



# Towards Sustainable Road Transport

By Ronald M. Dell, Patrick T. Moseley, David A. J. Rand

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**Towards Sustainable Road Transport** By Ronald M. Dell, Patrick T. Moseley, David A. J. Rand

Increasing pressure on global reserves of petroleum at a time of growing demand for personal transport in developing countries, together with concerns over atmospheric pollution and carbon dioxide emissions, are leading to a requirement for more sustainable forms of road transport. Major improvements in the efficiency of all types of road vehicles are called for, along with the use of fuels derived from alternative sources, or entirely new fuels. *Towards Sustainable Road Transport* first describes the evolution of vehicle designs and propulsion technologies over the past two centuries, before looking forward to possible new forms of energy to substitute for petroleum. The book also discusses the political and socio-economic drivers for change, investigates barriers to their broad implementation, and outlines the state-of-the-art of candidate power sources, advanced vehicle design, and associated infrastructure. The comprehensive technical information supplied by an expert author team ensures that *Towards Sustainable Road Transport* will provide readers with a clear understanding of the ongoing progress in this field and the challenges still to be faced.

- Drivers of technological change in road transport and the infrastructure requirements
- Discussion of alternative fuels for internal combustion engines and fuel conversion technologies
- Detailed exploration of current and emerging options for vehicle propulsion, with emphasis on hybrid/ battery electric traction, hydrogen, and fuel cells
- Comparative analysis of vehicle design requirements, primary power source efficiency, and energy storage systems

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## **Editorial Review**

### About the Author

Ronald Dell PhD DSc CChem. FRSC graduated from the University of Bristol. He lived for several years in the USA where he worked as a research chemist, first in academia and then in the petroleum industry. Upon returning to Britain, Ron joined the UK Atomic Energy Research Establishment at Harwell in 1959. During a tenure of 35 years, he investigated the fundamental chemistry of materials used in nuclear power and managed projects in the field of applied electrochemistry, especially electrochemical power sources. Since retiring in the mid-1990s, he has interested himself in the developing world energy scene and has co-authored with David Rand several books on Batteries, on Clean Energy, and on Hydrogen Energy.

Pat was awarded a Ph. D. for crystal structure analysis in 1968 by the University of Durham, U.K., and a D. Sc. for research publications in materials science, by the same university, in 1994. He worked for 23 years at the Harwell Laboratory of the U.K. Atomic Energy Authority where he brought a background of crystal structure and materials chemistry to the study of lead-acid and other varieties of battery, thus supplementing the traditional electrochemical emphasis of the subject.

From 1995 he was Manager of Electrochemistry at the International Lead Zinc Research Organization in North Carolina and Program Manager of the Advanced Lead-Acid Battery Consortium. In 2005 he also became President of the Consortium.

Dr. Moseley was one of the editors of the Journal of Power Sources for 25 years from 1989 to 2014. In 2008 he was awarded the Gaston Planté medal by the Bulgarian Academy of Sciences.

Dr David Rand AM PhD ScD FTSE was educated at the University of Cambridge where he conducted research on fuel cells. In 1969, he joined the Australian Government's CSIRO laboratories in Melbourne. After further exploration of fuel cell mechanisms and then electrochemical studies of mineral beneficiation, David formed the CSIRO Novel Battery Technologies Group in the late 1970s and remained its leader until 2003. He was one of the six scientists who established the Advanced Lead-Acid Battery Consortium in 1992 and served as its Manager in 1994. As a Chief Research Scientist, David fulfilled the role of CSIRO's scientific advisor on hydrogen and renewable energy until his retirement in 2008. He remains active within the organisation as an Honorary Research Fellow, and has served as the Chief Energy Scientist of the World Solar Challenge since its inception in 1987. David was awarded the Faraday Medal by the Royal Society of Chemistry (UK) in 1991 and the UNESCO Gaston Planté Medal by the Bulgarian Academy of Sciences in 1996. He was elected a Fellow of the Australian Academy of Technological Sciences and Engineering in 1998, and became a Member of the Order of Australia in 2013 for service to science and technological development in the field of energy storage.

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