Convert to Electric Vehicles

2009 | Electric Auto Association (EAA)

"Promoting the use of electric vehicles since 1967"



Electro Automotive VoltsRabbit



Acterra EV Conversion Project



DC Motor



Example components

Why Build an EV?

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

Building your own 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. Don't 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.

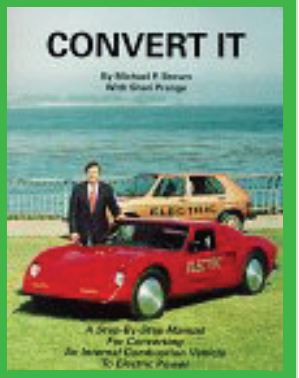
What steps are involved?

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.

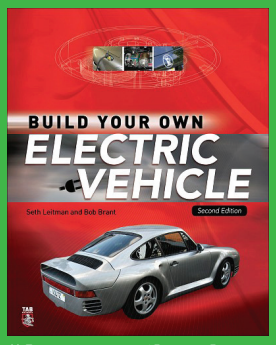
1. Determine your driving needs: range – the distance you travel in a single day; type of vehicle – family car, commuter, utility vehicle, or racing car.
2. Look for an EV kit for the vehicle you choose. Kits will make the conversion significantly easier – they include all of the parts, except batteries. 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), and 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!

[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 10 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)

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More Resources and Links

- Seek out the nearest Electric Auto Association (EAA) chapter http://electricauto.org and attend a local meeting. The links page has information about conversions and components (http://electricauto.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. Electro Automotive also offers parts along with full kits for conversions.
- "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).
- 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).
- EV discussion group http://www.evdl.org.
- 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.electricdrive.org/index.php?tg=articles&topics=48&new=0&newc=0.
- An EV conversion diary http://www.evsupersite.net.
- Acterra's EV conversion project http://www.acterra.org/ev.
- National Electric Drag Racing Association (http://www.nedra.com).

About the Electric Auto Association

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.

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