

# ELECTRICITY INDUSTRY FUNDAMENTALS

## 2-Day Training Course: The Essential Bridging Course for the Electricity Sector

An essential course on Australian electricity industry design & performance, key issues, reforms & future directions for those working within or alongside the industry needing to fast track their learning.



23-24 March 2020 • Perth  
19-20 October 2020 • Sydney

18-19 May 2020 • Melbourne  
9-10 November 2020 • Brisbane



### Our Expert Course Instructor

#### Dr Hugh Outhred

Hugh has delivered 130 training courses in 15 countries on electricity industry design and renewable energy integration for participants from governments, non-government organisations, the electricity supply industry and private industry.

### Key Learning Objectives

- ▶ Overview of electricity and gas industries in Australia
- ▶ Key electricity industry technologies and how the industry works
- ▶ Electricity industry design – objectives and implementation
- ▶ Design and performance of electricity derivative markets
- ▶ Network services and ancillary services in the NEM
- ▶ The National Electricity Market (NEM) – design, performance and trends, including challenges in wind, PV and storage integration
- ▶ Retail market design & possible future evolution
- ▶ Overview of the current issues facing the electricity industry

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## ABOUT THE COURSE

This course will provide a clear understanding of the fundamental structure and workings of the Australian electricity industry and the National Electricity Market (NEM). Although this course will examine the stationary energy sector as a "whole", it will focus more on electricity than gas.

Our expert instructor will describe the structure of the Australian electricity and gas industries, design of the NEM, current electricity industry issues including renewable energy and storage integration and the CoAG energy market reform agenda.

Participants will also learn about the technical concepts and language used within the electricity industry and within the emerging renewable energy and storage and "smart grid" technology spheres. This will help them bridge the cultural gap between the existing industry and the emerging technologies. For those who need to become experts in the energy industry, this course will provide a fundamental background.

## WHO WILL BENEFIT

Managers, executives and staff from the electricity, gas, renewable energy and storage industries, regulatory bodies and government, banks, brokers, lawyers, consultants, industry advisors, major energy users and other industry professionals seeking more knowledge about the current electricity industry and future trends.

## WHAT OUR CLIENTS SAY

*"Over the years I have attended many training courses provided by [Informa Corporate Learning]. I have always found the course content to be relevant and accurate and the course facilitators to be leaders in their field."*

Analyst, **ENI Australia Ltd.**

## EXPERT COURSE INSTRUCTOR



### Dr Hugh Outhred

Hugh Outhred is the Managing Director of Ipen Pty Ltd, a company established in 1998 to provide independent perspectives on energy, society and the environment. Hugh holds a PhD in Electrical Engineering from the University of Sydney and is a Fellow of the Australian Institute of Energy.

Hugh has provided advice and taught 125 short courses since 1988 on electricity industry design and renewable energy integration for governments, non government organisations, the electricity supply industry and private industry in 14 countries.

Hugh has contributed to the theory of electricity industry design since 1979 and to its practical implementation in Australia since the 1980's. In 1985 and 1986, he was seconded to the government of New South Wales as an advisor on electricity competition and sustainability. In 1995 and 1996, he led a project for the National Grid Management Council to undertake electricity trading experiments to trial the proposed National Electricity Market trading rules prior to their formal implementation. In 1997, he was appointed as an inaugural member of the NSW Licence Compliance Advisory Board, a position he held until the Board was replaced as part of revised industry governance arrangements in 2001 and in 1998 he was appointed as an inaugural member of the Australian National Electricity Tribunal - a position he held until the Tribunal was replaced as part of revised industry governance arrangements in 2006. In 2008, Hugh was a Lead Author for the IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation, which was published in 2011.

Hugh retired from the School of Electrical Engineering and Telecommunications at the University of New South Wales in September 2007 from the positions of inaugural Presiding Director of UNSW's Centre for Energy and Environmental Markets and Head, Energy Systems Research Group in the School of Electrical Engineering and Telecommunications.

Hugh was a Fulbright Senior Fellow at the University of California Berkeley in 1994 and has held visiting positions at Massachusetts Institute of Technology in the USA, the University of Liverpool in the UK, the Universidad Pontificia Comillas in Spain, Roskilde University Centre in Denmark and Murdoch University in Perth. He has been a Board member of the Australian Cooperative Research Centre for Renewable Energy, an Associate Director of UNSW's Centre for Photovoltaic Devices and Systems and a member of CSIRO's Energy Flagship Advisory Committee.

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## 2-Day Course Outline

### The nature of electricity and gas industries

- Australia's energy resources within the broader global context
- The stationary energy sector energy conversion chain
- Key properties of electrical energy and the electricity industry
- Managing availability and quality of supply by ancillary services
- Coal and gas fired power stations, including co- and tri-generation
- Wind, PV and reversible energy storage
- Demand side options – efficiency and flexible demand
- Comparison of options on economic, technical, social and environmental criteria

### Overview of electricity industry design

- Objectives of electricity industry design and decision-making protocols
- Structural choices in electricity industry design
- Comparison of design choices in Australia, North America and Europe
- Limitations of present industry design choices and possible future design choices based on "smart-grid" concepts

### Design of electricity derivatives & derivative markets

- Contracts for difference
- Call and put options
- More complex derivatives
- Derivative market designs – OTC & exchanges

### Design of the NEM

- Scope and key features that manage on-going supply-demand balance
- Participant categories & requirements
- Spot & derivative pricing using market regions & network loss factors
- Dispatch, pre-dispatch, PASA, ESOO and NTNDP

### Performance of the NEM

- Security and reliability – history and trends
- Demand, spot and derivative prices – history and trends
- Market shares and market power issues
- Strengths and weaknesses of the present design

### Network services in the NEM

- Services provided by transmission and distribution networks
- Network ownership, operation, investment and pricing
- Future trends in network services

### Ancillary services in the NEM

- Frequency-related ancillary services
- Voltage-related ancillary services
- Security-related ancillary services
- Performance to date & future trends

### Retail market design and trends

- Economic, social & environmental objectives
- Current retail market design & its limitations
- Possible future directions in retail market design

### Overview of current issues for the Australian electricity industry

- Governance and institutions
- Transition to a low-carbon future, including challenges of renewable energy and storage integration
- Network investment and regulation
- Smart grid, end-user engagement and retail market evolution



Would You Like To Run This Course On-Site?

### Informa Corporate Learning: On-site & Customised Training

If you have **8+** interested people, an onsite course can be an ideal solution. Speak with **Anton Long** or **Holly Baldwin** on **+61 (02) 9080 4455** to discuss your customised learning solution, or email [training@informa.com.au](mailto:training@informa.com.au)

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## Easy Ways to Register

**1 Web**  
[www.informa.com.au/electricityfundamentals](http://www.informa.com.au/electricityfundamentals)

**2 Telephone**  
+61 (02) 9080 4395

**3 Email**  
[training@informa.com.au](mailto:training@informa.com.au)

## Stay Connected



## Electricity Industry Fundamentals

| Course Codes | Location  | Course Dates | Super Early Bird price valid until |                   | Early Bird price valid until |                   | Standard price valid after |                   | 4+ Dels Discount       |                   |
|--------------|-----------|--------------|------------------------------------|-------------------|------------------------------|-------------------|----------------------------|-------------------|------------------------|-------------------|
|              |           |              | PE - 14 Feb 20                     | ME - 10 Apr 20    | PE - 6 Mar 20                | ME - 1 May 20     | PE - 6 Mar 20              | ME - 1 May 20     | SY - 2 Oct 20          | BR - 23 Oct 20    |
| P20GR14PE    | Perth     | 23-24 Mar 20 | \$2,595 + \$259.50 GST             | <b>\$2,854.50</b> | \$2,895 + \$289.50 GST       | <b>\$3,184.50</b> | \$2,995 + \$299.50 GST     | <b>\$3,294.50</b> | \$2,316 + \$231.60 GST | <b>\$2,547.60</b> |
| P20GR14ME    | Melbourne | 18-19 May 20 | \$2,595 + \$259.50 GST             | <b>\$2,854.50</b> | \$2,895 + \$289.50 GST       | <b>\$3,184.50</b> | \$2,995 + \$299.50 GST     | <b>\$3,294.50</b> | \$2,316 + \$231.60 GST | <b>\$2,547.60</b> |
| P20GR14SY    | Sydney    | 19-20 Oct 20 | \$2,595 + \$259.50 GST             | <b>\$2,854.50</b> | \$2,895 + \$289.50 GST       | <b>\$3,184.50</b> | \$2,995 + \$299.50 GST     | <b>\$3,294.50</b> | \$2,316 + \$231.60 GST | <b>\$2,547.60</b> |
| P20GR14BR    | Brisbane  | 9-10 Nov 20  | \$2,595 + \$259.50 GST             | <b>\$2,854.50</b> | \$2,895 + \$289.50 GST       | <b>\$3,184.50</b> | \$2,995 + \$299.50 GST     | <b>\$3,294.50</b> | \$2,316 + \$231.60 GST | <b>\$2,547.60</b> |

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### Informa Corporate Learning – On-site & Customised Training

Informa Corporate Learning has a long-standing track record of delivering very successful customised learning solutions achieving real and measurable value for our clients through our senior training consultants.

If you have 8+ interested people, an on-site course can be the ideal solution – giving you the opportunity to customise our course content to your specific training needs, as well as attracting significant savings compared to public course costs.

### Why Choose On-site With Informa Corporate Learning?

- 1. Custom design** – Together, we will identify the best blended learning solution for your culture, your people and your training objectives.
- 2. Quality Assured** – We design market-leading training programs, concepts and methodologies, with a 400+ course portfolio. Our rigorously selected 900+ instructor faculty are recognised experts in their field. Quality of their content and delivery methods is assured through continuous monitoring and evolution.
- 3. On-site training** is a cost effective way to train your people and achieve your defined outcomes.

### Our Long Standing Clients Include:

ActewAGL, Ajilon, Ambulance Victoria, ANU, Arrow Energy, Australian Super, Barrick, BHP, Chevron Australia, Coffey International, ConocoPhillips, CSIRO, Dalrymple Bay Coal Terminal, Department of Education, Department of Planning, Electricity Generating Authority of Thailand (EGAT), ENI Australia, EY, Fortescue Metals Group, Health Purchasing Victoria, IBM, IP Australia, Jemena, Litmus Group, Metro Trains, Office of the National Rail Safety Regulator, Origin Energy, Pacific National, PT Freeport, Public Transport Authority – WA, QGC – BG Group, Queensland Rail, Rio Tinto, Romgaz, SA, South Australia Health, Telstra, Transport & Infrastructure, UBS, Woodside and more...

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