CIRENCESTER SCIENCE AND TECHNOLOGY SOCIETY
The January lecture was given by Dr Colin Snowden, Linacre College, Oxford on "Can Fuel Cells Compete?".

Fuel cells date from 1839, but despite considerable development in the USA, UK and Japan, progress has been slow. However the American moon buggy used fuel cells as did the Shuttle Programme.

All fuel cells aim to convert hydrogen from natural gas into electricity. Hydrogen ions move from the anode via an electrolyte to the cathode to react with oxygen (from air) to form water, with power being produced.

Dr Snowden described the four types of fuel cells ranging from solid polymer electrolytes operating at 90° C to a solid zirconia electrolyte operating at 1000 ^{o}C. The efficiency of converting the gas into electricity based on calorific value ranged from 35% for the former to 52% for the latter.

The obvious major application of fuel cells is in transport, where with an independent source of hydrogen, efficiencies of 30% can be obtained compared with up to 20% for a petrol engine and up to 27% for a hybrid petrol/battery system.   If the hydrogen economy arrives then higher efficiencies would be possible. The major problem preventing use of fuel cells in cars is the high capital cost (about 1500$/KW) compared with 50 for a petrol engine. The Speaker did not believe that fuel cells would compete with hybrid cars but might be used in buses.

A possible niche market for fuel cells is for power generation in areas not covered by the National Grid. Rolls Royce is developing such a system, but the Speaker doubted the size of the market.

The most promising niche application is being developed by Ceres Power, a spin-off company from Imperial College with backing from British Gas. It is aiming to produce 8KW from an oxide fuel cell used in conjunction with a gas boiler for domestic heating.

Dr Snowden said that to date, extensive use of fuel cells had been prevented because of marked improvements in competing technologies, such as combined heat and power systems.