

Understanding the Electricity System:

A half-day learning-by-doing workshop for energy professionals

Context

Electricity systems around the world are being transformed, with a top-down drive to reduce emissions and bottom-up interest in localising and democratising energy supply. New solutions are being created as various organisations seek to address society's demand for energy in ways that reduce its environmental footprint. Moreover, this transformation is taking place within the traditional constraints of delivering a reliable and affordable electricity supply to all.

Liberalised power systems traditionally have generation companies that produce the power, retail businesses that supply electricity to customers and a wholesale market where participants trade with each other. However, lines are becoming blurred with the rise of the prosumer, the aggregator and smart energy. The system is usually overseen by a regulator, system operator and market operator who keep the lights on, foster innovation and ensure fair play. Understanding how they are integrated in a practical system provides invaluable context for those involved in any aspect of energy, whether that be innovation, policy making, trading, generation or retail services.

The Game



This workshop is designed to give you experience of the commercial aspects of generating, trading and supplying electricity. The main activity in the workshop is a business game, designed by a team who, between them, have more than fifty years' experience of working within the energy sector. It will give you experience of strategic decision making, the business risks that commercial organisations face, and the day-to-day challenges of operating an energy company ...whilst having fun!

On the day you will work in a small team to run an energy company participating in a simulated version of an electricity market. You will be responsible for sourcing and delivering power to your customers by operating electricity generating plant and trading with other teams. The imperative of keeping the customers' lights on whilst making a profit for your shareholders will become clear as you also strive to minimise your emissions.

The simulated environment will take you through a typical year of operating the company, experiencing the effect of weather on generation and customer demand. You will be able to choose whether to generate with clean wind, baseload nuclear, flexible gas or just buy from the market place. You will have an opportunity to expand your company through acquisition of further generation or retail businesses or even by investing in community energy schemes.



Learning Outcomes

If energy trading is new to you, this workshop will help you to gain a basic understanding of how it works. You will discover the advantages and disadvantages of differing sources of power and appreciate the need to trade energy on wholesale markets. If you already have some knowledge of the system, this workshop will allow you to explore the challenges facing those who run the system on a daily basis, and appreciate the constraints on policy makers and strategists designing future

energy systems. This will help you in your day to day work as you better understand how it fits within the generation, trading and supply value chain.

In addition, the business game environment is a safe and fun place to develop and enhance personal skills such as:

- Team work
- Negotiating skills
- Strategic thinking
- Risk management

Agenda

Elements in a typical 4-hour event are shown, but these can be varied to meet specific training needs.

Introduction (1 hour)	Game play (2½ hours)	Wrap Up (½ hour)
Introduction: Host Organisation Talk: Challenges of the energy system Explanation: Game rules Game: Setup and initial investments	Game: Spring Day Game: Summer Day Game: New Investments Game: Autumn Day Game: Winter Day	Results: Winning teams Feedback: On the game from facilitators Discussion: Lessons learnt

Your Facilitators

Andy Boston is director of Red Vector Ltd, an independent energy consultancy specialising in modelling energy systems and delivering interactive learning. Before that he headed up the Analysis Team at Energy Research Partnership - a forum for government, industry, academia and the third sector to tackle the big issues arising from the decarbonisation of the energy sector.

Prior to his role at ERP he was Technical Head of Energy Systems at E.ON's Technology Centre, overseeing the low carbon, energy modelling and optimisation fields. He read Physics at Oxford and is a Chartered Engineer.

Andy pioneered the use of business games within E.ON, designing and delivering 20-30 events, some for external clients. These had a range of purposes, some were for testing strategies or exploring new market rules, others were run as team building exercises, or for training new staff.



Dr Mike Colechin is director of Cultivate Innovation Ltd, working with the organisations and individuals who are delivering innovative, low carbon energy solutions.

Prior to setting up Cultivate, Mike worked as Partnership Manager for the Energy Technologies Institute (ETI), an organisation that brings together engineering projects to accelerate innovation and help the UK meet its long-term energy objectives. He still delivers this role on a part-time basis, ensuring that the ETI creates value for its funders (both public and private) and the wider community of industry, public sector and academic players involved in energy in the UK. This is about informing policy, supporting companies developing the solutions, and building investor and industry confidence in new approaches to energy.

Mike is a Chartered Mechanical Engineer with over 20 years' experience in the energy sector. Prior to joining the ETI, he spent 15 years with E.ON, first as a Combustion Engineer and subsequently as a member of E.ON's R&D Management Team.