



# LABORATORY VENTILATION SAVINGS ANALYSIS

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APPLICABLE FOR PIC CLAIM

## COURSE OVERVIEW

Engineering professionals who intend to building their careers as energy amangers need to understand critical environment requirement , energy savings technology and usage of software to perform analysis. The main aims of this module are to provide an understanding of demand ventilation control analysis, fumehood requirement and VAV system, new/retrofit project HVAC equipment estimation and cost analysis on various energy savings solutions.

## COURSE OBJECTIVES

On successful completion of this module, the participants will be able to:

- Understand the design criteria for laboratory which affect cost
- Understand of demand ventilation control
- Set up (or develop) energy policy, energy planning, procedure for evaluating performance of energy systems and energy performance review, documentation and communication processes
- Integrate energy management system into business practice
- Understand critical environment safety before implementation of energy saving management and technology
- Evaluate financial attractiveness of energy retrofit projects
- Understand the various energy savings performance models

## PRE-REQUISITES

Candidate must have a relevant degree in engineering or science and preferably have attended the workshop: Demand Ventilation Controls in Laboratory.

Candidtaes are assumed to:

- be able to interpret process diagrams
- have computer literacy
- HVAC basic knowledge

26 JULY 2016

9:00AM - 5:00PM

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



# LABORATORY VENTILATION SAVINGS ANALYSIS

## PROGRAMME OUTLINE

### Session 1: Demand Ventilation Controls Recap (2 hours)

- Introduction to lab design
- Importance and impact of lab ventilation on first costs and energy usage
- Typical lab energy costs and metrics
- A holistic summary of the technologies and strategies used in low energy lab design
- Overview of Variable Air Volume (VAV) lab air flow controls as an enabling technology
- Temperature and minimum dilution ventilation control
- Overview of the three lab airflow drivers and how they can be reduced
- Reducing the fume hood exhaust air flow rates
- Reducing the cooling load requirements for lab airflow
- Reducing the dilution ventilation requirements
- Demand Based Control
- Detailed discussion of Demand Based Control: First cost savings
- Case study examples of energy and first cost savings
- Variable exit velocity exhaust fan control approaches
- Wind responsive approach
- Demand based control approach
- Sample example of energy savings

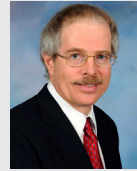
- Hydronic cooling approaches
- Basic concepts and benefits of hydronic cooling in labs
- Various hydronic cooling approaches for labs
- Low pressure drop design for labs
- Basic concepts
- Duct and coil design considerations
- Static pressure reset strategies
- Airflow control synergies and impacts
- Relevant US standards and guidelines

### Session 2: Laboratory Ventilation Savings Analysis (4.5 hours)

- Energy and first cost analysis of the various energy savings approaches
- Description of a detailed lab energy and capital using a sample lab example
- Comparison of savings and first costs using a sample lab example
- Various laboratory ventilation scenario exercise
- Cashflow savings analysis
- Emission savings
- Energy savings
- Heat recovery savings analysis
- First cost savings
- Solar energy savings
- 5 and 10 years cycle cost analysis
- Summary and review of major conclusions

### Session 3: Open Book Quiz (1.5 hours)

## ABOUT THE TRAINER



**Mr. Gordon Sharp** is the Chairman of Aircuity and has over 25 years of experience and over 25 patents in energy efficiency, indoor environmental quality and laboratory controls.

As the founder and former CEO of Phoenix Controls, he led his world leader in laboratory airflow controls that was acquired by Honeywell in 1998. In 2000, Gordon founded Aircuity out of Honeywell and is a smart airside energy efficiency company.

Gordon is an MIT graduate, an ASHRAE Distinguished Lecturer, and the Executive Vice president and a member of the Board of Directors of I<sup>2</sup>SL, the International Institute of Sustainable Laboratories. He is also a member of ASHRAE Standard 170 on Healthcare Ventilation and the ANSI/AIHA/ASSE Standard 29.5 on Laboratory Ventilation.

## RATES

EARLY BIRD (before 31 May)	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)	

\* Fees inclusive of GST

\* SEAS reserves the right to make changes to the trainer, programme, venue, cancel or reschedule the programme if necessary or warranted by circumstances beyond our control

\* Payment to be made by the early bird closing date to enjoy early bird rate

\* 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)		NRIC No
	HP No		
2	Name (Dr/Mr/Mrs/Ms)		NRIC No
	HP No		

## ORGANIZATION'S DETAILS

Company Name	
Company Address	
Contact Name	Tel
Email	Fax