



LABORATORY VENTILATION SAVINGS ANALYSIS

SCEM-PDUs & PE-PDUs TO BE AWARDED . APPLICABLE FOR PRODUCTIVITY AND INNOVATION CREDIT (PIC)

Date : 18 November 2016

Time : 9:00am – 5:00pm

Venue City Serviced Offices Pte Ltd
No. 9 Raffles Place
Republic Plaza II, Level 18
Trademark Meeting Room
Singapore 048616

COURSE OVERVIEW

Engineering professionals who intend to build their careers as energy managers 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 cost 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 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 SEAS programme: Demand Ventilation Controls in Laboratory.

Candidates are assumed to:

- Be able to interpret process diagrams
- Have computer literacy
- HVAC basic knowledge

Programme Outline

Session 1

- 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 cooling load requirements for lab airflow; Reducing 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
- Duct and coil design considerations
- Static pressure reset strategies; airflow control synergies & impacts
- Relevant US standards & guidelines

Session 2: Laboratory Ventilation Savings Analysis

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

Session 3: Open Book Quiz

Organized by:



About SEAS

The Sustainable Energy Association of Singapore (SEAS), an industry association launched in 2006, today has 160 members in the area of Energy Efficiency, Solar, Wind, Biomass, Carbon and Clean Energy Financing. SEAS aims to be the voice of sustainable energy industry and promote the business of its member companies.

SEAS also specialises in training, courses and conferences focussed on sustainable energy. SEAS aims to be the one-stop information and training provider in the area of sustainable energy. Our trainers and lecturers are not only highly qualified academic professionals but also industry specialists and professionals that are successful and sought after practitioners in the area of Sustainable Energy. The majority of Key Qualified Personnel (KQP) and Accredited Energy Services Companies are members of SEAS. They have, as a group successfully executed a multitude of energy projects with varying complexities both locally and regionally.

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 I²SL, the International Institute of Sustainable Laboratories. He is also a member of ASHRAE Standard 170 on Healthcare Ventilation and the ANSI/AIHA/ASSE Standard Z9.5 on Laboratory Ventilation.

Laboratory analysis



Registration Form – Laboratory Ventilation Savings Analysis 18 Nov'16

Administrative Information

Yes! I would like to register for this programme.

Registration and Payment

Please indicate if you are our SEAS Member	Early Bird (Registration with payment made on/before 17 Oct 2016)	Normal Fee	Group Fee (4 or more delegates)
<input type="checkbox"/> SEAS Member	S\$350.00	S\$450.00	-
<input type="checkbox"/> Non Member	S\$450.00	S\$500.00	S\$380.00

Please complete the enclosed registration form and forward it together with your cheque at least 7 days before the commencement of the programme to

**Sustainable Energy
Association of Singapore**
No. 1 Cleantech Loop #02-06
Cleantech One, Singapore 637141
(Att: Training Department)

Crossed cheque made payable to
**Sustainable Energy
Association of Singapore**

- ❖ Fees are inclusive of GST.
- ❖ Fees include refreshments, lunch and programme collateral.
- ❖ Enjoy group discount **for 4 or more delegates** registered at the same time from the same organization and same billing source.
- ❖ Only one type of discount scheme is applicable at any one time.
- ❖ Important: Walk-in delegates will only be admitted on the basis of space availability and with full payment made on site.

Participant's Details

Cancellation

- Name (*Dr/Mr/Mrs/Ms): _____ NRIC: _____
Designation: _____ HP No: _____
Email: _____ SCEM No: _____ PE No: _____
- Name (*Dr/Mr/Mrs/Ms): _____ NRIC: _____
Designation: _____ HP No: _____
Email: _____ SCEM No: _____ PE No: _____
- Name (*Dr/Mr/Mrs/Ms): _____ NRIC: _____
Designation: _____ HP No: _____
Email: _____ SCEM No: _____ PE No: _____
- Name (*Dr/Mr/Mrs/Ms): _____ NRIC: _____
Designation: _____ HP No: _____
Email: _____ SCEM No: _____ PE No: _____

SEAS reserves the right to change programme venue, cancel or reschedule the programme if necessary or warranted by circumstances beyond our control.

There will be no refund of fees for withdrawal. However, if the registration participant is unable to attend, a representative may be allowed to attend at no extra cost. Please inform us of the changes by fax or via email 7 days before the commencement of the programme.

Organization's Details (For Billing, pls tick Company or Personal)

Confirmation of Registration

Company Name Personal: _____
Billing Address: _____
Postal: _____
Contact Person's Name (*Dr/Mr/Mrs/Ms): _____
Tel: _____ Fax: _____
Email: _____

Confirmation of registration will be given 5 working days before the commencement date via email. Registration is confirmed only upon receipt of payment.

If you do not hear from us

Please contact Ms. Agnes Seah at:
Tel: +65-63388578

Email: training@seas.org.sg