A comparison of Manhattan, New York City, USA, and Shanghai, China, in terms of LEED and lifecycle assessment

Presenter: Dr. Svetlana Pushkar

Presenter Biographies and Experience:

Svetlana Pushkar. Ph.D. 2001-2007, Technion - Israel Institute of Technology, Civil and Environmental Engineering. 2013 - current, Department of Civil Engineering, Faculty of Engineering, Ariel University, Senior Lecturer (tenured). Research interest: Leadership in Energy and Environmental Design (LEED); Life cycle assessment (LCA); building materials and components. Ph.D. 2001-2007, Technion - Israel Institute of Technology, Civil and Environmental Engineering. Over the past eight years, I have published over 30 original studies in the field of green building rating systems, particularly LEED-certified projects. I used an academic approach to study various LEED certification strategies. However, I desperately need a critical review of my research by LEED professionals.

Abstract:

We compared different LEED certification strategies in Manhattan, USA, and Shanghai, China, using lifecycle assessment (LCA). Scores for “energy efficiency optimization” from the “energy and atmosphere” category (EAc6) were used to rank projects according to their level of achievement as “high” or “low”. The Wilcoxon–Mann–Whitney and Cliff’s δ tests were used to compare the Manhattan and Shanghai groups. To compare environmental damage between these groups, the LCA-ReCiPe2016 method with a two-way ANOVA was used. To compensate for the low EAc6 score, Manhattan scored high in the Materials and Resources (MR) category and Shanghai scored high in the Indoor Environmental Quality (EQ) category. The LCA of “high” EAc6 and “low” MR and vice versa for Manhattan and Shanghai showed that the use of fossil fuels (coal and gas) led to a preference for the high EAc6 strategy (in both locations), whereas non-fossil fuels (solar and wind) led to a preference for the high MR (Manhattan) and EQ (Shanghai) strategy. It was concluded: (i) achieving EAc6 is a determining factor in choosing an LEED strategy and (ii) the choice of LCA-LEED strategy depends on the fuel source used in the country.