



FACTS AND FIGURES

Fuel Cell Today – Education Kit 8

The history of the fuel cell can be traced back to the nineteenth century. Since then the development and the usage of fuel cells in various applications have come a long way.

- William Grove invented the fuel cell in 1839.
- In 1959, Francis Bacon demonstrated a 5kW alkaline fuel cell.
- General Electric invented proton exchange membrane fuel cells in the 1950s.
- The first "commercial" use of fuel cells was by NASA in the 1960s during the Apollo space missions. Alkaline fuel cells have flown over 100 missions and operated for over 80,000 hours in spacecraft operated by NASA.
- The US Navy has used fuel cells in submarines since the 1980s.
- Fuel cell bus demonstration programmes have been successfully operated in several cities around the world. The largest fuel cell bus demonstration programme to date was the European Union backed CUTE project (Clean Urban Transport for Europe).
- All major car manufacturers already have prototypes on the road; the first few fuel cell cars have been leased to customers.
- Iceland has started to convert its fishing fleet from diesel engines to hydrogen fuel cells as part of a national project to create a fossil fuel free economy.
- Many companies are hoping to produce their first semi-commercial models of fuel cell cars during the next decade. However, it is very unlikely that fuel cell cars will be produced in real commercial numbers before 2010.

- Companies started to bring real fuel cell products to the market in 2004. In the future, portable direct methanol fuel cells could power mobile phones, laptops and cameras.
- Small stationary fuel cells, including residential units became available in small numbers from late 2004.
- Most commercial fuel cells are currently low temperature fuel cells.
- The main types of fuel cells are: alkaline, direct methanol, molten carbonate, phosphoric acid, proton exchange membrane and solid oxide.
- A fuel cell is around 60 per cent efficient at converting fuel to power, double the efficiency of an internal combustion engine.