Table.8. Progress in commercialization of fuel cell vehicles

1990 – California Air Resources Board announces zero emission vehicle mandate, requiring introduction of zero emission vehicle, and catalyzing interest in electric vehicles including Fuel cell vehicles.
1993-Georgetown Bus demonstrated with phosphoric acid fuel cell and onboard methanol reformer
1993-Partnership for a new generation of vehicles announced, a government/industry partnership aimed at producing cars with three times the fuel economy of current vehicles. Big three US automakers begin studies of options including fuel cells.
1993- Ballard Power Systems demonstrates first hydrogen fueled PEM fuel cell bus
1995 – Daimler-Benz demonstrates the NECAR 1 an experimental PEM fuel cell van with hydrogen storage
1995 – Ballard Power Systems demonstrates improved hydrogen fueled PEM fuel cell bus
1995 – Mazda demonstrates hydrogen fueled PEM fuel cell golf cart
1996 – Toyota demonstrates experimental PEM fuel cell car with metal hydride storage
1996 – Daimler – Benz demonstrates the NECAR II a prototype van with compressed hydrogen gas storage and Ballard fuel cell.
1997 – Ballard begins demonstration of hydrogen PEM fuel cell buses in Vancouver, BC.
1997 – Ballard and Daimler-Benz form US $ 320 million joint venture to develop PEM fuel cell cars by 2005.
1997 – Toyota demonstrates PEM fuel cell car with onboard methanol reformer.
1997 Daimler-Benz demonstrates NECAR III a prototype small car with PEMFC and onboard reformation of methanol.
1997 Ford joins Daimler-Benz and Ballard in US$420 million venture to commercialize PEM fuel cell car by 2004.
1998 – GM announces intent to develop production of ready prototype fuel cell car by 2004.
1998 – Chrysler announces intent to develop production ready prototype fuel cell car by 2004 with onboard reforming of gasoline.
1998 – Mobil and Ford form alliance to develop onboard fuel processors for fuel cell vehicles.
1998 – Mazda joins Ballard, Daimler-Benz and Ford alliance to develop fuel cell automobiles.
1998 – Honda announces intent to develop methanol fueled fuel cell vehicle.
1998 – Nissan announces intent to develop fuel cell vehicle.

Table .5. **ENERGY DENSITIES OF VARIOUS FUELS**

Fuel	Heat of combustion kJ/g
Hydrogen	120.1
Gasoline	43.3
Diesel	44
Methane	50
Methanol	20.1
Ethanol	26.9
Ammonia	18.6

Table.6. Energy Densities of Fuels for Fuel Cell applications

Fuels	Maximum Energy Density $kWhkg^{-1}$
Hydrogen	32.67
Methanol	6.132
Ammonia	5.52
Hydrazine	5.218
Formaldehyde	4.82
Carbonmonoxide	2.040