

The EV Conversion Process - Summary

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Rick covered all aspects of the conversion process in the last two classes. This is a short summary of his presentation with the goal of highlighting the key points in each section. Refer to his presentation material for more information.

Also used as a reference "Overview of Conversion Steps":

See Appendix 2 at <http://evconversions.ca/manual>

The Major Steps

- **Outfit your garage**
- **Planning**
- **Acquire a suitable vehicle**
- **Design**
- **Prepare the Vehicle**
- **Purchase Components**
- **Fabricate / Purchase Parts**
- **Assembly**
- **Install Wiring**
- **Install Batteries**
- **Instrumentation**
- **Testing**
- **Registration / Insurance**

Electric Vehicle Conversion Process - Major Points in each Step

Outfit your garage

Quality axle stands, 3-ton hydraulic jack, creeper, motor lift
Welding and Soldering equipment
Hand Tools, Multi meter, Scale, wire/cable cutters
Lathe, milling machine required for motor adapter

Planning

Plan your route for distance, terrain, cargo, passengers.
Consider desired range and performance.
What type of vehicle will be suitable for you?
What voltage will be required? Do some calculations.
What battery type and number will meet your requirements?
What will the vehicle weight be? Anticipated range?
What are the legal considerations for your province?

Acquire a suitable vehicle

Room for batteries and components
Two wheel drive standard shift without rust

Design

Plan and diagram the wiring for 12V system
Plan and diagram the high voltage wiring system
Plan Heater, Power brakes
Design battery boxes, consider heating and cooling
Plan component placement
Design a control plate (to hold controller, shunt, pot box, etc) (*picture*)
Plan the instrumentation and battery charger

Prepare the Vehicle

Take Measurements
 Weigh the vehicle
 Measure ride height
Mark down everything especially wires for later reference.
Drain fluids
Remove engine
Remove muffler, gas tank and gas lines, rad and hoses
Degrease, pressure spray

Purchase Components

Motor, Controller, Contactor, Shunt, cables, wiring, etc

Individual battery monitors, voltmeter, ammeter, LED display system

DC/DC converter, charger, suspension springs/leafs

Battery terminals, etc..

Source your batteries but don't buy them yet.

Fabricate / Purchase Parts

Choose the parts you want to build

and those you want to buy (ie: motor coupler, adapter plate)

Battery boxes, Heating system and controls, Power brakes

Solder battery cable terminals

Motor mounts

Assembly

Mate motor to adapter plate

Mate adapter plate to transmission

Install motor/transmission into vehicle, leave connections accessible but protected.

Install heating system, test

Install auxiliary battery

Install power brake pump, test

Install power steering, test (optional)

Install components to control plate

Install throttle/potbox linkage

Wiring

Complete the 12 Volt wiring, colour coded. Install fuses

(key switch, heater, lights, battery monitors, ammeter, voltmeter, etc)

Install the high voltage wiring, starting from the components

Use proper contactors and relays for the voltage

Run the cable in a central location. Install fuses

Batteries

Purchase batteries in one lot

Install traction batteries, with heating and cooling in mind

Prepare batteries for use (equalize, use a BMS)

Recheck vehicle suspension and ride height

Weigh the vehicle

Consider your tires

Instrumentation

- Amp meter, Volt meter (bare minimum)
- Battery monitoring system
- Battery temperature
- Motor Speed
- Current at the motor, current at the controller

Testing

- Wire up one traction battery
- Test the system with drive wheels off the ground
 - Turn key to turn on 12V power
 - Continue to turn key to engage the high voltage system
 - Accelerate and see that the wheels turn in the right direction
- Turn off vehicle
- Finish wiring the traction pack
- Check and re-check everything

Registration/Insurance

- Get certified from a 3rd party (you kept your documentation right?)
- Register your vehicle with MTO/SAAQ
- Fuel change: gas to electric
- Apply for applicable rebates (ON: RST bulletin#702)
- Install plates

Done!