A Quick Guide to Converting Your Car to Electric

There are a lot of good reasons to convert your car from petrol to electric power. Some of these include:

1. Reduce emissions

The EV (electric vehicle) produces no emissions, so no toxic fumes which are especially hazardous to human health in places like tunnels, enclosed car parks, around schools, shopping centres, busy intersections, and so on.

When you charge your EV from the mains power grid, you will create emissions at the power station, depending on the generation technology in use, but greenhouse gases will generally be lower than if petrol (or diesel) is burnt in the vehicle itself. Charging EVs overnight from off-peak power can significantly reduce their impact on the environment, and bringing renewable energy sources, such as wind or solar power, on-line improves the EV's environmental impact.

2. Low Running Costs

An EV is much cheaper to run than its petrol counterpart. Typically in Australia we would expect an electricity cost of 1 to 2 cents per kilometre to run an EV. Compare that to the fuel cost of your current car. Furthermore, since there is very little to service and maintain in the electric system, the cost of servicing and maintenance is negligible.

3. Economic Benefits

Cheaper motoring is nice for the individual, but reducing our dependence on imported fuels is a benefit for the national economy as a whole. Our expenditure on imported oil mostly creates offshore profits for foreign or multinational corporations, rather than circulating through our own economy and benefiting our community.

4. Excellent Performance

Contrary to some misguided reports, electric cars have excellent performance, and can be great fun to drive. They deliver power where you need it - at low RPM, so you get great acceleration, and excellent top speed as well.

There are some disadvantages for EVs:

1. Limited Range

You can only travel so far before needing to recharge. With traditional lead-acid batteries a range of 70 to 100 km between charges is typical. New-generation lithium batteries can step that up to 200 km, but at a price.

2. EVs are not in General Production

At the current time, you cannot walk into a showroom and drive out in an EV. Therefore, you have to either convert one yourself, or get someone to do it for you. The information on this page, and on this web site, is designed to help you with this.

How to Convert Your Car to Electric

For reasons of space, we can only give you a brief outline of the process here, but it should give you an idea of what is involved.

1. Select your Car

Generally speaking, smaller cars make better conversions, because they are lighter, and thus require less energy to drive them. You can go too small, however, since the car still has to capable of carrying the battery pack required to power it. So start with a small or small-medium sized car, and we would recommend one with a manual transmission. These are typically more efficient than automatics, and make better conversions. Power steering and air-conditioning can complicate your conversion and increase the cost. These are features which, if you can manage without them, are best avoided.

2. Remove the Internal Combustion Components

This is the fun part - ripping out things like the engine, cooling system, alternators, fuel tank, starter motor, and lots more. By the time you have finished with this job, you will have removed nearly all of the parts of your car which you can normally expect to break down or wear out. Hallelujah!

3. Source the Electric Components

You will need four main components:

(i) An electric motor designed to be used in an electric vehicle. You can buy this from us (EV Motors).

(ii) A controller to regulate the power from the batteries to the motor.

(iii) A suitable battery pack.

(iv) A battery charger designed to charge the battery pack.

In addition, you need a whole bunch of gauges, cables, connectors, etc. You may also need a 12 volt vacuum pump and reservoir tank, to replace your vacuum-assisted brake system. You might want a DC-DC converter to keep your 12 volt accessory battery charged up from the main pack, so you don't need to charge it separately. You definitely need an emergency cut-off switch to allow the driver to manually shut down the system in case of an emergency.

Check out our Directory page for a list of component suppliers.

4. Install the new Components

This requires a level of expertise normally limited to qualified people. The general setup is that the batteries are connected to the controller, which is in turn connected to the motor. The motor is installed in place of the original combustion engine, normally with an adaptor plate custom-made by an engineer to connect the motor to the transmission. It's quite a simple system, but has to be installed by someone who knows what they are doing.

5. Register your EV

You will need to have your conversion certified as safe and roadworthy by an engineer approved by your vehicle registration authority. This authority will have a set of rules which you must comply with in order to register the vehicle. These rules are concerned with safety, for both the driver and passenger of the car, and other road users. Once you have your approval certificate, you will be able to register your vehicle and drive past petrol stations with a broad grin on your face.

Getting Someone else to Convert the Car for You

There are now a few workshops around Australia where you can drive in with your petrol car and have a specialist turn it into an EV. You can find some contact details and links on our Directory page.

Further Research

This page is only a rough guide to the process of converting your car to electric. We strongly recommend that you undertake further research before undertaking your EV project. Here are a couple of suggestions for further reading:

1. The book "Build Your Own Electric Vehicle" by Bob Brandt. An excellent account of a real-world conversion project in the US. Published in 1994, this book is probably out of print as such, but can be found if you hunt around on-line booksellers and other web-based shopping sites.

2. The Electric Vehicle Discussion List <www.evdl.org> is the leading forum for people involved with and interested in EVs. It is mostly US-based, but welcomes participants from around the world, and most of the information there is useful wherever you are located.

3. Join your local EV association or club. The perfect place to meet other like-minded people, plus your local experts. There are many of these organisations, in a number of countries. In Australia the peak body is the Australian Electric Vehicle Association <www.aeva.asn.au>.

We encourage you to take the step and make that EV dream a reality. We hope the information presented here will be of help to you in the initial planning phase.

Good Luck!

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