

An Analysis of Fuel Cell Technology for Sustainable Transport in Asia

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1. Introduction

Fuel cell technology is often discussed as a potential alternative to existing vehicle power systems such as petrol or diesel combustion engines due to the higher potential thermodynamic efficiencies, and low, direct greenhouse gas emissions [1]. If hydrogen produced by renewable energy is used as the fuel then fuel cell technology could also lead to co-benefits in terms of improving urban air quality, reducing oil imports, and improving energy security [2]. These issues are of particular importance in developing countries in Asia as increasing affluence leads to increasing demand for automobiles [3]. However, despite intensive public and private research efforts into developing fuel cell vehicles (FCV), particularly in Japan, the U.S.A., and Canada, the global number of vehicles is still only 800, as of 2008 [4]. A number of barriers to commercialisation have been identified previously, including the high cost of components such as the electrocatalyst and the membrane, difficulties in onboard hydrogen storage, and the development of supporting fuelling infrastructure [2]. This paper aims to examine the current status of this technology and the policy measures being adopted in various Asian countries to support its development, alongside proposals for stimulating innovation in this area.

2. Methods

Research activity and current technical status will be examined using established techniques such as bibliometric and patent analysis from OECD database. Policy measures will be examined by a combined assessment of public research grant activity, the extent of academic-industrial collaborations, and the promotion of demand side measures such as public procurement and consumer subsidies, and supply side measures such as encouraging new entrants to what is often a conservative industry.

3. Expected Results

A detailed evaluation of the size and scale of research activity in fuel cell technology in Asia will be achieved, alongside an overview of the historic trends of this activity. Comparative assessments between various countries will be presented in order to highlight possible clustering and opportunities for new linkages to be exploited. Identification of successful policy interventions in terms of increased market size or improved air quality/reduced greenhouse gas emissions will be useful in guiding policymakers as well as pointing to possible pathways for encouraging adoption of new ideas regarding 'green' technologies.

4. References

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