



Hydrogen Industry Fundamentals

Learn about hydrogen industry fundamentals, including its uses in the process industries and its production methods, sources, costs, and logistics in this hydrogen course.

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Attend In-Person or Live Digital

Course Information

Face to Face Training	MELBOURNE	13 - 14 February 2024 17 - 18 October 2024
	BRISBANE	20 - 21 February 2024 31 Oct-1 November 2024
	SYDNEY	14 - 15 March 2024 14 - 15 November 2024
	PERTH	4 - 5 April 2024 28 - 29 November 2024
	CANBERRA	7 - 8 May 2024 12 - 13 December 2024

Live Online Training	May 2024							
	Part1	13 May	Part2	14 May	Part3	15 May	Part4	16 May 1pm - 5pm AEST
	September 2024							
	Part1	3 Sep	Part2	4 Sep	Part3	5 Sep	Part4	6 Sep 1pm - 5pm AEST

Key Learning Objectives

- How hydrogen is currently produced and its cost of production
- How hydrogen may be produced from renewable sources – electrolysis, bio fuels, photolysis and estimated cost of production
- How hydrogen can be stored and estimated storage costs
- Understand possible future transport methods and international trade costs – as compressed gas, as liquid or via ammonia or naphthenes
- How hydrogen is transported by pipeline and the cost of transport
- Learn how hydrogen is used in fuel cells for stationary and vehicle applications
- Analyse the cost of hydrogen to a consumer from different production, storage and transport scenarios
- Analyse how hydrogen will compete with conventional fuels for stationary and vehicle applications
- Develop an understanding of the key hurdles in developing a hydrogen economy

Who Will Benefit

The main aim of a hydrogen economy is to replace fossil fuels with hydrogen as the fuel source. This hydrogen course is aimed at:

- Persons with an interest in fostering and developing a large-scale hydrogen industry in Australia and, potentially, in promoting and developing international trade in hydrogen.
- Industry and government commercial managers, economists and engineers interested in gaining and understanding the costs of the hydrogen economy and the relative costs of various production, storage and transport costs to local and distant markets.
- Business professionals interested in developing commercial opportunities in any emerging hydrogen industry.
- Research and development engineers and scientists interested in identifying key hurdles, which could benefit from further R&D activities to reduce costs to the consumer.



Course Information

About the Course

Hydrogen replaces fossil fuels in power generation and transport. Hydrogen is widely used in the process industries and is a fuel that produces no carbon dioxide emissions. It is typically produced at a considerable scale and often transported through pipelines from producers to users.

Our Hydrogen Industry Fundamentals training can provide you with a comprehensive perspective and understanding of the hydrogen economy. The coverage and level of detail make it one of the best hydrogen courses online.

The first modules of our hydrogen training program will review the current production and uses of hydrogen in the process industries, which may be used as a basis for an emerging hydrogen economy.

The modules on hydrogen production from renewable sources will outline the technology and costs of alternative approaches to the production of hydrogen. The cost will be critically compared to conventional production methods as they presently stand and with the incorporation of carbon capture and storage.

A hydrogen course module will address storage options and costs for small and large-scale storage as gas or liquid hydrogen.

Modules will address the approach to the transport of hydrogen and the unit cost of the various options over short and long distances. The principal options considered will be by pipelines, as compressed gas or liquid, or via an intermediate product such as ammonia or naphthene. The costs of transporting hydrogen over long shipping distances to markets in North Asia will be estimated for various options.

The use and productivity of hydrogen fuel used in fuel cells for stationary and vehicle applications will be explained and the competitive advantages for hydrogen identified.

The cost position of hydrogen versus conventional fuels will be estimated to set an outline price for a target landed price of Australian produced hydrogen in NE Asia. Scenarios to meet this target will be discussed.

A final hydrogen training module will develop case studies for hydrogen versus conventional fuels in various locations of interest for a fully developed hydrogen economy.

Meet Your Course Director



Dr. Duncan Seddon industrial career started with ICI on Teesside in the UK where he worked on the production of plastics and fibres. He moved to the Billingham Works where he was responsible for the energy management of a large integrated chemical complex. He moved to ICI Australia in 1980 and worked on the conversion of natural gas to methanol and olefins. In 1983, he moved to BHP and worked on gas to liquids (GTL).

Since 1988, Duncan has practiced as an independent consultant offering a broad range of services to companies and government bodies with an interest in refining and petrochemicals processes. He has a particular interest in the production of chemicals and fuels from gas and coal and the technology and economics for producing fuels from renewable sources.

Duncan is the author of over 120 papers, patents, including several papers on the production cost of hydrogen and its competitive position versus conventional fuels.

He has written two books - "Gas Usage and Value - The Technology and Economics of Natural Gas Use in The Process Industries" (PennWell, 2006) and "Petrochemical Economics - Valuing and Selecting Technology in a Carbon Constrained World" (ICP press, 2010). He is the co-editor (with Bo Zhang) of "Hydroprocessing Catalysts and Processes- The Challenges for Biofuels Production" (World Scientific, 2018).

Duncan is a Fellow of the Royal Australian Chemical Institute and a Member of the Society of Petroleum Engineers.

Course Outline

THE MARKET FOR HYDROGEN

- The use of hydrogen in the process industries
- Safety
- Oil refineries
- Petrochemicals
- The use of hydrogen in the chemicals industry
- The use of hydrogen in reducing metal ores

METHODS OF HYDROGEN PRODUCTION

- The production of hydrogen from coal
- The production of hydrogen from natural gas
- The production of pure hydrogen
- Hydrogen production from the hydrocarbon process industry
- Hydrogen production from the chlor-alkali industry
- Hydrogen in natural gas

THE COST OF HYDROGEN PRODUCTION FROM FOSSIL FUELS

- Hydrogen production from natural gas
- Cost of hydrogen production from a central facility from natural Gas
- Impact of scale of operation
- Hydrogen from coal
- Greenhouse gas emissions

THE PRODUCTION OF HYDROGEN FROM RENEWABLE SOURCES

- The production of hydrogen by electrolysis
- High-temperature electrolysis
- Comparison of performance of different cells
- Other approaches
- Impact of solar radiation variation on electrolysis
- Economics of hydrogen production by electrolysis
- Photochemical water splitting
- Hydrogen production from biomass

HYDROGEN STORAGE AND TRANSPORT

- Transport of hydrogen as liquid
- Storage in salt caverns
- Storage as hydrides
- Hydrogen compression
- Hydrogen transport by pipelines
- Cost of hydrogen storage and transport

THE MASS SHIPPING OF HYDROGEN

- Cost of ships and shipping
- Transport of hydrogen as an intermediate – ammonia and hydrocarbons

COMPETITIVE POSITION OF HYDROGEN VERSUS FOSSIL FUELS

- Fuel cells
- Fuel cell applications
- Competitive position hydrogen and fossil fuels in vehicles

CASE STUDIES FOR THE HYDROGEN ECONOMY

Case Study 1: Hydrogen Production and Use in a Domestic Setting

Case Study 2: Hydrogen From Large Scale Solar Power

Case Study 3: Remotely Produced Hydrogen Shipped to North East Asia

Case Study 4: Hydrogen From Victorian Lignite to North East Asia



"I really enjoyed the course, and it has helped me to understand the hydrogen industry, process and challenges better."

Project Senior Engineer, Fortescue Future Industries Pty Ltd

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Easy Ways to Register



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Hydrogen Industry Fundamentals

Course Code	Location/ Format	Course Dates	Early Bird price valid until ME - 26 Jan 24 BR - 2 Feb 24 SY - 23 Feb 24 PE - 15 Mar 24 CB - 19 Apr 24 ME02 - 27 Sep 24 BR02 - 11 Oct 24 SY02 - 25 Oct 24 PE02 - 8 Nov 24 CB02 - 22 Nov 24		Standard price valid after ME - 26 Jan 24 BR - 2 Feb 24 SY - 23 Feb 24 PE - 15 Mar 24 CB - 19 Apr 24 ME02 - 27 Sep 24 BR02 - 11 Oct 24 SY02 - 25 Oct 24 PE02 - 8 Nov 24 CB02 - 22 Nov 24	
P24GR30ME	Melbourne	13 - 14 February 2024	\$2,995.00 + \$299.50	\$3,294.50	\$3,095 + \$309.50 GST	\$3,404.50
P24GR30BR	Brisbane	20 - 21 February 2024	\$2,995.00 + \$299.50	\$3,294.50	\$3,095 + \$309.50 GST	\$3,404.50
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P24GR30AUV	Live Digital	All 4 Parts	13 - 16 May 2024	\$2,395 + \$239.50 GST	\$2,634.50	
P24GR30AU02V	Live Digital	All 4 Parts	3 - 6 September 2024	\$2,395 + \$239.50 GST	\$2,634.50	

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