Technology Fact Sheet

Fuel cells for mobile applications[i] /http://climatetechwiki.org/technology/mobile-fuel-cells/

General description

Fuel cells are used to produce electricity. They are considered a promising technology to replace conventional combustion engines in vehicles. Fuel cells may also replace batteries in portable electronic equipment. The most widely used types of fuel cells for mobile devices are Proton Exchange Membrane fuel cells (PEM FC). PEM fuel cells use hydrogen or certain alcohols such as methanol as fuel.

Fuel cells are used to produce electricity and are more advanced and energy-efficient technologies than combustion engines, which burn the fuel. Fuel cells operate according to the principle of electrochemical reactions and therefore they function completely different than combustion engines.

Implementation

Several car manufacturers were planning the deployment of PEMFC vehicle fleets planning to launch fuel cell vehicles in 2012-2020 (Crawley, 2006). However, as electric and hybrids vehicles have been receiving more attention in the last couple of years, it is possible that some of the PEMFC plans announced by car manufacturers have been postponed.

Implementation barriers

The main obstacle to widely implement fuel cell technology is high cost.

Infrastructure availability is another important prerequisite for the use of PEM fuel cells in transport applications. PEM fuel cells require high purity hydrogen which is not available everywhere.

GHG emissions reduction (megatons CO_2 equivalent) – data not available.

PEM fuel cells are more efficient than internal combustion engines. However, overall CO2 balance will depend depends largely on the way the required hydrogen has been produced.

Impact on development priorities:

a) *social*

b) *economic*

- increase energy security of the country;
- improve balance of payments by reducing imports of fossil fuels.

c) *environmental*

An important benefit of using PEM fuel cells in transport applications would be the fact that fuel cell powered vehicles do not emit any local air pollutants, such as NOx, CO or particulate matter. This would improve local air quality, especially in cities. PEMFCs also do not emit significant noise during operation.

d) *other*

Investments – data not available.

Investment costs per kW for PEMFC and DMFC systems are higher than for other types of fuel cells (Business Insights, 2009) – on average by 100 USD/kW.

One of the reasons is the expensive materials used in PEMFC and DMFC systems such as platinum and ruthenium. Moreover, transport applications and portable items require small systems, hence the fuel cell systems needs to be miniaturized. The latter leads to higher costs for the tubes, compressors, controllers, etc. which are used to connect the system with the fuel supply and exhaust gas tubes (Schoots et al. 2010).

The cost of fuel cell systems must be further reduced before fuel cells become competitive with conventional technologies (internal combustion engine costs about $25–$35/kW).

Operation and maintenance costs– data not available

GHG reduction costs– data not available.

Technology lifetime– data not available.

Other
Source: http://climatetechwiki.org/technology/mobile-fuel-cells

[i] This fact sheet has been extracted from TNA Report - Technology Needs Assessment for climate change mitigation - Republic of Moldova. You can access the complete report from the TNA project website **http://tech-action.org/**