

# ADVANCED STEAM AND COGENERATION

## COURSE OVERVIEW

Refineries and Petrochemical plants typically have complex steam systems. Minimising the energy cost of such systems requires a broad perspective that considers the conversions between different forms of energy including fuel, steam and power. In a real plant environment the energy saving objectives must be achieved whilst considering hardware limitations, external contracts, reliability and human behaviour.

## COURSE OBJECTIVES

- An ability to understand and calculate robust economics for complex systems
- Understanding of the most appropriate steam system configuration for your individual context
- Deeper understanding of key equipment (gas turbines, steam turbines, condensate systems)
- Tools and skills to help improve the performance of all staff on site to achieve better energy efficiency

**PDUs AWARDED  
BY PROFESSIONAL  
ENGINEERS BOARD,  
SINGAPORE.**

**APPLICABLE FOR  
PRODUCTIVITY AND  
INNOVATION CREDIT (PIC)  
VISIT [IRAS.GOV.SG](http://IRAS.GOV.SG) FOR  
MORE INFORMATION.**

23 FEBRUARY 2016

9:00AM - 5:00PM

SEAS Training Centre  
9 Penang Road, #08-02 Park Mall, Singapore 238459



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## PROGRAMME OUTLINE

### Session 1: Economics

- Value of energy - efficiency improvements
- Energy Economics
- Steam / Fuel / Power and PEE
- Marginal steam pricing mechanisms

Case Studies and Working Sessions

### Session 2: Cogeneration

- Steam and Power generation - fundamentals
- Thermodynamic cycles and relative efficiencies
- Steam Turbines, Gas Turbines, HRSGs
- Condensate systems

Case Studies and Working Sessions

### Session 3: Optimisation

- R-curve analysis for optimal cogeneration
- Overall cycle efficiencies
- Improvement opportunities
- Steam system management

Case Studies and Working Sessions

## ABOUT THE TRAINER

**Andrew Morrison** has spent seven years with KBC, and is currently a Senior Consultant within the Energy Services team. He has been involved in many energy related projects including pinch analysis studies, process simulations and utility system modelling.

Andrew has worked on energy improvement and design projects for oil refineries and petrochemical facilities throughout Europe, Russia and Asia. He has presented lectures and delivered energy training to a wide range of audiences, and was previously based at the KBC Walton-on-Thames office in the United Kingdom.

Prior to joining KBC, Andrew spent four years in his home country of New Zealand working on projects throughout the dairy, pulp and paper and chemical industries.

Andrew holds a BE(Honours, 1st Class) in Materials and Process Engineering from the University of Waikato, New Zealand. He has also published a number of journal papers and carried out postgraduate study in energy efficiency

## RATES

EARLY BIRD (before 8 January)	NORMAL FEE	GROUP FEE
S\$350.00 (SEAS Member)	S\$450.00 (SEAS Member)	S\$380.00 (4+ delegates from 1 organization)
S\$450.00 (Non Member)	S\$500.00 (Non Member)	

\* **Important:** Walk-in delegates will only be admitted on the basis of space availability and with full payment made on site.

\* **Fees inclusive of GST**

\* **Payment to SEAS & Address:** Please send a crossed cheque to:

Sustainable Energy Association of Singapore, 9 Penang Road, #08-02 Park Mall, Singapore 238459

# CALL US AT 6337 9886 TO ENQUIRE

## REGISTRATION FORM Yes! I would like to register for this programme I am unable to attend but please put me on your mailing list

PARTICIPANT'S DETAILS		Number of Delegates	Fees Payable
1	Name (Dr/Mr/Mrs/Ms)		Designation
	HP No	Email	PEB <input type="text"/>
2	Name (Dr/Mr/Mrs/Ms)		Designation
	HP No	Email	PEB <input type="text"/>
<b>ORGANIZATION'S DETAILS</b>			
Company Name			
Company Address			
Contact Name			Tel
Email			Fax