

# Future-Proofing the Electricity Grid

March 16-17, 2015

Meralco Center, Ortigas, Pasig City

This 2-day learning event and executive briefing aims to provide in-depth knowledge or answers to the following questions:

1. How will the power industry deregulation impact the utility grid?
2. What are the trends in renewable/imbedded generation and customer behaviour in a competitive market?
3. What are the engineering/technical issues and challenges in grid planning, design and operations for a traditional utility given the disruptive technologies and renewables penetration?
4. How would a utility prepare or respond to address the issues?
5. What were the regulatory policy trends and responses from mature markets?
6. What were the lessons learned and the roadmap taken by mature markets?

## Course Outline: DAY 1

### Electricity industry characteristics, issues and trends (part 1):

- Energy conversion chain concepts & their application in the stationary energy sector
- Basic features of an electricity industry & its functional services – generation, network, end-use, reversible storage, monitoring & control
- Historical evolution of the electricity industry structure
- Electricity generation options: fossil fuels, renewables, nuclear
- Transmission & distribution services
- End-use energy services
- Reversible energy storage
- End-use energy service flows, availability & quality of supply, temporal & locational aspects
- Managing risks to end-use energy service flows: operation & investment aspects
- Monitoring & control, smart-grid concepts
- Electricity industry design challenges in the Anthropocene: the energy trilemma (security, equity, sustainability)

### Electricity industry design overview:

- Characteristics of complex technological systems, particularly the electricity industry
- Decision-making framework for the electricity industry: governance, security, technical, commercial regimes
- Commercial contracts & markets & their applicability to the electricity industry
- Structural choices for the electricity industry

### Design choices for electricity industry markets, governance and regulation:

- Wholesale electricity market design: energy, ancillary services, spot & derivative markets, market regions & nodal pricing, capacity markets
- Retail electricity market design for active end-users, distributed generation & storage
- Pricing of monopoly network services
- Regulating industry structure and market performance
- Regulating monopoly network services



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## Course Outline: DAY 2

### **Evolving electricity industry design in North America:**

- Scope of the North American electricity industry
- Evolution of the North American electricity industry
- Important current issues:
  - Centralised wholesale markets versus bilateral wholesale trading
  - Monopoly retail versus competitive retail
  - Integration of non-storable wind & solar energy, reversible energy storage
  - Active end-users, smart grids & growing distribution-level complexity

### **Evolving electricity industry design in Europe:**

- Scope of the European electricity industry
- Evolution of the European electricity industry with particular attention to the UK
- Important current issues:
  - Multi-national wholesale trading arrangements
  - Financing for large power station projects, particularly nuclear energy
  - Integration of non-storable wind & solar energy, reversible energy storage
  - Active end-users, smart grids & growing distribution-level complexity

### **Evolving electricity industry design in Vietnam:**

- Scope of the Vietnamese electricity industry
- Evolution of the Vietnamese electricity industry
- Important current issues:
  - Attracting investment
  - The transition strategy to move to a new industry structure and market arrangements
  - Electricity market design in a system with high levels of hydro generation
  - Choice of pricing models, vesting contracts, and other market design features

### **Options for future proofing The Philippines electricity industry:**

- Scope of The Philippines electricity industry
- Evolution of The Philippines electricity industry
- Important current issues:
  - Attracting investment
  - Market design philosophy and principles
  - Developing market-based approaches for ancillary services
  - Contracting arrangements
  - Discussion of future proofing options for The Philippines



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## YOUR GLOBAL EXPERTS



**Dr. Hugh Outhred**

Hugh Outhred is Managing Director of Ipen Pty Ltd, a boutique company established in 1998 to provide advisory and educational services in the interdisciplinary area of energy, society and the environment.

Hugh holds the degrees of BSc, BE (First Class Honours) in Electrical Engineering and PhD in Electrical Engineering from the University of Sydney. He is a Fellow of the Australian Institute of Energy and a Life Member of the Institute of Electrical and Electronic Engineers.

After a 35-year career at the University of New South Wales, Hugh retired in September 2007 as Presiding Director, Centre for Energy and Environmental Markets and Head, Electrical Energy Research Group, School of Electrical Engineering and Telecommunications.

Hugh has been a Fulbright Senior Fellow at the University of California Berkeley, a Lead Author for the IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation, a Board Member of the Australian CRC for Renewable Energy, an Associate Director of UNSW's Centre for Photovoltaic Devices and Systems, a Member of CSIRO's Energy Flagship Advisory Committee, a Member of the National Electricity

Tribunal and a Member of the NSW Licence Compliance Advisory Board. He has provided advice and taught over 100 short courses on competitive electricity industry design and renewable energy integration.



**Dr. Stuart Russell Thorncraft**

Stuart is a Managing Consultant at Intelligent Energy Systems Pty Ltd (IES), an Australian-based energy consulting firm, where he is responsible for leading projects mainly based in Asia that involve the provision of advice and consulting services to governments, energy companies and financial institutions on the energy markets of Australia, Singapore, Vietnam, Philippines, South Korea, Myanmar and others in South-east Asia. He has over 15 years of experience in providing advice on energy policy, modelling and projecting energy markets, advice on electricity market IT systems, technical aspects of the design and operation of electricity markets.

He has managed and made contributions to numerous projects within the Asia-Pacific region, such as the development of an integrated energy master plan for the Government of Myanmar, technical support and assistance to the Philippines Electricity Market Corporation on matters related to electricity market design, and technical assistance to the Electricity Regulatory Authority of Vietnam on the reform of their electricity sector.

Stuart holds a Ph.D. in Electrical Engineering from the University of New South Wales. Prior to becoming a Managing Consultant, Stuart spent six-years undertaking research for the Centre for Energy and Environmental Markets (CEEM) at the University of New South Wales where he focused on the technical design and operation of electricity markets. This gave rise to several academic publications and research presentations at universities and conferences in Europe and the USA. Earlier in his career, Stuart was a control systems software engineer at Honeywell, where he gained practical experience in the design and implementation of supervisory control and data acquisition (SCADA) system, real-time control, software engineering and database design.

**Program Investment: P45,000 net per person**

**Special Rate for the 2 courses (Future Proofing the Electricity Grid  
and The Energy Market Transformation): P85,000 net per person**

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