



Hydrogen and Fuel Cell Systems Explained

Monday 2 September to Tuesday 3 September 2019

RMIT University, Melbourne, City Campus, Location 8.9.43

Facilitator: Andrew L. Dicks

Consultant and Adjunct Principal Research Fellow, Griffith University

Hydrogen Energy is a topic of increasing importance for addressing climate change and urban pollution. In August 2018, a National Hydrogen Roadmap was published by CSIRO and in the same month a report commissioned by ARENA set out the economics of using hydrogen to export renewable energy from Australia to countries such as Japan and Korea. At the end of 2018 the COAG Energy Council set up a hydrogen Working Group under the leadership of Australia's Chief Scientist, Dr Alan Finkel, to develop a national strategy to

- build a hydrogen industry
- position Australia's hydrogen industry as a major global player by 2030

The strategy will look at progressing options to provide hydrogen for future transport, decarbonize Australia's gas network, as well as the development of a hydrogen export industry.

The State of Victoria is already taking a leadership position in developing a hydrogen industry. One of the first announcements was state support to that of the Federal Government and the Government of Japan to a world-first project to produce hydrogen in the Latrobe Valley for export to Japan. The State Government has also allocated \$2million to ensure that Victoria benefits from a green hydrogen economy through a Victorian Hydrogen Investment Program. More recently Toyota has announced the repurposing of the old manufacturing site at Altona to become a \$7.4 million Hydrogen Centre that will provide fuel for hydrogen vehicles.

With interest at a high level and growing, it is important that those involved in the energy and transportation businesses understand the role that hydrogen and fuel cell systems can play in our future. After decades of R&D much of the technology is proven, early products and applications are appearing almost daily, and there are undoubtedly many opportunities for those who understand the technology. The workshop aims to provide essential knowledge of the principles and practices of hydrogen energy and fuel cell systems. It is based on the 3rd edition of the widely-acclaimed textbook "Fuel Cell Systems Explained" by Andrew L. Dicks and David A. J. Rand, published in April 2018.

Workshop content

The workshop will provide a complete overview of

- The operating principles of fuel cells
- The components that make up fuel cell systems
- All leading fuel cell types
- The methods of generating, storing and transporting hydrogen
- Current activity in Australia and elsewhere in hydrogen and fuel cell systems
- The latest research outcomes for fuel cell systems and hydrogen generation

Supported by the Hydrogen Research Group, RMIT School of Engineering

Take home

Participants will receive

- A hardback copy of the textbook Fuel Cell Systems Explained 3rd edition (RRP \$213 AUD)
- Electronic and paper copies of the presentation material
- An understanding of the role of hydrogen and its technologies in clean energy businesses
- In-depth knowledge of hydrogen production, storage and transmission, and fuel cell technologies
- List of useful hydrogen and fuel cell information sources including company and organisations websites

Who should attend?

- Consultants, executives, engineers and managers seeking engagement in clean energy technology
- Senior undergraduates or postgraduates in science and engineering interested in a career in clean energy
- Government officers with a responsibility for clean energy policy
- Those involved in setting standards for safety and regulatory issues
- Engineers and technicians responsible for building and implementing hydrogen systems

Workshop overview

Day 1. Introduction to fuel cell systems

Fuel cell concepts and design
Efficiency, open-circuit voltage and operational voltages
Alkaline and Proton-Exchange Membrane (PEM) fuel cells
Direct liquid and Phosphoric Acid fuel cells
Molten carbonate and solid oxide fuel cell systems

Day 2. Hydrogen energy systems

Safety and regulatory issues
Generation of hydrogen from hydrocarbon fuels
Generation of green hydrogen by water splitting
Hydrogen storage and transmission
Commercialisation issues with practical examples, including applications for stationary power generation and vehicles

The Facilitator: Andrew Dicks

Andrew is internationally recognised for his work in high temperature fuel cell systems, and was awarded the HE Jones (London) medal of the Institution of Gas Engineers for his development of natural gas systems. He was principal scientist at BG plc during the 1990s in which capacity he worked with some of the leading fuel cell developers including Ballard Power Systems (Canada), Siemens (Germany), Westinghouse (USA) and ECN (the Netherlands). Andrew was awarded a Senior Research Fellowship in 2002 at the University of Queensland to study the application of nanomaterials in energy systems. He has led and has worked on many hydrogen and fuel cell development projects in Canada, Europe and Australasia, including the renewable energy system for the Sir Samuel Griffith Centre in Brisbane. Andrew gained his BSc and PhD in Industrial Chemistry from Loughborough University, is a Chartered Chemist and Fellow of the Royal Society of Chemistry. He has been a director of the Australian Institute of Energy and was the founding President of the Australian Association for Hydrogen Energy.

Registration

Costs for the workshop are \$1450 (early bird – available until 9 August) or \$1850 full rate.

To register please follow this link to Eventbrite:

<https://www.eventbrite.com.au/e/hydrogen-and-fuel-cell-systems-explained-tickets-63723197800>

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