

MAKING CHOICES ABOUT HYDROGEN



TRANSPORT ISSUES FOR DEVELOPING COUNTRIES

EDITED BY LYNN K. MYTELKA AND GRANT BOYLE

Making choices about hydrogen: Transport issues for developing countries

Edited by Lynn K. Mytelka and Grant Boyle

International Development Research Centre

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Introduction

Since the mid-1990s the emergence of a hydrogen economy and the speed with which this will arrive have been vigorously debated. The debate has mainly been carried on among policymakers and oil and gas, automobile, fuel-cell and renewable energy firms in the countries of the North, where policies and the technological competences and competitive practices of firms have played a central role in shaping both the debate and the direction of technological change during this period. Part I looks at this debate as it relates to the development and commercialization of hydrogen and fuel cells in the transport sector.

For developing countries the current debate highlights the uncertainties involved in making choices about hydrogen and fuel cells in planning the development of their transport sector. As a disruptive technology, dominant designs for the production, storage and distribution of hydrogen have not yet been established. Nor have performance characteristics been achieved that would make hydrogen proton-exchange-membrane (PEM) fuel cells competitive with the internal combustion engine. Yet costs are coming down and the efficiency and durability of hydrogen fuel cells (HFCs) are improving. How to deal with competing arguments that push the hydrogen economy into the longer term (2050) and those that place its advent in a shorter-term perspective (2020) is one key issue for developing countries today as they explore their options for the design of national energy, environment and transport policies.

The chapter by Mytelka sets out a framework for understanding this debate and applies it to two historical cases – oil and the internal-combustion

engine – where many of the issues raised in current debates over fuels and fuel cells first emerged. One of these was the need for further basic research to make the early gasoline-based internal-combustion engine competitive with the alternatives of its day. The extent to which further basic research will be needed before commercialization of hydrogen fuel-cell vehicles is feasible parallels this earlier concern. A second is the speed with which progress is made in bringing down the cost of hydrogen production, storage and transportation and of the hydrogen fuel cells themselves. The Ishitani and Baba and the Chalk and Miller chapters engage in a discussion of these issues; they also highlight the importance of broad-based public participation in such debates and the creation of public-private partnerships in developing the codes and standards that the commercialization of hydrogen fuel-cell vehicles will require at both national and international levels. At present, only a very few developing countries are participating in this process.

A third issue of concern to developing countries, where transport and refuelling infrastructure of all sorts still needs to be built, is the chicken-and-egg problem that arises with respect to hydrogen infrastructure. This results from the need to coordinate a large number of different actors, both public and private, and the uncertainties surrounding the choice of hydrogen delivery system: at the pump or through decentralized modes such as hydrogen to the home – an innovative design still in its infancy. From a business perspective, the chapter by de Scheemaker takes the position that in the shorter term using existing infrastructure will be more cost-effective. It also argues for a demand-driven approach in which public policy helps to create the market for hydrogen, to which the private sector would respond by building the necessary infrastructure. Although the chapter notes that the hydrogen economy is still some 20 years away, it points to the importance for developing countries of learning from the experiences of developed countries in building hydrogen infrastructure and the need to begin a process of designing their own hydrogen roadmaps.

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