

Electric Vehicles - A Brief Overview

The first electric cars were built in the United States in 1891. They were quieter, smoother, easier to drive, and required less maintenance than petrol cars. During the First World War the cost of petrol doubled in Australia and electric cars became so popular that in 1916 Sydney City Council set up a special charging station in Palmer Street, where owners could recharge their vehicles for a reasonable fee. At this time it was expected that the petrol engine would soon become obsolete, but the electric car continued to be hampered by its heavy batteries. The inability to find a cheap and easy-to-produce alternative battery, the limited range and its lower maximum speed were restrictions that are still not fully resolved today.



1917 Detroit Electric
Photographer Reynardo
December 2007

However the longevity and low maintenance needs of these vehicles is demonstrated by the 1917 Detroit which was seen at the Electric Vehicle Festival in October 2009 and which is still used as a prestige vehicle for weddings and other formal functions.

A Stanton Baker built in 1903 which is garaged just outside the ACT border near Hall and is still working.



During the remainder of the 20th century the petrol engine was dominant. The relatively low cost of fossil fuels and the high power capacity of these vehicles was exploited for industrial growth. Electric vehicles continued to be produced in small quantities in many countries and several thousand are in use in Scandinavia. This century has seen an explosion in the production of electric vehicles and it is reported that over 350 cars from both traditional as well as new manufacturers are to be tested on British roads over the next 2 years. There are over 40 vehicle manufacturers planning to release fully electric vehicles during 2011 and 2012. Over 400,000 hybrid cars that incorporate both an electric and a combustion engine have so far been sold world wide. There is one or more vehicle electric conversion businesses in most Australian States.

The major disadvantages of electric cars is the weight and power limitations of the batteries and the time taken for recharging. New technologies are rapidly overcoming these limitations. New lithium based batteries are not only lighter but also last 3 or 4 times longer than traditional lead acid batteries. New charging methods can lead to more rapid recharge rates (the Norwegian "Think" fully electric vehicle reporting 80% recharge in 15 minutes).



Despite the range limitation of fully electric vehicles (most reporting from 60 to 150 km range on full charge) most urban transport needs are for trips of less than 60 km a day with 50% of the trips less than 20 kilometres. This is easily fulfilled with a fully electric car making them an ideal solution for most business car fleets and short distance commuters.



Range extended electric vehicles using modern generators or fuel cells are planned to reach the market by 2012 (eg Vauxhall Ampera) . These vehicles will likely have range of 450 kms or more. They can be designed to run on renewable energy and thus have near zero carbon emissions.

The environmental benefits of replacing petrol or diesel engine vehicles with electric vehicles is enormous. Figures from Denmark indicate that presently 24% of the total CO₂ emissions in the world come from transportation. This has risen

dramatically over the last few years and will likely increase substantially in the future, as the need for transportation increases. One kilometre driven in an electric car can reduce the CO₂ emissions by about 40%, compared to one kilometre driven in an equivalent diesel or gasoline car.

If all vehicles in Australia were replaced with electric vehicles there would be an annual reduction in emissions of about 1.8 million tones of CO₂. If the energy used was provided by solar, wind and other renewable resources such emissions could be zero. Comparatively an electric car uses the equivalent of less than 2 litres of fuel per 100 kms

Summary

1. Over 100 years of experience have proven electric vehicles to be reliable and long lasting
2. Present technology would allow replacement of all short range commuter vehicles with electric vehicles
3. The development of extended range electric vehicles using renewable energy fuels will allow the replacement of most or all petrol and diesel driven vehicles over the next several years.
4. The reduced maintenance and general running costs should repay the higher initial costs over a period of 3 to 4 years.
5. The replacement of petrol and diesel driven vehicles by electric vehicles would lead to a reduction in total CO₂ emissions of more than 20%