

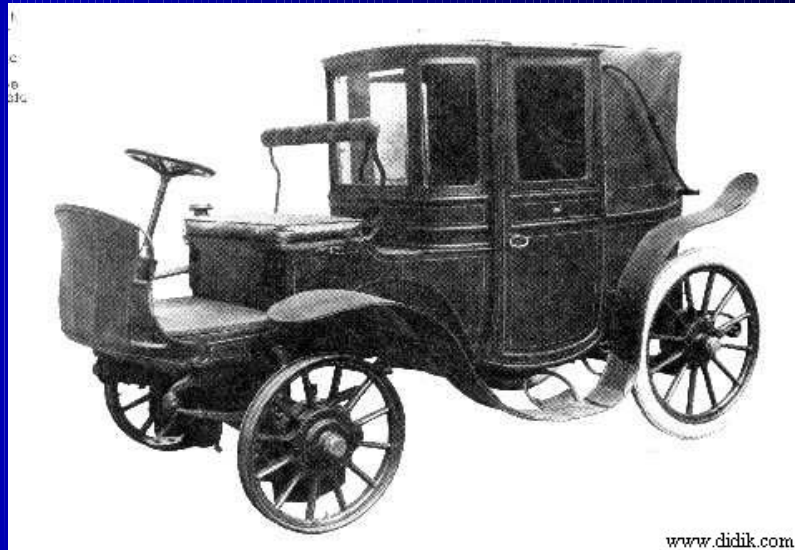
Electric Vehicle Overview

Pilfered from various web sites

www.sfeva.org

History of EVs

- In the late 1890s, EVs out-sold gas cars 10 to 1.



<http://www.aevasa.kestar.com.au>



Fossil fuel costs



Explosion at a BP oil refinery in Texas killed at least 14 people and injured more than 100.

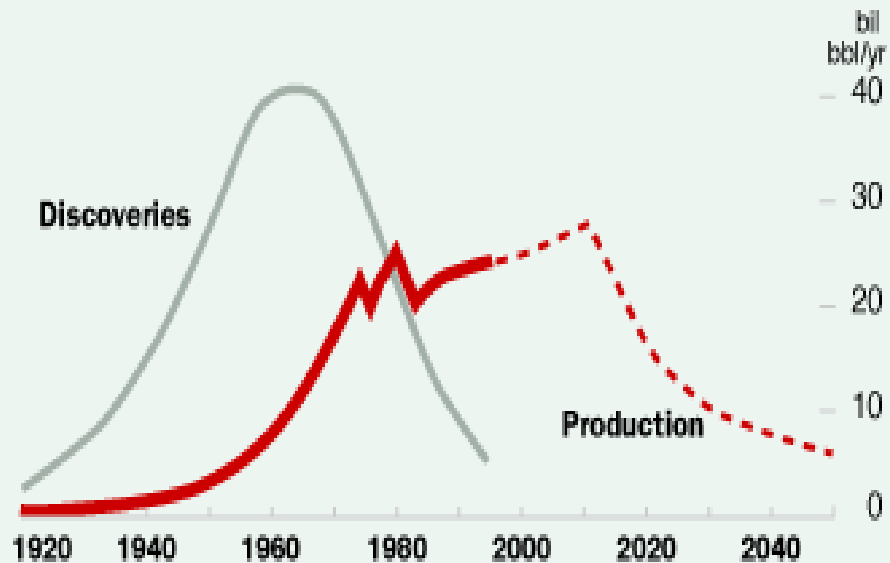
- Extracting, transporting, refining and burning oil has bad consequences for human health and the environment.



Limited fossil fuels

SLIPPERY SLOPE

Since oil finds have dwindled in recent years, output is certain to fall.



Source: L.F. Ivanhoe

- Oil is not forever.
- Demand is increasing everywhere.
- We don't have domestic reserves to meet our current, excessive demand.

California takes the lead

- Largest U.S. car market
- Cost of lung cancer in CA: \$5 billion/year (1990)
- CARB sets mandate:
 - 2% ZEVs by 1998
 - 10% ZEVs by 2003



Well-To-Wheel Emissions

Smokestacks:

- Pollution produced for 100,000 miles of driving:
 - EVs: <100 pounds
 - ICEs: 3,000 pounds
(L.A. Dept. of Water & Power)

Greenhouse gases:

- Even if the electricity comes from fossil fuels, EVs cut greenhouse gases by 70%
- (Union of Concerned Scientists)

Upstream EV issues



- Power plant pollution:
a common
misconception
- Battery components
- Battery recycling:
>90% recycled

GM EV-1



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2003: Mandate eviscerated



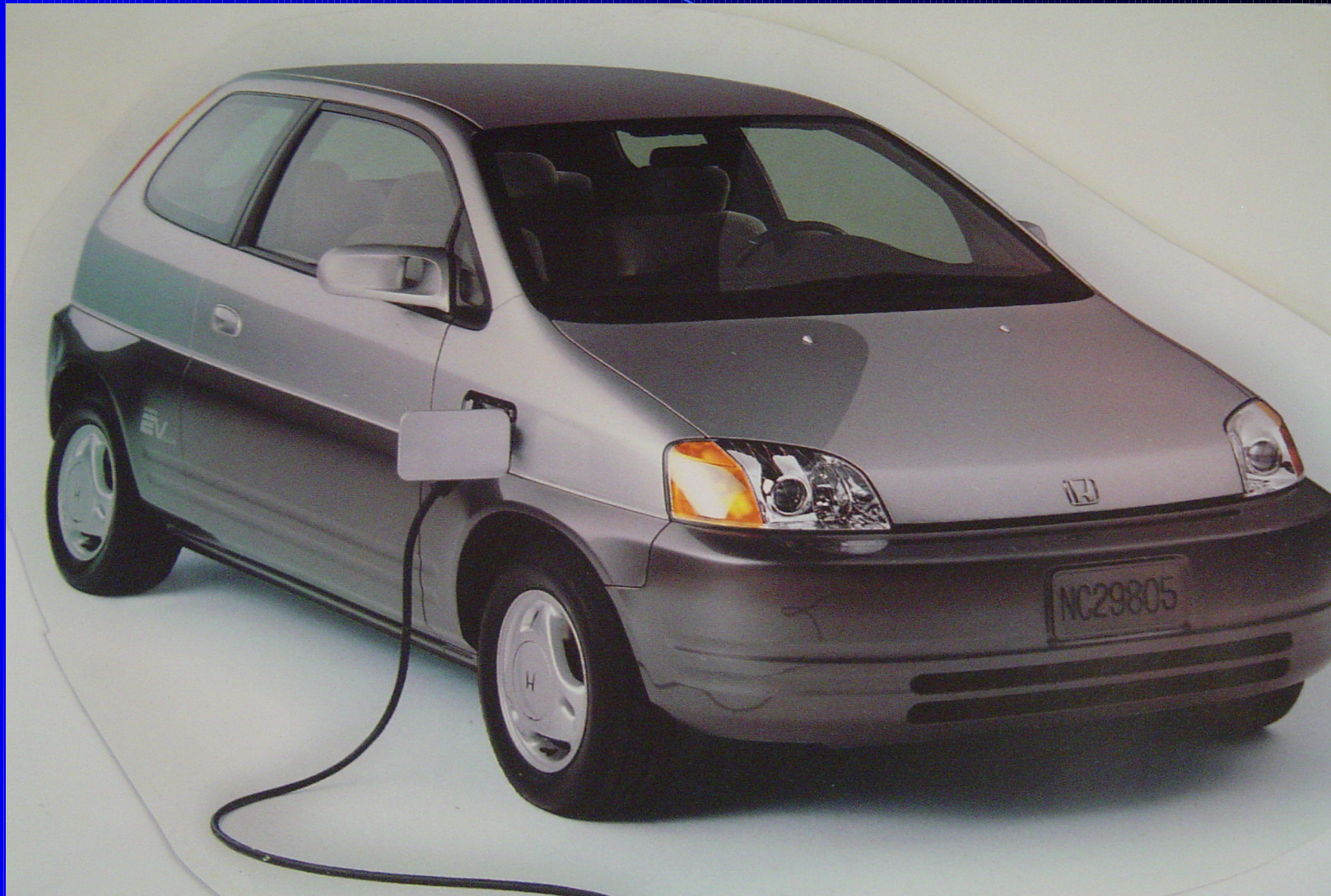
<http://www.aevasa.kestar.com.au>

Toyota RAV-4 EV



<http://www.aevasa.kestar.com.au>

Honda EV +



<http://www.aevasa.kestar.com.au>

Ford Th!nkCity



<http://www.aevasa.kestar.com.au>

Nissan Altra EV



<http://www.aevasa.kestar.com.au>

The Future: An Interim Step Plug-in Hybrids

- California Cars Initiative: Prius Plus
<http://www.calcars.org/>
- All-electric in city,
and 100-230 mpg
overall.



PV + EV

- Annual true-up billing: summer offsets winter.
- Time-of-use metering: charge at 5 cents/kWh, sell at 30 cents/kWh.
- Never buy gas.



Sparrow

- Myers Motors:
www.myersmotors.com
1-866-693-7778
- Used from Cloud
Electric, others



Put a deposit on a Tango

MEET THE TANGO

INTRODUCING THE WORLD'S FASTEST
URBAN TRANSPORTATION



The revolutionary
commuter vehicle that
combines the speed and
agility of a motorcycle
with the security and
comfort of a luxury car.

<http://www.aevasa.kestar.com.au>

Tango: www.commutercars.org



Every crowded parking area has spaces perfect for Tangos and motorcycles.

- \$500 deposit:
\$18,700 car
Range: 60-80 miles
- \$1,000 deposit:
\$39,900 car
Range: 100+ miles
- \$10,000 deposit:
\$85,000 car
Range: even longer

<http://www.aevasa.kestar.com.au>

Neighborhood Electric Vehicles (NEVs)



- Top speed: 25-35 mph
- Example:
GEM: \$7,000-\$9,000
Global Electric Motorcars
(Daimler-Chrysler)
- See www.sfeva.org for others & links

<http://www.aevasa.kestar.com.au>

Electric bikes & scooters



<http://www.aevasa.kestar.com>

The Future: Plug-in Hybrids

- California Cars Initiative: Prius Plus
<http://www.calcars.org/>
- All-electric in city, and 100-230 mpg overall.



<http://www.aevasa.kestar.com.au>



Photo by Fine Cars, 2006. Some rights reserved.

<http://www.evija.kestar.com.au>

Chevy VOLT



<http://www.aevasa.kestar.com.au>

Buy or make a conversion



<http://www.aevasa.kestar.com.au>

Cloud Electric conversions: www.cloudelectric.com



- Geo Metro (1994+)
- Range: 45-60 miles
- Speed: 75+ mph
- \$13,000 plus shell

<http://www.aevasa.kestar.com.au>

Conversions

- 1973 Arab Oil Embargo prompts EV conversions and a few electric car companies.

- Right: 1980 VW Rabbit hatchback



<http://www.aevasa.kestar.com.au>

EV Bones:

<http://www.evbones.com/>

- Chevrolet S-10 EV trucks (refurbished)
- 877-898-1195
- Lead-acid or NiMH batteries, recharge in 2-4 hours on average



<http://www.aevasa.kestar.com.au>

EV community resources



- See www.sfeva.org for listservs
- Mike Gaylord in SF:
mikegaylord@hotmail.com
- Lawrence Rhodes:
bassoon@jps.net
\$3,500 VW conversions,
range 15-20 miles





CoolGreenCar.Net



Step 1: Research!



Converting a car is a big decision, and you want to make the right choices. Fortunately there is a wealth of information available, as well as knowledgeable enthusiasts around the country. Check the back page of this pamphlet for a few good places to start.

Step 2: Select your donor vehicle



Any vehicle can be converted to electric. Generally small and light vehicles will give you the best performance for your money, but you should always choose something you will enjoy driving.

Step 3: Remove engine and related components



Electric cars are actually much simpler than petrol vehicles, so a lot of parts are removed – the main ones being the engine, exhaust, fuel tank and radiator.

Step 4: Install electric components

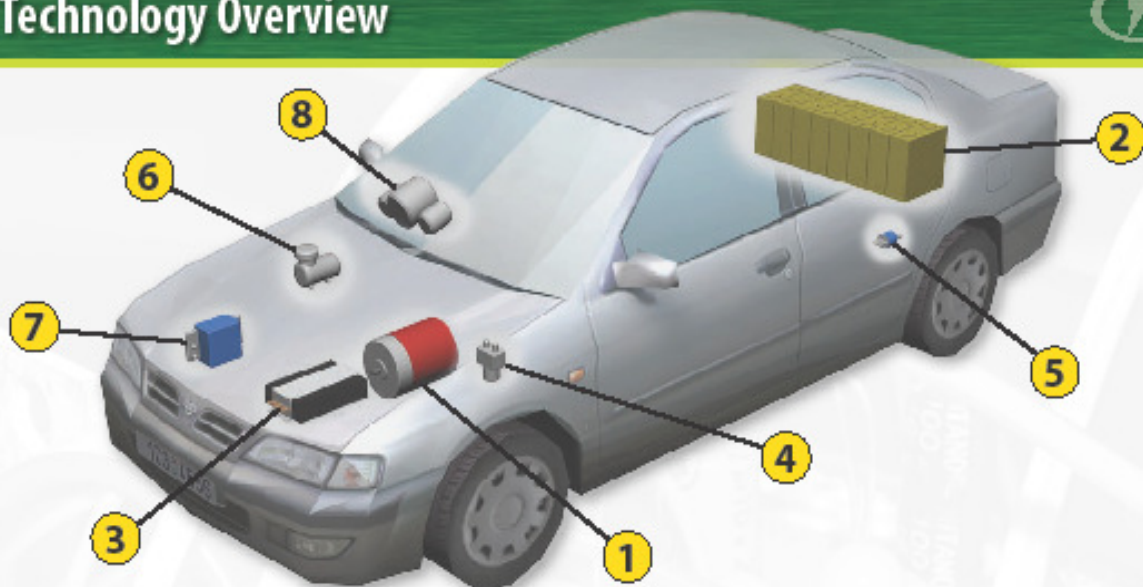
A small, quiet and efficient electric motor goes where the engine was, and your batteries are installed in the remaining space – usually a few where the fuel tank was and a few under the bonnet.



You'll also need some other components to replace your original heater, alternator and brake booster so everything in the vehicle operates just as it used to.

Step 5: Relicense Your Vehicle

Now that your electric vehicle is complete, you should relicense it as an electric to make the conversion official. Licensing costs for EVs are significantly lower in most states.



1) Electric Motor

This is what makes the car move, instead of the petrol engine. There are various types available, with up to 500 horsepower and up to 95% efficient – compared with about 30% for a petrol engine! With only one moving part, they will run for 100,000kms before needing any servicing.

2) Battery Pack

This is what stores the energy for powering the motor. You can use lead acid batteries for economics, or lithium batteries for longer range – up to 400km on a single charge!

3) Motor Controller

This little box does all the hard work, electrically speaking, as it controls the flow of electricity from your battery to the motor when you press the accelerator pedal.

4) Contactor

This is like a big ON switch, powering up your drive circuit when you turn on the key.

5) Fuse or Circuit Breaker

Every EV will have a fuse in its power circuit to ensure that the vehicle will be shut down safely if anything goes wrong.

6) Vacuum Pump

Petrol vehicles use vacuum pressure from the engine to provide power brakes. Electric vehicles simply use a small electric vacuum pump, so your brakes work just the same.

7) DC/DC Converter

Instead of an alternator, electric vehicles use a small electronic device to power your vehicle's 12V systems (such as lights, stereo, power windows) off the main battery pack.

8) Instrumentation

An electric car usually has some specialised instrumentation on the dash to help the driver monitor the state of the battery (the equivalent of your fuel gauge) and the operation of the various components.



Conversion Example: Sports Cars

Introduction



Electric sports cars can be a lot of fun, but you need to choose your components wisely to avoid disappointment. They are usually quite light and aerodynamic, allowing for relatively high running efficiency.

The main difficulties associated with sports cars are keeping the converted weight under the Gross Vehicle Mass, and finding high performance components within your budget. Also, because they are often

coveted as petrol vehicles, they're usually not the cheapest donor car to start with.

Direct drive (i.e. having the motor coupled directly to the tailshaft, with no gearbox) is a popular choice for sports cars but it does require a much more powerful motor, controller and batteries. As a rule of thumb, for direct drive you need a motor that's around 10% of the total vehicle weight.

Range

In a compact sports car, you'll typically need 150-200 Wh per km. (i.e. 15-20 kWh pack per 100km range)

Cost

Expect to spend about \$15K on components to do it well, plus labour costs if you're getting the conversion done professionally.

Some Suggested Models

Ford Capri, Mazda MX5, Mazda RX7, MGB, Nissan Silvia, Nissan 180SX, Porsche 924, Porsche 944, Toyota Celica, Toyota MR2. And of course any Ferraris/Lamborghini/Lotus if you're feeling rich!

Suggestions For Improving Efficiency

- Install low rolling resistance tires, and maintain good tire pressure.
- Keep your brakes well serviced so they're not dragging
- Remove roof racks, bullbars and other exterior objects which increase aerodynamic drag.
- Use your gears wisely to minimise load on the motor.
- Make sure all connections in your power circuit are clean and tight, and don't use undersized power cables.

Typical Components

Motor: Most sports cars are rear wheel drive, with a north-south oriented motor. This gives plenty of room for high performance motors such as the NetGain Warp 9 or Warp 11.



Battery Pack: Lead acid batteries are the cheapest place to start, though lithium batteries actually work out cheaper in the long run due to their excellent cycle life, despite the higher upfront cost. A 144V pack of ThunderSky 160Ah Lithiums (LFP160AHA) will usually give you over 100km range.

Controller: A 500A controller such as the ZEVA MCS005 will do the job, but a high power controller such as the CafeElectric Zilla is highly recommended for best performance.



Charger and Battery Management System (BMS): For lead acids, a good option is to use separate chargers for each battery, such as the Projecta SM1215, which gives you automatic balancing each charge.



For lithium batteries, you can use the Zivan NG3 charger with EV-Power's TS-90 BMS.

Contactor: The Nanfeng ZJW400A is a low cost solution for your main contactor.

Fuse: Unfortunately circuit breakers with high enough current ratings are very expensive, so a semiconductor fuse is your best option.

Vacuum Pump: The MES-DEA 70/6E is specifically designed for power assisted brakes in EVs.



DC/DC Converter: The IOTA DLS-45 can supply up to 45A at 13.8V to power all your 12V systems.



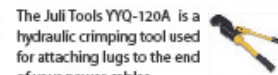
Instrumentation: A multi-function battery monitor such as the TBS E-Xpert is highly recommended for keeping an eye on your battery pack.

Cabling: 95mm² cabling and lugs are recommended for high performance electric vehicles.

Tools: Working with the large power cable in EVs can be tricky without the right tools.

Juli Tools HS-250 cable cutters will handle even the largest gauge cable in EVs.

The Juli Tools YYQ-120A is a hydraulic crimping tool used for attaching lugs to the end of your power cables.



Zero Emission Vehicles Australia

149 Watsonia Road, Maida Vale WA 6057

Web: <http://www.zeva.com.au> Email: enquiries@zeva.com.au

Phone: (08) 9454 8682 Fax: (08) 9454 4540

Your Nearest EV Workshop:

DC or AC Motor



Delphi Drive



<http://www.aevasa.kestar.com.au>

DC controller or VSD



Basic Aftermarket IKEA pack



Basic Steps Overview

- Join AEVA
- Establish what your Daily commuting needs are
- Work out what performance you need/want
- Establish a budget \$
- Source a Road worthy Vehicle
- Notify Transport SA
- Contact your Engineer

- Order Your Kit / components
- Weigh the Vehicle --- Total, Front & Rear
- Measure Ride Height on flat level surface
- Identify what you have electrically
 - Engine Management, Canbus ect

- Have the Air con Degassed
- Clean the Engine bay and under the vehicle
- Drain all Fluids
- Measure up mounting points
- Strip out all ICE related components-
 - Exhaust, Fuel Tank, Radiator, ECU, Overflow, alternator, Motor

- Always consider your SAFETY
- Fit Coupling to gearbox or flywheel
- Fit adapter plate & Motor
- Mount Rear Battery Box
- Mount Accessories – Pot box, Controller, DC/DC converter, Relay box, Inertia Switch, Vac pump ect
- Run cables / crimp cables



<http://www.aevasa.kestai.com.au>

- Mount and wire Traction batteries & Charger
- Fit Instruments
- Fit Demister
- Weigh Vehicle
- Notify Engineer
- Get vehicle Inspected

AND THEN

- Drive Vehicle To AEVA meeting and let us all admire your achievement !



<http://www.aevasa.kestar.com.au>



What you can do:

- Join AEVA
<http://www.aevasa.kestar.com.au/index.htm>
- <http://www.aeva.asn.au/>
- Tell the car companies what you want (clean cars) and don't want (their suit against Calif.)
- Let politicians know too!



Jointly present

AutoCRC
Smarter Safer Cleaner



Electric Vehicles in Australia Seminar Melbourne

Currently electric vehicles (EVs) are a topical issue in Australia, with manufacturers making announcements about their availability in the near future, trials being organised in most Australian states and technological advances making them a real sustainable transport option for the future. This seminar brings State and Commonwealth governments together with technology providers (CSIRO and UniSA), Retrofitters (BEV) and other experts to talk about their current experiences with electric vehicles, and elaborate on what the future might hold. This seminar will provide valuable information on what the latest developments and issues around EVs are and will be.

Date: Friday 7th May, 2010 Time: 9.30am - 4.00pm
Venue: Moonee Valley Racecourse, Champions Room
Address: McPherson Street, Moonee Ponds
RSVP: Tuesday 4th May, 2010 (please see reverse side for registration)

9.30	Registration Opens	
9.50	MC - Prof. Simon Watkins - RMIT University	Welcome
10.00	Mr Martin Lewis - Swinburne University of Technology	A Practical Approach to EVs
10.30	Mr. Richard Hall and Mr. Rauno Kael - Kangan Institute	Skills Development for an EV Future
11.00	Morning Tea	
11.30	Dr. Howard Lovett	Motor and Controller Technology
12.00	Dr. Tony Hollenkamp	Battery Technology
12.30	Mr. Ross Blade - Blade Electric Vehicles	Retrofitting Existing Vehicles to EVs
1.00	Lunch	
2.00	Dr. Rocco Zito - University of South Australia	EV'S and Travel Behavior Change
2.30	Mr. Jon Real - Commonwealth DITRD LG	Australian ADRs, Standards and Labelling
3.00	Mr. Kristian Handberg - DIIRD	Victorian EV Trials and Policy
3.30	Panel Session	
4.00	Seminar conclusion	



- http://www.youtube.com/watch?v=zPSoNfmubXc&feature=player_embedded#!