Assessment of Hydrogen Energy for Sustainable Development

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Series C: Environmental Security

Assessment of Hydrogen Energy for Sustainable Development

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Organization – International Centre
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Published in cooperation with NATO Public Diplomacy Division

Proceedings of the NATO Advanced Study Institute on
Assessment of Hydrogen Energy for Sustainable Development:
Energy & Environmental Security
Istanbul, Turkey
7–10 August 2006

A C.I.P. Catalogue record for this book is available from the Library of Congress.

ISBN 978-1-4020-6441-8 (PB)
ISBN 978-1-4020-6440-1 (HB)
ISBN 978-1-4020-6442-5 (e-book)

Published by Springer,
P.O. Box 17, 3300 AA Dordrecht, The Netherlands.

www.springer.com

Printed on acid-free paper

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PREFACE

The NATO Advanced Research Workshop (ARW) entitled “Assessment of Hydrogen Energy for Sustainable Development: Energy & Environmental Security” was held during the four-day period, 7–10 August 2006, in Istanbul, Turkey. This NATO-ARW was organized to discuss the issues concerning environmental security and sustainable development of hydrogen energy technologies using advanced renewable energies sources, such as wind, solar, biomass, wave, geothermal, and hydro energy. In addition, an assessment of the difficult problems of environmental security and development of hydrogen energy technologies was needed to review the technological, financial, legal, and institutional barriers to a cost-competitive, standardized, widely accessible, safe, and environmentally benign hydrogen economy.

Energy and environmental security are truly major problems facing our global economy. Fossil fuels, particularly crude oil, are confined to a few regions of the world and the continuity of supply is governed by dynamic political, economic, and ecological factors. These factors conspire to force volatile, often high fossil fuel prices while, at the same time, our environmental policies are demanding a reduction in greenhouse gases and toxic emissions. Thus a coherent energy strategy is required, addressing both energy supply and demand, taking account of the whole energy life cycle including fuel production, transmission and distribution, and energy conversion, and the impact on energy equipment manufacturers and the end-users of energy systems. In the short term, our aim should be to achieve higher energy efficiency and increased energy supply from local energy sources, in particular renewable energy sources. In the long term, a hydrogen-based economy will have an impact on all these sectors. In view of technological developments, vehicle and component manufacturers, transport providers, the energy industry, and even householders are seriously looking at alternative energy sources and fuels and more efficient and cleaner technologies – especially hydrogen and hydrogen-powered fuel cells.

The aim of this NATO-ARW was thus to bring together legal experts, engineering specialists, policy analysts, and scientists to focus on hydrogen energy for sustainable development; to discuss policy and technical issues essential for the development and deployment of hydrogen energy technologies; to discuss how to foster large-scale, long-term public–private cooperation to advance hydrogen energy technologies and infrastructure development; to analyze and set priorities for research, development, and deployment and ensuring support for the most promising and beneficial activities.

The NATO-ARW format consisted of invited lectures, oral, and poster contributions. By attending this workshop, all of the participants gained an insight into the current status of hydrogen systems and had the opportunity to develop collaborations between participants.

This Proceedings brings together the papers of invited and contributed participants. We hope that they will serve as both a useful reference and a resource material for all the participants and for those whose interest in the subject matter may develop after the event.

This NATO Advanced Research Workshop, “Assessment of Hydrogen Energy for Sustainable Development: Energy & Environmental Security” (Ref. No. CBP.EAP. ARW 982094) was supported by the North Atlantic Treaty Organisation (NATO) Security through Science Programme. Their contribution is gratefully acknowledged.

Finally, this workshop was also carried out in cooperation with the United Nations Industrial Development Organisation – International Centre for Hydrogen Energy Technologies (UNIDO-ICHET). Based in Istanbul, UNIDO-ICHET acts as a conduit for knowledge and technology flow between developed and developing countries by providing support, facilities, and expertise concerning all aspects of energy conversion technologies involving hydrogen.

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