The conference was very illuminating. It also helped all of us to get an understanding of how our efforts are beginning to have a positive effect on the much larger subject of global warming and pollution.

The major focus was on Hybrids, the current direction of transportation companies. We had an excellent interaction and presentation by Andy Franks about the positive attributes on the plug-in hybrid design. Still, the automakers are resistant to having large enough battery packs and connections to make the batteries grid-rechargable. We might be making his slide presentation available on the EAAEV website.

In the Vancouver, BC area there is a substantial EV effort. Walter Wardrop of CME/IRAP described the efforts involved with the Fuel Cell and H2 developments for vehicle usage. Frank Donnelly of RailPower presented their progress on a hybrid locomotive, which uses a battery pack to store power and thus reduce diesel usage 75+%.

Dave Miller of Mountain Power Labs describe the company's progress of modular lithium battery management system. Without management, the high power of lithium cannot be fully tapped and utilized for EV development.

Philip Dayson of Dynasty presented the rebirth of the IT nEV and the shift from purpose-built vehicles to standard European vehicles that can easily be converted to electric. The main challenge is establishing the proper cost breaks to provide reasonable consumer pricing and manageable margins to develop their business.

Lastly, Roger Stockton of Delta Q presented how their modular 1kw chargers can be used individually or paralleled for low to medium voltage EVs.

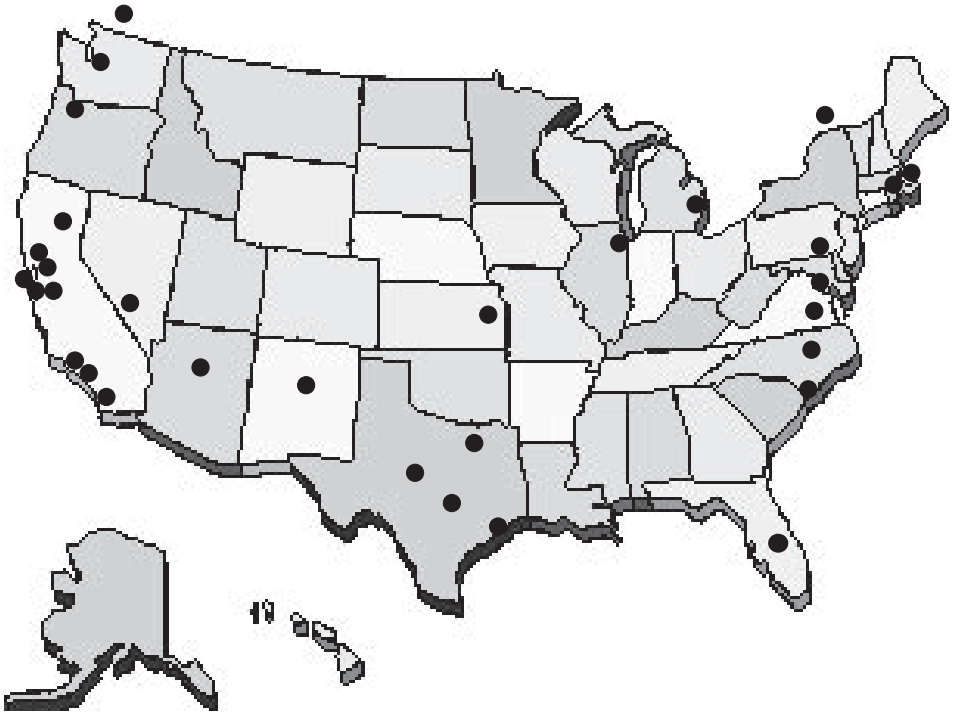
Thanks everyone!

Alan - for standing up to take responsibility and be the chair of the event, organizing the Science World space and the get together meals.

Roger, Phil, and Walter - for giving really interesting, inspiring & fun talks.

Gordon - for jumping in and doing all sorts of things, facilitating communication in all directions, and spending waaaaaaaaaaaay more time than you had.

ELECTRIC AUTO ASSOCIATION CHAPTERS



CANADA

VANCOUVER EVA (VEVA)
Web Site: http://www.veva.bc.ca
Contact: Haakon MacCallum,1-604-258-9005, info@veva.bc.ca
Mailings: P.O. Box 3456, 349 W. Georgia St., Vancouver, BC V6B3Y4, Canada
Meetings: 3rd Wed./month (except July and August, 7:30 to 9:30 pm
Location: BCIT Electrical Bldg SE1 Cafeteria - see map on website

ELECTRIC VEHICLE COUNCIL OF OTTAWA (EVCO)
Web Site: http://evco.ca
Contact: Alan Poulsen, 1-613-271-0940, info@evco.ca
Mailings: P.O. Box 4044, Ottawa, ON K1S 5B1 Canada
Meetings: Last Monday/month, 7:30 to 10:00pm
Location: The Canada Science & Technology Museum, 1867 St.Laurent, Ottawa

UNITED STATES

ARIZONA

PHOENIX EAA (PEAA)
Web Site: http://www.phoenixeaa.com/
Contact: Sam DiMarco, 1-480-948-0719, voltek_2000@yahoo.com
Mailing: PO Box 6465, Scottsdale, AZ 85258-6465, USA
Meetings: 4th Sat./month, 9:00 am
Location: Varies, see Web Site for details.

CALIFORNIA

CHICO EAA (CEAA)
Web Site: http://geocities.com/chicoeaa/
Contact: Chuck Alldrin, 1-530-899-1835, calldrin@sunset.net
Mailing: 39 Lakewood Way, Chico, CA 95926-1555, USA
Meetings: 2th Sat./month, 10:00 am.
Location: 1350 East 9th St, Chico, CA

EAST (SF) BAY EAA (EBEAA)
Web Site: http://geocities.com/ebeaa/
Contact: Ed Thorpe, 1-510-864-0662, eaa-contact@excite.com
Mailing: 2 Smith Ct., Alameda, CA 94502-7786, USA
Meetings: 4th Sat./month, 10:00 am.
Location: 1515 Santa Clara Ave, Alameda, CA

LOS ANGELES EAA (LAEAA)
Contact: Louis Weiss, 1-323-935-2690, warbucks@attbi.com
Mailing: 1811 Hi Point St., Los Angeles, CA 90035-4621, USA
Meetings: 1st Sat./month, 10:00 am
Location: 1200 E California Blvd, Pasadena, CA

NORTH BAY EAA (NBEAA)
Web Site: http://www.nbeaa.org
Contact: Nick Carter, 1-707-573-9361, nick@npcimaging.com
Mailing: 2228 Magowan Drive, Santa Rosa, CA 95405
Meetings: 2nd Sat./month, 10:00 am-12 noon
Location: See web site or contact for meeting location.

SAN DIEGO EVA (SDEVA)
Web Site: http://home.att.net/~NCSDCA/EVAoSD/
Contact: Chris Jones, 1-619-913-6030, NCSDCA@WorldNet.ATT.net
Mailing: 315 South Coast Highway 101, Encinitas, CA 92024-3543, USA
Meetings: 4th Tues./month, 7:00 pm
Location: 2080 Pan American Plaza, Balboa Park, San Diego

SF PENINSULA EAA (SFPEAA)
Web Site: http://geocities.com/sfpeaa/
Contact: Bill Carroll, 1-650-589-2491, billcarroll@eaaev.org
Mailing: 160 Ramona Ave., San Francisco, CA 94114-2736, USA
Meetings: 1st Sat./month, 10:00 am
Location: 601 Grand Ave, South SF, CA

SAN JOSE EAA (SJEAA)
Web Site: http://geocities.com/sjeaa/
Contact: Terry Wilson, 1-408-446-9357 dongillis@yahoo.com
Mailing: 20157 Las Ondas Way, Cupertino, CA 95014-3132, USA
Meetings: 2nd Sat./month, 10:00 am
Location: 2350 Cunningham Ave., San Jose, CA

SILICON VALLEY EAA (SVEAA)
Web Site: http://eaasv.org/
Contact: Will Beckett, 1-650-494-6922, will@becketts.ws
Mailing: 4189 Baker Ave., Palo Alto, CA 94306-3908, USA
Meetings: 3rd Sat./month, 10:00 am
Location: 3000 Hanover St., Palo Alto, CA

CALIFORNIA (cont.)

VENTURA COUNTY EAA (VCEAA)
Web Site: http://geocities.com/vceaa/
Contact: Bruce Trucker, 805-495-1026, tuckerb2@adelphia.net
Mailing: 283 Bethany Court, Thousand Oaks, CA 91360-2013 ,USA
Meetings: Call or email for location/meetings.

FLORIDA

FLORIDA EAA (FLEAA)
Web Site: http://www.floridaeaa.org
Contact: Shawn Waggoner, shawn@suncoast.com
Meetings: Varies, see website

KANSAS / MISSOURI

MID AMERICA EAA (MAEAA)
Web Site: http://maeaa.org/
Contact: Mike Chancey, 1-816-822-8079, eaa@maeaa.org
Mailing: 1700 E. 80th St., Kansas City, MO 64131-2361, USA
Meetings: 2nd Sat./month, 1:30 pm
Location: See web site for details.

ILLINOIS

FOX VALLEY EAA (FVEAA)
Web Site: http://www.fveaa.org/
Contact: Bill Shafer, 1-708-771-5202, assessorbill@cs.com
Mailing: 1522 Clinton Place River Forest, IL 60302-1208, USA
Meetings: 3rd Fri./month 7:30 pm
Location: 2000 Fifth Ave., River Grove, IL

MASSACHUSETTS

NEW ENGLAND EAA (NEEAA)
Web Site: http:/neeaa.org/
Contact: Tony Ascrizzi, 1-508-799-5977, tonyascrizzi@juno.com
Mailing: 34 Paine Street, Worcester, MA 01605-3315, USA
Meetings: 2nd Sat./month, 2:00 pm
Location: Call or email for meeting location.

PIONEER VALLEY EAA (PVEAA)
Web Site: http://geocities.com/pveaa/
Contact: Karen Jones, 1-413-367-9585, pveaa@hotmail.com
Mailing: P.O. Box 153, Amherst, MA 01004-0153 USA
Meetings: 3rd Sat./month, 2:00 pm
Location: 43 Amity Street, Amhurst, MA.

MICHIGAN

DMC-EAA DETROIT MOTORCITY CHAPTER (DMCEAA)
Web Site: http://geocities.com/detroit_eaa/
Contact: Richard Sands, 1-734-281-4087, rsands01@comcast.net
Mailing: 13162 Fordline St, Southgate, MI 48195-2435, USA
Meetings: Call or email for location/meetings.

NEVADA

LAS VEGAS EVA (LVEAA)
Web Site: http://www.lveva.org/
Contact: William Kuehl, 1-702-645-2132, bill2k2000@yahoo.com
Mailing: 4504 W. Alexander Rd., N. Las Vegas, NV 89115-2489, USA
Meetings: 2nd Sat./month, 10:00 am
Location: 1401 E. Flamingo Rd, Las Vegas, NV

NEW MEXICO

ALBUQUERQUE EAA (AWAA)
Web Site: http://abqev.org/
Contact: Tom Stockebrand, 1-505-856-1412, info@abqev.org
Mailing: 1013 Tramway Ln NE, Albuquerque, NM 87122-1316, USA
Meetings: 1st Tues./month, 7:00 pm
Location: 6810 Menaul NE, Albuquerque, NM

NORTH CAROLINA

COASTAL CAROLINAS (EAACC)
Contact: Jayne Howard, 1-910-457-4383, EAAofCC@aol.com
Mailing: 4805 E. Southport Supply Rd., Hwy 211, Southport, NC 28461-8741, USA
Meetings: Varies, call for details.
Location: 4805 E. Southport Supply Rd., Hwy 211, Southport, NC

TRIANGLE EAA (TEAA)
Web Site: http://www.rtpnet.org/teaa/
Contact: Ken Dulaney, 1-919-461-1241, teaa@rtpnet.org
Mailing: 202 Whitehall Way, Cary, NC 27511-4825, USA
Meetings: 3rd Tues./month, 5:30 pm
Location: Varies, call for details.

OREGON

OREGON EVA (OEVA)
Web Site: http://www.oeva.org/
Contact: Ralph Merwin, prizmev@yahoo.com
Mailing: 2905 NE 29th Ave., Portland, OR 97212-3558, USA
Meetings: 2nd Thur./month, 7:30 pm
Location: SW Salmon & 1st St, Portland, OR

PENNSYLVANIA

EASTERN EV CLUB (EEVC)
Web Site: http://members.aol.com/easternev/
Contact: Peter Cleaveland, 1-610-828-7630, easternev@aol.com
Mailing: P.O. Box 717, Valley Forge, PA, 19482-0717, USA
Meetings: 2nd Wed./month, 7:00 pm
Location: 201 E Germantown Pk, Plymouth, PA

TEXAS

AUSTIN AREA EAA (AAEAA)
Web Site: http://www.austinev.org/
Contact: Aaron Choate, 1-512-453-2890, info@austinev.org
Mailing: PO Box 49153, Austin, TX 78765, USA
Meetings: Call or email for location/meetings.

HOUSTON EAA (HEAA)
Web Site: http://www.heaa.org/
Contact: Dale Brooks, 1-713-729-8668, brooksdale@usa.net
Mailing: 8541 Hatton St., Houston, TX 77025-3807, USA
Meetings: 3rd Thurs./month, 6:30 pm
Location: 3015 Richmond Ave., Houston, TX

NORTH TEXAS EAA (NTEAA)
Web Site: http://www.geocities.com/nteaa/
Contact: Paul Schaffer, 1-972-437-1584, pshf@hotmail.com
Mailing: 430 Ridge Crest, Richardson, TX 75080-2532, USA
Meetings: Varies, call/email for details.

VIRGINIA

CENTRAL VIRGINIA EAA (CVEAA)
Contact: Ernest Moore, 1-804-271-6411, ernie_moore@yahoo.com
Mailing: 4600 Melody Ct., Richmond, VA 23234-3602, USA
Meetings: 3rd Wed./month, Call for details.
Location: Westwood Ave., Richmond, VA.

WASHINGTON

SEATTLE EVA (SEVA)
Web Site: http://www.seattleeva.org/
Contact: Steven Lough, 1-206-524-1351, stevenslough@comcast.net
Mailing: 6021 32nd Ave. NE, Seattle, WA 98115-7230, USA
Meetings: 2nd Tues./month, 7:00 pm
Location: See website, call for details.

WASHINGTON D.C.

EVA OF WASHINGTON DC (EVA/DC)
Web Site: http://www.evadc.org/
Contact: David Goldstein, 1-301-869-4954, goldie.ev1@juno.com
Mailing: 9140 Centerway Rd., Gaithersburg, MD 20879-1882, USA
Meetings: 2nd or 3rd Tues./month, 7:00 pm
Location: Building 31-C, 6th, Bethesda, MD.

Listing updated, verified and current as of this issue. Please check main web page for any changes in current listing. The Electric Auto Association is a 501 (c)(3) nonprofit organization.

Looking for an EV to meet your driving needs?

If you are trying to decide if an EV is right for you, or are not sure what kind of EV to choose, here are some guidelines.

The first thing to do is to determine how far you really drive each day. It's easy to do but most people greatly overestimate how far they drive. If your car has a trip meter then just set it before starting out in the morning then check how far you have driven when you get home at night. If your car doesn't have a trip meter just note the mileage from the odometer. Do this for a week or so and look at the maximum mileage that you did. That will give you a good idea of the reliable range your EV will need.

Now look up the range in the table below and see what type of EV will be best for you. For example if your daily commute is 5 miles then an electric bike would work for you. You could also select any vehicle, that other than the Zappy style scooter, as 5 miles is within the range of all these vehicles. Also remember that if you can charge at work during the day then you can select an EV with half your required range.

Less than 3 Miles	Zappy style scooter
Less than 8 Miles	Electric Bike
Less than 15 Miles	Electric motor bikes and scooters - Lectra, Voloci, Lepton, Sol Gato, Swap
Less than 20 Miles	NEV if you travel on surface streets with speed less than 25mph - GEM, Th!nk Neighbor, Columbia ParCar, Planet Electric, Humdinger Electric three wheelers - Sparrow, Gizmo Electric Car Conversions usually operate in this range but check carefully before you buy
Less than 35 Miles	City EV - Th!nk City Full Sized EV - PbA Ford Ranger, Solectria Force
Less than 70 Miles	Full sized EV - RAV4 EV
Less than 100 Miles	Aerodynamic full sized EV - EV1
Greater than 100 Miles	Hybrid Electric Vehicle (not an EV) - Toyota Prius, Honda Civic HEV, Honda Insight

I have tried to be somewhat conservative on the numbers above because there are many factors that effect EV range such as driving in hilly areas, the ambient temperature, or the way that you drive. The numbers above should be taken as a guideline. I believe these ranges will give a more reliable idea for daily operation than relying on the often overblown range claims of the various manufacturers.

Information taken from the website: www.evfinder.com

Sources - Used EVs-4-Sale:

EAA Main Links Page
http://www.eaaev.org/eaaevsforsale.html

Silicon Valley Chapter EAA
http://www.sveaa.org/

Innevations
http://www.innevations.com/used-evs.html

Eco-Motion Electric Cars
http://www.halcyon.com/slough/contributions.html

Phoenix Chapter EAA
http://phoenixeaa.com/

EVFinder
http://www.evfinder.com

EV Tradin' Post
http://www.austinev.org/evalbum/geobook.html

EVA/DC
http://www.evadc.org/forsale.html

Triangle EAA
http://www.rtpnet.org/~teaa/forsale.html

Check out these websites and the various EAA Chapter websites for new and used EV vehicles, production and conversions, and EV parts.

EV Charging Maps & Info:

EV Charger list
Covers Arizona, California and Georgia.
Web Site: http://evchargernews.com/

Ottawa Canada Charging Locations
Web Site: http://www.econogics.com/ev/chargloc.htm

Additional Canada Charging Locations
Web Site: http://www.ve-montreal2000.com/site/en/vebornes/Cartebornes.htm

How to Install Electric Vehicle Charging
Web Site: http://www.eaaev.org/eaaevcharging.html

EAA MERCHANDISE

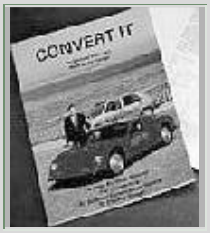
-- General Items --

	*License Plate Holder, black plastic frame, white lettering on visible green.*	LICPH1	$10.00	
License Plate	*Motorcycle size, only in metal & black or chrome. (Special order, need additional 6 weeks.)*	Black: LICPH2-B Chrome: LICPH2-C	$14.00	
	*Embroidered Sew-On Patch, white. (Special order, allow an additional 3 weeks.)*	PATCH1	$ 9.00	
	*Embroidered Sew-On Patch, green. (Special order, allow an additional 3 weeks.)*	PATCH2	$ 9.00	
	*Embroidered Bucket Hat, comes in: small/medium & large/xlarge.*	S/M: DCP01-SM L/XL: DCP01-LXL	$25.00	
	*Ceramic Coffee Mug.*	MUG003	$ 5.50	
	*Insulated Car Coffee Mug.*	MUG02	$ 6.50	
	*Embroidered Polo Shirt (Forest or navy S,M,L,XL,XXL), 10 weeks for all colors other than Forest.*	SHIRT01-F-S SHIRT01-F-M SHIRT01-F-L SHIRT01-F-XL SHIRT01-F-XXL Same for SHIRT01-N-…	$40.00	
	*EAA Car Window Shade.*	SS001	$ 8.00	
	*EAA Bumper Sticker #1 (10.5"x3.75").*	BS800	$ 2.00	
	*EAA Bumper Sticker #2 "The Switch is on"(15"x3.75")*	BS002	$ 2.00	

-- EV Buyers Guides --

	**Electrifying Times Preview 2004 *Electrifying Times Preview 2000 *1997 EV Buyers Guide *1996 EV Buyers Guide *1995 EV Buyers Guide*	ET2002 ET1999 BG1997 BG1996 BG1995	$ 5.95	

-- Literature --

	*Convert-It EV conversion Book*	CONV01	$24.95	
	*KTA Electric Vehicle Kits & Component Parts Catalog*	CATAL1	$5.00	
	Window Literature Holder (light plastic)	WL002	$15.00	
Indicate Month/Year and/or Vol #, back 20 yrs.	*Back issues of CE (Current EVents) magazine*	CE001	$ 3.00	

-- Special --

	*AVCON to 14-50 adapter kit - sheet metal box, 14-50 outlet (2 hots and a ground, no neutral), for 220 VAC chargers, no 120 VAC (6weeks)*	ADAPT1	$255.00	
(fill out complete membership form on flip side of page)	***Electric Auto Association Membership ($10 rebates to local chapter.)***	***6 /year of Current EVents, member voting rights***	$39.00	

Shipping: USA 10%, Canada 15%, All Others 20% of subtotal
Handling $2.00 Send check (USA dollars) to:

EAA Merchandise, ***5820 Herma St, San Jose, CA 95123 USA***

Electric Auto Association (EAA) Membership Application Form

Copy and fill out this form, attach a check or money order or use PayPal in US funds only for $39 ($42 Canada) ($45 International) payable to **Electric Auto Association** . You can fold this form as indicated and mail it with your payment enclosed. Use tape to seal the form before you mail it. Or send information in this form and pay through PayPal using http://eaaev.org/membership.htm.

New Member: ❑ Renewal: ❑ Country (if non-USA):_____ Date: _____

Name: _____ *email: _____

Mailing Street Address: _____ Home phone#: _____

Mailing City, State & ZIP: _____ *Work phone #: _____

*Do you ❑ own or ❑ lease an Electric Vehicle? ❑ Production ❑ Conversion ❑ Bicycle ❑ Other:_____ ❑ No

I support the _____ EAA Chapter, or please select an EAA Chapter closest to me. ❑

(*optional) All information in this application is for the exclusive use of the EAA and not be sold or given to any other organization.

(fold back ward, this will protect your personal information, placing it on the inside)

Please Identify your primary areas of interest relating to the EAA (check as many as you wish):

❑ Hobby/Builder ❑ Professional (income) ❑ Competition (Rallies, Races, Records) ❑ Owner/Driver
❑ Environmental/Gov. Regs. ❑ Social (Rallies, Shows, Dinners) ❑ New Technology & Research
❑ Promotion & Public Awareness of EVs ❑ Student or General Interest ❑ Electrathon/Bicycle/other

The Electric Auto Association www.eaaev.org

Providing free Electric Vehicle information to the public since 1967'

The Electric Auto Association is a non-profit, 501(c)(3) for the promotion of electric vehicles. Membership includes the informative complementary EAA publication, **Current EVents** . Donations are tax deductible. All information and statistics in this application are for the exclusive use of the EAA and is not sold or given to any other organization or company.

From your membership dues, a percentage goes to the EAA Chapter you support for public Electric Vehicle promotion EVents like rallies, shows and EV rides.

(fold the bottom half under. This will now be the front of the letter. Be sure to seal it with tape)

Return address

_____
_____
_____

membership@eaaev.org

1st Class Postage Here

Electric Auto Association
Membership Renewals
4189 Baker Ave.
Palo Alto, CA 94306-3908 USA

EV CONFERENCE AND EAA CHAPTER EVENTS CALENDAR

August 20 - 21, 2004
WICKED WATTS RACE
Las Vegas, Nevada, USA
Las Vegas Motor Speedway. Racing starts Friday August 20th at 6pm for door slammers, dragsters and bikes. Jr. dragsters on Saturday August 21st at 8am.
Web Site: http://www.nedra.com

July 31, 2004
EV AWARENESS DAY
Portland, Oregon, USA
Annual Portland EVA Chapter EV display event in downtown Portland.
Web Site: http://www.oeva.org/

August 21, 2004
EBEAA EV DISPLAY AND DRIVE/ RIDE RALLY
Hayward, California, USA
East (SF) Bay Chapter EV distance rally and display/ride event.
Web Site: http://www.geocities.com/ebeaa

September 21-24, 2004
EUROPEAN LEAD BATTERY CONFERENCE
Berlin, Germany
Ninth International conference focused on battery use, technology and manufacturing of lead-acid batteries.
Web Site: http://www.ldaint.org/9elbc

September 25, 2004
NEDRA NATIONALS
Woodburn, Oregon, USA
Premiere electric drag race event at the end of summer.
Web Site: http://http://www.nedra.com

October 9, 2004
SVEAA ELECTRIC CAR RALLY
Palo Alto, California, USA
32nd Annual Silicon Valley Chapter EV distance rally and display/ride event.
Web Site: http://eaasv.org

October 16, 2004
SUSTAINABLE TRANSPORTATION RALLY AND FESTIVAL
Amherst, Massachusetts, USA
Pioneer Valley EAA Chapter participates with other alternative fuel vehicles.
Web Site: http://geocities.com/pveaa

November 1 - 5, 2004
The 2004 Fuel Cell Seminar
San Antonio, Texas, USA
The Fuel Cell Seminar offers technical papers, exhibits and coverage of the latest technical advances.
E-mail: fuelcell@courtesyassoc.com
Web Site: http://www.fuelcellseminar.com

November 2 - 7, 2004
38th Tokyo Motor Show: Commercial & Barrier-Free Vehicles
Makuhari, Chiba
Web Site: http://www.tokyo-motorshow.com/eng

November 4 - 9, 2004
International Hydrogen + Fuel Cells Group Exhibit, Shanghai
Pudong, China
International Industry Fair
The first Chinese Group Exhibit on Hydrogen + Fuel Cells will take place annually at the Shanghai International Industry Fair.
E-mail: arno@fair-pr.com
Web Site: http://www.fair-pr.com

November 20 - 21, 2004
GEORGIA EV RALLY
Jefferson, Georgia, USA
Student teams will be competing in the 8th Georgia Electric Vehicle Rally.
Web Site: http://www.eveducation.org/

December 2, 2004
2020: California s Transportation Energy Future Conference
Los Angeles, California, USA
This forum will discuss California's actions to become the first state to establish a petroleum reduction goal and plan. This one-day conference will present the need, technologies, methods, and modes for reducing California petroleum consumption and increasing the use of non-petroleum fuels by the year 2020, as recommended in a joint report by the California Air Resources Board and California Energy Commission. CALSTART will also present its prestigious Blue Sky Awards for 2004 at the luncheon.
E-mail: mpeak@calstart.org or malcaraz@calstart.org
Web Site: http://www.calstart.org

January 15 - 21, 2005
FC Expo 2005
Tokyo, Japan
The first international tradeshow specialized in exhibiting fuel cells and hydrogen related technologies/products.
E-mail: fc@reedexpo.co.jp
Web Site: http://www.fcexpo.jp/english

April 2 - 6, 2005
EVS 21: The 21st Worldwide Battery Hybrid and Fuel Cell Electronic
Monte Carlo, Monaco
Vehicle Symposium & Exhibition
Developers and investors will explore and present viable solutions of advanced vehicle technology towards their vision for sustainable mobility.
E-mail: info@evs21.org
Web Site: http://www.evs21.org

April 11 - 15, 2005
International Hydrogen + Fuel Cells Group Exhibit, Hannover Fair
Hannover, Germany
The world's biggest commercial exhibition on Hydrogen + Fuel Cells, with 24 countries representing their latest H2/FC developments and products. .
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Note: EAA Chapters.
Any major event information should be sent to cenews@eaaev.org for inclusion in the newsletter, at least 2-3 months ahead of event date. If you have recurring annual events, please provide New Year schedule at the start of the year. We want to maintain focus on EAA-specific events.

EAA **Chapter** Event =
EV related **Event** =
EV related **Conference** =

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