HYDROGEN, THE POST-OIL FUEL?

An IFP Energies nouvelles – CEA collaboration

coordinated by Édouard Freund and Paul Lucchese
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Conclusion

Appendix 1 – Scheme of a Traditional Conversion Refinery

Appendix 2 – Refining Schemes Corresponding to the Results Presented (in Ascending Complexity and Conversion Level)
HYDROGEN, THE POST-OIL FUEL?

Hydrogen, energy vector for the future? Or, on the contrary, limited to its current applications in the field of chemistry and refining for decades to come, possibly even until the end of the century? There is much controversy over this issue and two sides to the argument. Advocates of the hydrogen civilisation consider that, following a technological revolution, hydrogen will play a universal role alongside electricity as a substitute for fossil fuels, especially (but not only) in transport, leading to radical elimination of CO₂ emissions. For the sceptics, and even outspoken opponents, hydrogen will remain restricted to its current applications due to the insoluble problems inherent to its generalised use, especially in transport.

This book highlights the increasing and inevitable role of “energy” hydrogen – as opposed to chemical hydrogen – in the key sectors of transport and “clean” electricity production. The first section is dedicated to current applications of energy hydrogen, or those within reach in the not too distant future. The second section reviews the hydrogen production, distribution and storage technologies that are either commercially available or almost mature. The last section addresses the central issue of safety if hydrogen is to be used by the general public, before concluding on the short and medium term development perspectives of energy hydrogen.

This extensively documented book is intended for a wide audience including transport companies (road, air and waterway) and engine engineers, as well as all those interested in the future of transport and fuels in the post-oil world.

Édouard Freund is a former student of the École Polytechnique (1968), graduate from Imperial College (1973) and Doctor of Physical Science from the University of Paris VI (1974). He spent his entire career at IFP Energies nouvelles as Research & Development Director until 2008, taking a keen interest in hydrogen technologies from the outset.

Paul Lucchese is a former student of the École Centrale de Paris (1983) and holds a DEA in Applied Chemistry (1983). He has worked on hydrogen since 1999 at CEA, where he held the position of Director of New Energy Technologies until 2009. He is chairman of N.ERGHY, New European Research Grouping on Fuel Cells and Hydrogen, and member of the JTI HFC governing board. He also serves as French representative on hydrogen within the IEA (International Energy Agency) and at the IPHE (International Partnership for Hydrogen and Fuel Cells in the Economy).