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# Stephen Lau: Design prompts behaviour change and paves way for a zero carbon world



*Professor Stephen Lau, Design Research Director from LWK + PARTNERS and Honorary Professor of The University of Hong Kong*

Professor Stephen Lau, former Associate Dean of the National University of Singapore's Department of Architecture and current Design Research Director at LWK + PARTNERS, has over 30 years of architectural practice and teaching experience. His research areas include architectural acoustics, lighting, sustainable design and green building assessment. In his interview with Archcy, Professor Lau shed light on post-occupancy evaluation and highlighted the zero energy trend in the future of green building. He also shared how green building success in Singapore may provide valuable reference for China.

**1. China aims to complete the renewal of approximately 220,000 old districts within the period of its 14<sup>th</sup> National Five-Year Plan. What do you think about urban regeneration and renewal of old districts?**

Lau: How to maximise and make good use of the connections between various functional spaces in the process of urban regeneration, to meet the growing needs of living and culture, is a crucial challenge to all planners. When renewing and upgrading the old residential districts, planners should consider thoroughly when choosing between 'new' and 'old', to retain the existing 'soul' of the buildings while

meeting modern communities' living and needs. One of the concerning points is that how to help indigenous residents adapt to new ways of life, new technologies and the Internet of Things (IoT). Therefore, 'human-oriented' urban renewal is encouraged to avoid buildings emptied by outward migration.



*Mengzhuowan Urban Regeneration's masterplan, Chengdu, China aims to reconnect the community and riverside.*



*Revitalisation of Woo Cheong Pawn Shop, Hong Kong, China transforms the place and its surrounding streets into a vibrant city hub.*

## **2. What does 'sustainable building' mean to you? How does architectural design facilitate ecological cities?**

Lau: Economy, society and environment are the three cores of sustainable development. Economic and social development took precedence over environmental conservation in the past. Now, along with rising awareness to the environment, people have come to understand the interplay between economy, society and environment. Environmental conservation is increasingly crucial in the agenda of achieving sustainable development. Energy-saving and carbon reduction in the construction industry

is the key to accomplishing the goals of peak carbon emissions and carbon neutrality in China. Technological innovation is fundamental while architectural design determines energy usage. These are therefore the gene for carbon reduction, and the basic method of achieving ecological cities. LWK + PARTNERS envisions to influence people's behaviour through design and create new culture in the modern era, so designing sustainable buildings is our current key task.



*Staircases form an inviting landscaped setting with scenic harbour views to encourage usage at Tsuen Wan Sports Centre, Hong Kong, China.*

### **3. Aiming at China's goals of peak carbon emissions and carbon neutrality, you proposed a technical approach of 'human-oriented post-occupancy evaluation'. Can you explain more?**

Lau: In 2019, China authorities launched the Technical Standard for Nearly Zero Energy Building, which sets out the technical approach of 'Passive first, active enhancement, maximise renewable energy use'. Building on this, we advocate the use of a human-oriented post-occupancy evaluation that canvassed real users' feedback on their subjective perceptions of using the building. These post-occupancy evaluations aim to assess the building's ability to deliver an ergonomic experience. These time-relevant data give operators a better idea of how to fine-tune their operations to provide the best comfort for users while boosting energy-saving performance, carbon reduction and cost-effectiveness. Architects can also use the data to inform future designs.

### **4. Under the premise of carbon neutrality, how do designers in the building construction industry adapt to the current trend?**

Lau: In the context of carbon neutrality, there are new responsibilities for designers in building construction industry. Architecture is key to realising a net zero future, and zero energy buildings are certainly part of it. Not only are these green structures good for the environment, but they also foster a smarter, healthier landscape beneficial for people's health and wellbeing. With the use of artificial intelligence technologies, LWK + PARTNERS sets to build a fully responsive environment that helps people adapt to climate change and evolving human needs.





*Green Shore Residence Phase II in Guangzhou, China adapts to the Lingnan regional climate with semi-open spaces filled with natural air and light.*

## **5. What kinds of innovative green building materials and technologies emerged in recent years as far as you know?**

Lau: The goal of carbon neutrality has encouraged the development and adoption of green construction, low carbon technologies and green building materials. For instance, the use of innovative timber can bring the relationship closer between humans and nature under a low carbon basis. The progress of building energy conservation and emission reduction largely depends on the advancement of green building materials. Holistic energy conservation and emission reduction can be achieved through different channels include walls, doors, windows and roofs, as we move towards a green economy.



*The landscape design of Tianheng Bayview in Zhuhai, China adopts sustainable materials and a sponge city design with lawns capturing runoffs, porous pavement and rain gardens, playing a transitional role between the urban and natural environments.*

**6. As an experienced architectural practitioner across mainland China, Hong Kong and Singapore, what are the differences you can see when designing in various places?**

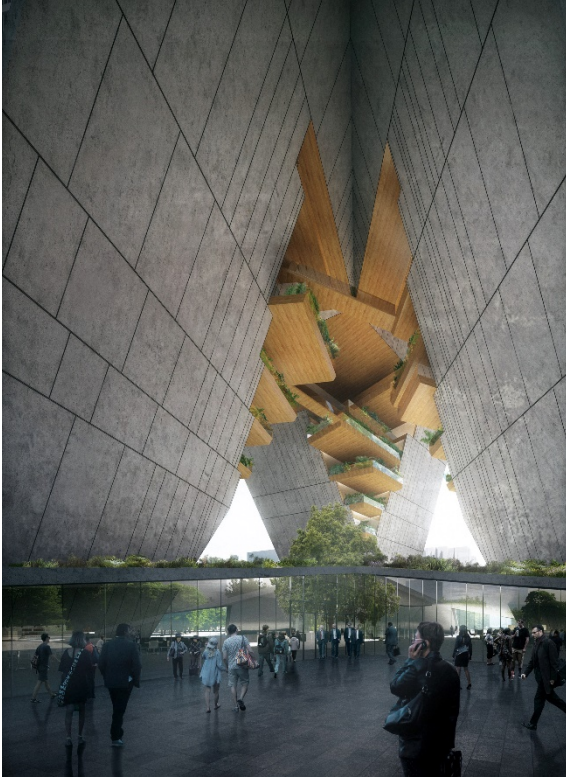
Lau: In architectural practice, there are different design requirements and needs in various places. It is vital to combine design considerations about sustainability, strategies, passive design and climate. More importantly, architectural buildings should connect with the natural environment as they are indivisible. Designing to the context that adapts to the surroundings is fundamental for achieving sustainable architecture which truly belongs to their own place.



*Asian cities can learn from Singapore's emphasis of Modular Integrated Construction (MiC) / Prefabricated Prefinished Volumetric Construction (PPVC) in housing policy.*

**7. What can China take from Singapore's experience in green building standards and garden city design?**

Lau: Singapore's making of green buildings, gardens, applications of ecological design in the external environment and interior spaces in shaping and reshaping green buildings, green gardens, and even green cities can provide inspiration for Chinese cities. Take the buildings in southern Chinese cities as an example, heat energy reception, daylighting and ventilation can be intervened by the building form and orientation. The United Nations Environment Programme stated that cooling energy demand is the fastest growing among the end uses of buildings. Most of the conventional rectangular buildings consist of a series of separated sealed spaces, blocking the natural wind from entering the buildings and the internal airflow. By contrast, if the building volume is divided into multiple stacked horizontal planes, cross-ventilation can be generated, while each plane can provide partial shading for the lower floors. LWK + PARTNERS' design team consider many conditions for adapting to various areas in China, such as the terrain and climate, local culture and lifestyle, to design spaces with good natural ventilation and daylighting. Environmental-friendly green landscape design can also encourage low energy usage and low carbon living, to enhance users' wellness, living convenience and comfort.



*In a competition proposal for an office building by LWK + PARTNERS, the architecture provides layers of experiential, landscaped spaces around the airy atrium.*