

Abstract

The advantages of a hydrogen fuel cell transport system over the existing fossil fuelled internal combustion engine (ICE) regime are well documented and include the significant reduction of gaseous emissions. There are good reasons to argue that the use of hydrogen fuel cells may be one of the few technologies that can satisfy global energy demand for transport while minimising environmental impact.

Although the goal is well defined, the path of the transition to a fuel cell transport system is highly uncertain. This is due to the method of fuel delivery, many aspects of which remain undecided, and also to the social and economic implications posed by a change to a new energy infrastructure. Therefore, as part of the process of managing the introduction of fuel cell vehicles, non-technological issues will need to be considered in parallel with technological developments.

To inform the required socio-technical analysis, the approach of *Quantitative Strategic Niche Management* has been employed. This includes analysis of environmental impacts, user attitudes, market acceptance, social learning, regulatory framework and government policy. Applied as a management tool, it can be used to encourage technological innovations by designing protection measures that enable new technologies to develop their potential before being exposed to prevailing market forces. The methodology also includes the use of a quantitative tool, the Lifetime Evaluation of Alternative Fuels (2) model, which is designed to assess cleaner fuels and technologies on economic and environmental grounds.

The thesis applies these methods to evaluate several fuel cell vehicle options for use in the UK. The analysis considers the merits of fuel cell transport in the context of the existing oil ICE regime. The results are used to construct a fuel cell vehicle incentive strategy that could be used to inform future UK transport policy.