

Location	Course	Date	Early Payment Date	
Wellington	ELO	Introduction to the Electricity Market	Tue March 2 <sup>nd</sup>	Feb 22 <sup>nd</sup>
	ELNP1	Nodal Pricing of Electricity	Wed March 3 <sup>rd</sup>	
	GMO	Introduction to the Gas Market	Thu March 4 <sup>th</sup>	
Auckland	ELO	Introduction to the Electricity Market	Tue May 4 <sup>th</sup>	Apr 26 <sup>th</sup>
	ELNP1	Nodal Pricing of Electricity	Wed May 5 <sup>th</sup>	
	ELRisk	Hedging Electricity	Thu May 6 <sup>th</sup>	
Wellington	ELO	Introduction to the Electricity Market	Tue Jul 20 <sup>th</sup>	Jul 12 <sup>th</sup>
	ELNP1	Nodal Pricing of Electricity	Wed Jul 21 <sup>st</sup>	
	GMO	Introduction to the Gas Market	Thu Jul 22 <sup>nd</sup>	
Wellington	ELO	Introduction to the Electricity Market	Tue Oct 19 <sup>th</sup>	Oct 11 <sup>th</sup>
	ELNP1	Nodal Pricing of Electricity	Wed Oct 20 <sup>th</sup>	
	ELRisk	Hedging Electricity	Thu Oct 21 <sup>st</sup>	

Early payment discount of 10% is available for payments received up to and including the Monday in the week preceding the week in which the course is scheduled, as shown above.

Register online (paying by credit card or on invoice) or register by faxing back the attached form.

### General course objective

- To provide participants with an introduction to, and working knowledge of, the essential elements of the New Zealand electricity and natural gas markets.

### Intended Audience

These courses are intended to form a comprehensive introduction to the wholesale markets for electricity and gas, with specific reference to and examples from New Zealand. The emphasis of the courses is on understanding issues relevant to spot and wholesale trading and hedging and the associated risks. At each stage of the courses we will use simple examples designed to help participants understand the material presented. Participants will receive course booklets, including answers to all exercises.

### Presenter - Greg Sise, Managing Director, Energy Link

Greg's experience in energy dates back to 1984, when he worked in the Energy Management Unit at the University of Otago developing software for monitoring and controlling energy production and consumption in buildings. He then worked in senior management positions for Univord Energy, a joint venture company arising from the University's energy management program, and subsidiary Energy Consultants. His activities included tariff optimisation, contract negotiation, energy audits, energy efficiency projects in buildings, risk management and hedging.

In 1996 Greg set up Energy Link as a joint venture with two small power companies. Energy Link provides advisory and brokering services, forecasting, modelling, training, packaged software and online software for the electricity and gas industries including larger consumers.

Greg has contributed to the development of the electricity market as a member of key industry working groups and as Project Manager for the NZEM's Real-time pricing and Demand-side Participation projects. He is

currently a member of the Board of the Energy Efficiency and Conservation Authority, the Crown entity which develops and delivers quality energy efficiency and renewable energy programs to the benefit of New Zealanders.

## The Investment

One-day courses:

- EL0 \$975
- GM0 \$975
- ELNP1 \$1,275
- ELRisk \$1,275

- Courses are one day each in length and commence 9:00 am, usually finishing between 4:30 and 5:00 pm. **Please be ready to start at 9 am, or let us know in advance if you will be late.**
- All the prices above are in New Zealand dollars. GST (goods and services tax) will be added to the above amounts on the invoice.
- Payments received in full by the specified early payment date (up to and including the Monday in the week preceding the week in which the course is scheduled) will qualify for a 10% **discount** on the above rates.
- Invoices will be issued upon registration and if not paid by the early payment date are otherwise payable 20<sup>th</sup> of the month following invoice.
- Discounts may apply for four or more participants from one company or for attendance at four or more courses. Please contact Greg Sise on 03 477 3572 or [greg.sise@energylink.co.nz](mailto:greg.sise@energylink.co.nz) to arrange a discount for a group booking.
- Registration, tea and coffee from 8:45 am.
- Morning and afternoon teas and lunch will be provided.

## Terms and Conditions

- Numbers are limited so you need to book early to ensure your place on any particular course.
- Cancellations will be accepted with full refund up until 5 working days before the workshop. Later cancellations will receive a refund less a service charge of 10%.
- Energy Link reserves the right to cancel the course at any time if there is insufficient interest, at its sole discretion. Fees will be refunded in full, or an alternative arranged as appropriate, at Energy Link's discretion, if the course is cancelled for any reason. Energy Link shall not be liable for travel, accommodation or any other costs whatsoever, incurred by people who have registered on courses subsequently cancelled.
- All course materials are copyright of Energy Link and may be used only for your internal business purposes. They may not be distributed or copied outside of your organisation without the written permission of Energy Link.
- Energy Link takes reasonable care to ensure that the material presented in the course is up to date and accurate. Energy Link's liability in respect of any claim for any loss whatsoever by you is strictly limited to the amount that you paid to attend the course. However, Energy Link will not accept liability for any consequential loss or damage which you may claim occurred as a result of attending the course.
- Course participants are advised that it is their responsibility to ensure that they understand their obligations in respect of undertaking their respective functions and using the information presented in these courses.
- Energy Link welcomes feedback and undertakes to correct, add or otherwise put right, at its sole discretion, any material error or omission brought to its notice in respect of course material, and to distribute the same to course participants at its sole discretion.

## Venues

### **Auckland:**

The Conference Centre  
AUT Technology Park  
585 Great South Road  
Penrose

Location map: [www.aut.ac.nz/resources/conference\\_centre/map\\_conference.pdf](http://www.aut.ac.nz/resources/conference_centre/map_conference.pdf)

Nearby hotels include the Novotel and Ibis Hotels at Ellerslie.

### **Wellington:**

Terrace Conference Centre  
St John House  
114 The Terrace

Location map: [www.terraceconference.co.nz/location.php](http://www.terraceconference.co.nz/location.php)

Nearby hotels include the James Cook and Novotel on The Terrace.

## What to Bring on the Day

You should bring a calculator and a pen with you so that you can complete the exercises.

## Registration and Confirmation

Register on line at our web site [www.energylink.co.nz](http://www.energylink.co.nz) or complete the Participant Information on the attached registration form and return to us by email or by fax. **Please include one or more email addresses where we can contact you to confirm dates closer to the time.** We will confirm your registration by return **email** and will confirm the courses by email prior to course date. If you do not provide us with an email address then we can not guarantee to contact you.

## Options

Energy Link's courses are also available in-house and for markets other than the New Zealand electricity market. We also deliver courses customised for particular audiences or companies.

For more information contact Greg Sise, telephone 03 477 3572 or email [greg.sise@energylink.co.nz](mailto:greg.sise@energylink.co.nz).

## Programs

Course outlines are attached.

Reply To: **Energy Link Ltd**  
Ph: 03-479 2475

[Trish.Joseph@energylink.co.nz](mailto:Trish.Joseph@energylink.co.nz)  
Fax: 03-477 8424

## Energy Industry Courses

**To Register:** Either print this sheet, complete the details and fax back to us, or email us the details. It is important that you give us the full names of all people registering and an email address we can use to confirm your enrolment(s).

### Participant Information:

	1	2	3	4
Name(s):				
Position:				
Company:				
Postal Address:				
City:				
Phone:				
Email:				
Indicate days attending below by filling in the boxes with the appropriate course dates				
<b>EL0</b> Auckland				
<b>EL0</b> Wellington				
<b>GM0</b> Auckland				
<b>GM0</b> Wellington				
<b>ELNP1</b> Auckland				
<b>ELNP1</b> Wellington				
<b>ELRisk</b> Wellington				
<b>ELRisk</b> Auckland				

Order no: (Optional) \_\_\_\_\_

Any special dietary requirements: \_\_\_\_\_

Please tick this box if you do not wish to receive Energy Link Ltd training and other services information.

# Introduction to the Electricity Market

Code: EL0

Objective: To provide an understanding of the essential elements of the NZ Electricity Supply system and the wholesale electricity market.

Prerequisites: None

## 1. Introduction

- Overview
- Electricity power flows and concepts
- Energy conversions and units

## 2. Industry Structure

- Generation, retail, transmission, distribution, consumers
- Historical perspective on industry structure
- Governing legislation and regulations, the role of government

## 3. Supply

- Types of generator and basic characteristics, fuels and renewable sources, generation by fuel type
- Fuel use and efficiency of thermal generators
- Heat rate and efficiency
- Conversion from fuel to energy, efficiency curves, cost structures, GT, CCGT, steam turbines

## 4. Transmission: The Grid

- AC lines and three phase transmission
- The HVDC link
- Losses and line limits

## 5. Demand

- Total demand for electricity in New Zealand
- Demand growth - history and projections
- Demand profiles - shape and what creates the shape

## 6. The wholesale spot market

- Role of the System operator
- Offers & Bids
- Market models
- Reserves
- Settlements

## 7. Electricity Markets and their Prices

- Understanding historical price patterns and their origin

## 8. The Retail market

- Pricing and reconciliation

## 9. The Hedge market

- Understanding Hedge contracts

NB: Course material may vary from the above on the day

# Introduction to the Gas Market

Code: GM0

Objective: To provide an understanding of the resources, infrastructure and systems used in supplying natural gas in New Zealand, and the wholesale gas market.

Prerequisites: None

## 1. Background

- Properties of natural gas
- Gas units – volume and energy
- Gas consumers and consumption categories
- Brief history

## 2. Industry Structure

- Government policy statement
- Gas Industry Company & relevant regulations

## 3. Gas demand

- Key users
- Demand drivers
- Alternative fuels

## 4. Gas supply

- New Zealand petroleum basins
- Basin prospectivity
- Exploration history and current environment
- Gas potential
- Gas reserves history and current status

## 5. Transmission

- Transmission piped network
- Line pack, imbalances, metering
- Distribution networks
- Production stations
- LPG and CNG

## 6. Distribution

- Delivery systems
- Market participants

## 7. Retailing

- Invoicing details
- Reconciliation

## 8. Market arrangements

- Maui players
- Upstream and downstream players
- Contracts & prices
- Pipeline open access & trading protocols
- Gas trading & settlement
- Market information
- Metering and reconciliation

## 9. Long term dynamics of supply and demand

NB: Course material may vary from the above on the day

# Nodal Pricing of Electricity

Code: ELNP1

Objective: To provide a working knowledge of nodal dispatch and pricing as it applies to the New Zealand electricity spot market, including simple formulae to apply and the ability to recognise the cause of certain nodal pricing effects.

Prerequisites: EL0. Alternatively, some familiarity with the electricity spot market including an overview knowledge of the SPD and RMT models, and with the processes and timing of publication of final, and other prices.

## 1. Market Processes and Models for Dispatch and Pricing

- Dispatch and pricing processes
- Marginal pricing
- Dispatch and pricing models – SPD and RMT
- Dispatch cost function
- Constraints in dispatch and pricing models
- Shadow prices
- Nodal energy prices and reserve prices defined
- Losses and constraints surplus

## 2. One Node ‘Markets’

- Dispatch and pricing of energy
- Reserves risk offsets
- Dispatch and pricing of reserve
- Dispatch and pricing effects for energy-reserve constrained dispatch
- Dispatch and pricing dominated by reserves

## 3. Adding Lines and Losses

- Pricing effects of losses in AC and DC lines
- Linear versus quadratic losses
- Contribution of losses to the losses and constraints surplus
- Loss modelling in SPD

## 4. Congested Networks

- Line limits
- Pricing effects of simple line constraints
- Contribution of constrained lines to the losses and constraints surplus
- “Spring washer effect” due to line constraints in loops in the Grid

Note: Only simple arithmetic is used in this course. Simple examples using a few nodes at most are used to assist learning. Course material may also vary from the above on the day.

# Hedging Electricity

## *An Introduction to Risk Management in the Electricity Market*

Code: ELRisk

Objective: To provide a practical introduction to the hedge market (which includes the market for all larger consumers whether or not they have hedge or fixed-price variable volume contracts), and to techniques and methods for hedging price risk in electricity markets, with an emphasis on developing skills in working with and applying common forms of hedge contract.

Prerequisites: EL0, with ELNP1 also being useful background. Alternatively, familiarity with key elements of the electricity supply system including the Grid, metering and various types of generation. Some familiarity with the behaviour of prices from the spot market is also useful.

### **1. Introduction**

- Common supply arrangements – ‘contracts for differences’, ‘fixed price variable volume’
- Physical and financial contracts
- Volatility in the electricity spot market
- Sources of risk, correlations between risks
- Attitudes to risk, risk premiums

### **2. Hedging Electricity**

- Forward curve
- Contracts for differences
- Hedge structure and cash flow
- Swaps, options and swaptions
- Indexed hedges
- Location factor risk
- The spot market’s ‘losses and constraints surplus’

### **3. Hedging Strategy**

- Adjusting hedge strategy for location factor risk
- Location factor algebra
- Optimum generation with hedges in place
- Timing of hedge transactions
- Building a “hedge book”

### **4. The Hedge Market**

- The hedge market in New Zealand
- Hedge market liquidity
- The role of the forward curve
- The role of price forecasts
- Hedge pricing and risk premiums

### **5. Buying and Selling Hedges**

- How supply and hedging arrangements are structured
- The ISDA agreement
- Front, middle and back offices
- Fair value and hedge accounting

NB: Course material may vary from the above on the day.