

China Europe International Business School

Academic Center IV Building



About CEIBS

The China Europe International Business School (CEIBS), a joint-venture for management education, was co-founded by the Chinese government and the European Union (EU) in 1994, with Shanghai Jiao Tong University and the EFMD serving as its executive partners. CEIBS offers China's largest full-time English-taught MBA program, the world's largest EMBA program, stand-alone Global EMBA, as well as a part-time Finance MBA program, a range of Executive Education programs and an intensive Ph.D. program.

Academic Center IV, the main teaching venue, is a three-story, 5,500 m² building containing lecture theaters, lecture halls, discussion rooms and administrative offices (See Figure 1). The first-floor lecture theater accommodates 80 students, has an area of 190 m² and an average height of 3.7 m.

The Challenge

Large amounts of outside air were being brought in to reduce carbon dioxide (CO₂) levels with the dangerous side effect of dramatically increasing indoor levels of PM_{2.5}. The facilities management team wanted to maintain safe levels of CO₂ and volatile organic compounds (VOC) without drawing so much polluted outside air.



Figure 1: Academic Center IV and lecture theater



Customer: CEIBS – China Europe International Business School

Climate Zone: 3A

Deployed: September, 2016

Location: Pudong New District, Shanghai, China

Industry: Education

Enrollment: 10,000 students

Challenges: Reduce PM_{2.5} and maintain CO₂ concentrations at state-of-the-art executive education center

Solution: One enVerid HLR[®] installed in 190 m² lecture theater to scrub air of contaminants and reduce the amount of outside air ventilation required

Results:

- 80% reduction in outside air
- Improved air quality:
 - › PM_{2.5}: 31 µg/m³
 - › CO₂: below 1,000 ppm
 - › Formaldehyde: 16 µg/m³
 - › TVOCs: 220 µg/m³
- Extended particulate filter life

Solution

It is generally accepted that high levels of air pollution and CO₂ impacts cognitive functions and student performance^{1,2}. CEIBS expressed the desire to improve indoor air quality (IAQ) and turned to enVerid Systems for help.

The enVerid project team assessed the HVAC mechanical environment, provided a detailed installation plan, and selected and supervised electrical and mechanical subcontractors with the customer’s approval. Installation of one enVerid HVAC Load Reduction (HLR) module was completed during summer vacation without disrupting HVAC operations.

80% Reduction in Outside Air and Improved IAQ

IAQ monitoring was performed per the US Environmental Protection Agency (EPA) standards. Samples were analyzed and certified by a highly-respected US-based lab (PRISM Analytical Technologies).

The HLR solution maintains healthy indoor air at full occupancy (see figures 2, 3 and 4).

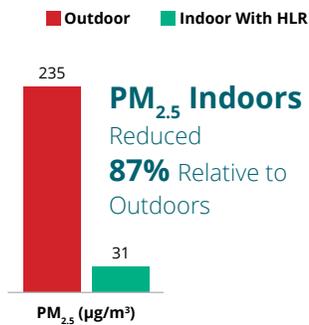


Figure 2: PM_{2.5} reduced to healthy level

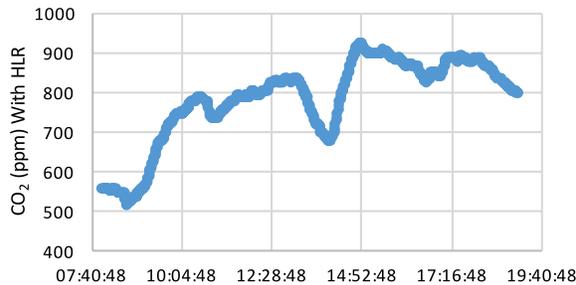


Figure 3: Occupancy varies during the day. CO₂ rises when students are in class and drops during breaks. Value below 1,000 ppm is allowable (ASHRAE).

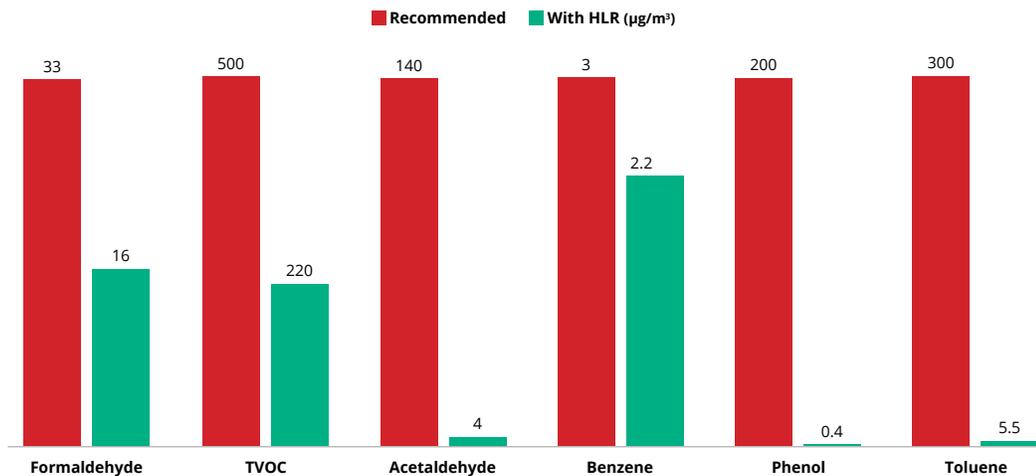


Figure 4: The HLR module maintained safe levels for hazardous chemicals. Recommended levels based on USGBC LEED guidelines.

¹ Chang, Zivin, Gross and Neidell, National Bureau of Economic Research, 2016

² Allen et al., Harvard School of Public Health, 2015



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enVerid Systems, Inc. is committed to improving energy efficiency and indoor air quality in buildings worldwide through its innovative HVAC Load Reduction® (HLR®) solutions. Awarded the prestigious 2016 R&D 100 Award, enVerid is the only solution that helps commercial, education and government buildings remove carbon dioxide (CO₂), aldehydes, volatile organic compounds (VOCs) and particulate matter (PM_{2.5}) from indoor air, reducing the outside air intake required for ventilation. enVerid’s HLR technology is ASHRAE-compliant and has been recognized by the U.S. Department of Energy, the U.S. General Services Administration’s Green Proving Ground Program, and the U.S. Green Building Council. For more information, please visit www.enverid.com.

