



ASHRAE Distinguished Lecturer Talk

Seminar on "21st Century Tall Building Design"

&

"Net Zero Building vs. Net Zero District"

10th Oct 2019 2 pm - 4:40 pm

Duration of the talk: Two Hours, followed by participants' interactions with speaker.



Luke Leung, P.E.

Director

Skidmore, Owings & Merrill

Chicago, IL 60604

United States

•Luke is a LEED (Leadership in Energy and Environmental Design) Fellow; He is also a Centennial Fellow from The Pennsylvania State University Architectural Engineering Department; Board of Directors for USGBC (United State Green Building Council), Illinois; Chairman of the ASHRAE (American Society of Heating, Refrigeration and Air Conditioning) Committee on "Tall Buildings"; Chairman of the Building Pressure Committee, Chicago Committee on High Rise Buildings; Sustainable Committee with Council on Tall Buildings and Urban Habitat; Part Time Professor at IIT; Member of the Chicago Sister Cities Program with China; MBA from University of Chicago, MS and BAE from Architectural Engineering at Penn State University.

•Luke Leung is a Director of the Sustainability Engineering Studio for Skidmore, Owings and Merrill LLP. His work includes Burj Khalifa, the world's current tallest man-made structure; Multiple times "Excellence in Engineering" award from the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE); 2 awards from National Institute of Building Sciences, among others. Selected projects also include Pertamina Tower (Net Zero Supertall), General Motors Global Headquarters, Roche Diagnostic in Indianapolis, Beijing Finance Street, Embassy of Ottawa in Canada, Embassy in Beijing, Lakeside – 55 million sqft low energy development, a LEED Platinum building with the first large scale horizontal wind turbine in the city of Chicago; etc., and has served as a member of the editorial team for the CTBUH guide *Natural Ventilation in High-Rise Office Buildings*, ASHRAE "*Design Guide for Tall, Supertall, Megatall Building Systems*", among other publications.

- **“21st Century Tall Building Design”**

The locations of cities, environmental changes, ever-increasing heights of tall buildings, and focus on high-performance design will create challenges for tall building design in the 21st century. This dialogue will discuss microclimates of tall buildings. In particular, it will focus upon the impact 21st century climate and changing air contaminants have on tall buildings. Tall buildings should be designed to be resilient; researching and exploring related microclimate topics can inform our design. Topics include: the integration of tall buildings within the city to achieve optimal energy performances; the latest stack effect data, monitoring, and control; elevator door opening sequences and their impact on elevator shaft pressure; the integration of natural ventilation in tall buildings; how energy consumption changes with height; and cloud computing and advanced modeling techniques on tall building design.

- **Net Zero Building vs. Net Zero District**

Over the last decade, the architectural and engineering design community has made great strides in improving the energy efficiency of buildings. This has been inspired by standards and guidelines developed by ASHRAE, USGBC, various government agencies and a public awareness translating to market demand. The next phase in the energy efficient design will challenge the community to produce Net Zero Buildings (NZB). To achieve the target net zero for the next generation, the answer may partially rest in the larger infrastructure in the city from the central heating and cooling plant, co-generation, clean energy from the grid and looking at waste or renewable sources as a "resource" to generate power, similar to nature that has no waste and is integrated as a whole.

There are many advantages that can be offered by a NZD such as more land is generally available for the alternative energy plants due to the limited site area of individual buildings. A district plant, electric, cooling, and/or heating will also see significant load diversity due to serving multi use buildings. The plant can also use larger more efficient generating equipment and would likely have unblocked access to the resources of wind and sun. Strategic locations of the generating plant can take advantage of increased efficiency measures such as lake or sea water cooling. Another main advantage of the NZD is that the responsibility is shared by the building owners, the utility companies and the local and federal government. We propose a design process to achieve NZB/NZD that begins with optimizing the architectural systems to reduce the energy requirements of buildings and then apply practical alternative energy strategies at the building level. At the district level, apply large scale alternative energy strategies such as thermal solar, photovoltaic and wind turbines for power generation. Next, apply non fossil fuel co-generation technologies for remaining peak and annual energy requirements.

Registration Form – Seminar on “21st Century Tall Building Design” & “Net Zero Building vs. Net Zero District”

Date: 10 Oct 2019 (Thursday)
Time: 2.00pm – 4.30pm
(Registration and lunch starts 1.00pm)

Fee for early registration by 2 Oct 2019:
Free for ASC student member (Maximum 10 pax)
S\$30 for ASHRAE Singapore Chapter (ASC) members
S\$60 for ASHRAE/IFMA/IES members
S\$80 per participant (non-members)
Fee for late registration after 2 Oct 2019:
S\$30 for ASC members
S\$80 for ASHRAE/IFMA/IES members
S\$100 for non-members
(Buffet Lunch will be provided)

Venue:
Singapore Polytechnic Graduates' Guild (SPGG)
Ballroom, Level 3, 1010 Dover Road
Singapore 139658
(Singapore Poly gate No.4)

Register by email to elta.ascsecretariat@gmail.com by **2 Oct 2019**, with the required Registration Details below. Please make the payment by issuing a cheque to **ASHRAE Singapore Chapter, c/o 159 Sin Ming Road, AMTECH Building, Lobby 2 #07-02, Singapore 575625**. Alternatively, you can pay by cash on 10 Oct 2019 at the registration counter.

Professional Engineers Board (PDU) points: Pending

For enquires on program and registration matters please contact:
Dr. Yang Junjing [Email: junjing.yang@googlemail.com], ASC

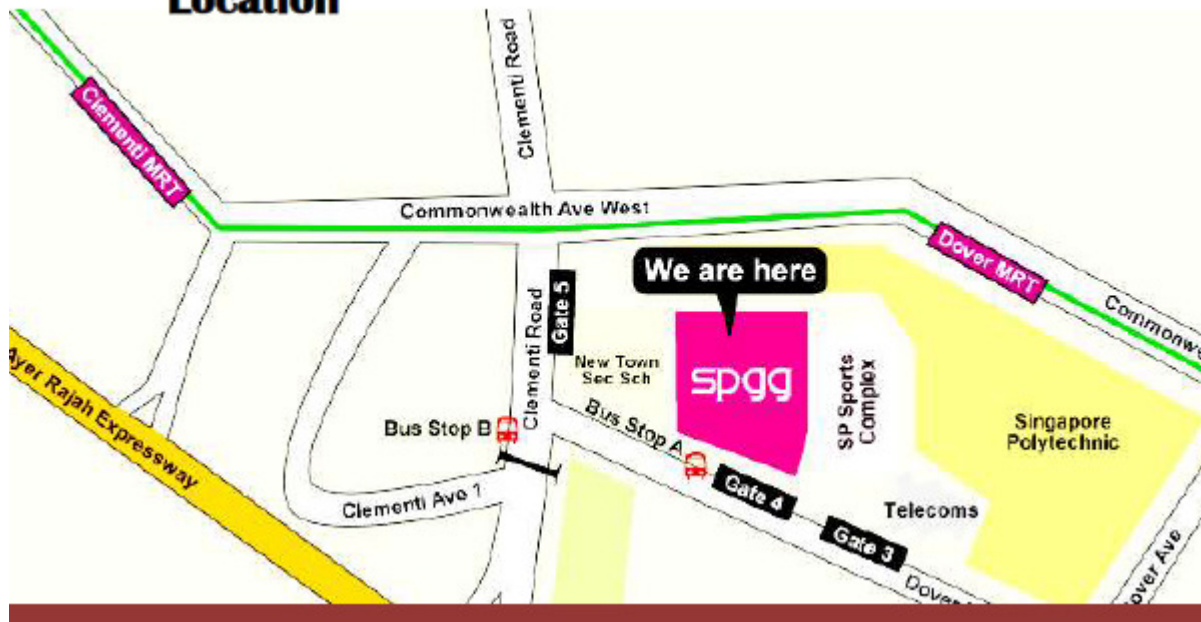
Registration Details

Name of Participant	ASHRAE Membership No.:	ASC Reg No.:	PE Reg No.:
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Organization:	<input type="text"/>	Designation:	<input type="text"/>
Mailing Address:	<input type="text"/>		
	<input type="text"/>	Postal Code	<input type="text"/>
Telephone / Mobile No.:	<input type="text"/>	Fax no.:	<input type="text"/>
Email:	<input type="text"/>		

Signature

Date

Location



- Located at 1010 Dover Road (SP Gate 4)
- 10 mins walk from Dover MRT
- Bus Services to SPGG:
 - Bus Stop A: SBS 33 & SBS 196
 - Bus Stop B: SBS 96, 151, 183