

University of Miami Students Working on Sustainable Housing Design for Hot and Humid Climates

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Buildings are responsible for using over 17% of the world's fresh water, 25% of its wood produce, and 40% of its material and energy flows. Excessive energy use, molds, and many other environmental health concerns are significant challenges that today's building professionals are facing in designing and constructing homes, especially in hot and humid climates. Building green is an opportunity to create healthier buildings that improve human health, build a better environment, and provide energy and cost savings.

A group of Architectural Engineering students at the University of Miami have been selected to U.S. EPA's 2004 nationwide student design competition focusing on the three components of sustainability: People, Prosperity and the Planet (P3). In this project, the design team will work with multi-disciplinary faculty advisors to design a "model" house to ensure occupant's health, sustainability and reduction of the impact of building materials and building itself on local and global environments. A number of sustainable design concepts and technologies will be implemented in the model house design. A main focus of the house design is to reduce the cooling load by effective architectural and engineering design and maximize the use of renewable (solar) energy and natural cooling. Active indoor air pollution control and resources saving will be achieved by selecting low-emission "green" materials. An emerging air-cleaning method utilizing the ultraviolet/photocatalytic oxidation (UV/PCO) technology will be applied to decompose chemical as well as microbiological air pollutants such as volatile organic compounds (VOC) and molds. With the help of existing energy and indoor air quality evaluation programs, the effectiveness of the model house design will be evaluated quantitatively. The overall objective is to reduce the total energy consumption by 50% over the conventional housing designs in hot and humid climate with less than 8% overall cost increase, while providing occupants with comfortable, natural and harmonious indoor environment with significantly reduced indoor-pollution exposures. The house would be reproducible in different sizes and designs. This will be based on certain criteria (energy, environmental, cost) that combine to produce pass/fail results for the specific input. Taking people, prosperity and the planet into consideration, this design will create a comfortable balance where all three components can exist and flourish.

Information on the EPA P3 student design competition can be found from <http://es.epa.gov/ncer/p3/index.html>. For more information about this design project please contact Dr. Xudong (Don) Yang, Department of Civil, Architectural, Environmental Engineering, University of Miami, Coral Gables, FL 33124. Tel: (305) 284-3456; email: xudongy@miami.edu.