

# 1. Architecture and Urban Design



## **Research Team:**

Green Buildings and Sustainable Design

## **Grand Challenge:**

Sustainable Design of Buildings and Urban-Ecological Landscapes

## **Key Terms:**

Energy efficiency, resource conservation, life-cycle costs, industry regulations, economic incentives

**Student Leader:** Dave Barg

## **Student Members:**

- Dave Barg - Green Building: Strategies for Implementation at the Residential Scale
- Yan Cheung - How might energy saving designs and techniques in architecture help improve the overall environment?
- Rachel Hunnicutt - Sustainability and the Role of the Architect

## **Mentor(s) Leader:**

- Paul Linden

## **Team Narrative:**

### **Challenges and Solutions to the Implementation of Green Building**

By David Barg, Yan Cheung, and Rachel Hunnicutt

Green building involves the use of sustainable building practices and materials. In contrast, conventional building uses unsustainable materials and building practices that

harm the environment by emitting noxious substances, contributing to global warming and creating unhealthy air pollution. Green building minimizes harmful emissions and conserves valuable resources. Unfortunately, green building has limited representation in the building industry. The research by this group examines how building professionals and building practices can best be restructured to promote green building.

The researchers on this project, David Barg, Yan Cheung, and Rachel Hunnicutt, investigated three main themes associated with the problem of green building implementation. First, the building industry plays an influential role in shaping conventional building practices. Building professionals are often most knowledgeable about the issues and play a significant role in popularizing them. Second, established approaches and routines have an enormous effect on building practices, often causing a close-minded approach to new sustainable technologies. In order to realize wide scale implementation of green practices, the outdated conventional practices need to be changed.

Third, financial gain and other economic factors are important incentives that drive the actions of the general public and building industry alike. Therefore, strategies for increasing green development should appeal to economic incentives.

A variety of sources were used by the three project researchers to investigate the challenges and opportunities of green building stated above. They incorporated interviews with architects, contractors, engineers, and academics. These sources provided insights into current issues as well as suggestions for possible solutions. These various perspectives, based on individual experiences, demonstrate the day-to-day dynamics and issues involved in the building industry. In addition to interviews, case studies offered examples of sustainable projects and the design strategies that made them possible. These successful projects can be used as models throughout the industry to promote more sustainable practices. Barg, Cheung, and Hunnicutt also incorporated scholarly research into their individual projects. Among the many useful sources they identified, one particularly compelling study demonstrated the correlation between the training of architects and the permanent incorporation of sustainability into design practice (Brady 1996). This type of research relates directly to the research group's contention that the education of building professionals plays an important role in promoting green building. As discussed below, these hypotheses were further tested in the individual projects that comprise this research group.

David Barg's research examines the reasons why conventional construction practices are unsustainable and how green residential projects can effectively replace these practices. Barg theorizes that the implementation of green building is an information and education problem as well as an economic problem and that the reliance on routine practices in the building industry has led to unsustainable methods. Sustainable building practices will proliferate when and if building professionals and the general population are knowledgeable about the positive effects of green practices and are also willing to adopt them. Barg contends that there is an economic stigma associated with green building because of a generally held impression that it is expensive. Studies have shown that there are many cost-effective ways to add green elements to homes. While some green building elements are initially costly, they have been shown to save money in the long run by conserving energy and lowering utility bills. The public is too often concerned

only with short-term costs. In terms of the life cycle costs of buildings, green development has been shown to be much more cost-effective over the life of the structure by saving maintenance and utility costs over time. Based on his research, Barg argues that strategies for the spread of sustainable knowledge must appeal to the economic interest of the public and be enforced by government policy because the general public responds to cost-saving opportunities and policy measures that shape certain behavior. Furthermore, Barg recommends implementing strategies that incorporate a green component into training curriculums and licensing procedures for building professionals, which will aid in the greater implementation of green building.

Complementing Barg's research, Rachel Hunnicutt probes the reasons why sustainable elements are often excluded from architectural design. She hypothesizes that since architects synthesize information from an array of different professions; they are most knowledgeable about green design and are in the best position to promote it. Towards this end she investigated the reasons why green architecture is not pursued more frequently and identified the stages in the planning process where it gets removed. Hunnicutt's findings suggest that architects are not wholly responsible for green building implementation because although they can recommend the incorporation of green elements, the actual decision and implementation falls upon the developer and the consumer. Demand for green practices may be growing, but it is still very small in the grand scheme of the building industry. Therefore, developers can still be quite successful without being involved in green projects. In contrast to Barg, Hunnicutt argues that another challenge has to do with cost. She posits that another large source of the sustainability problem is that many green products are expensive because demand is still low. These high prices combined with low demand levels do not help increase the implementation of green practices by developers. Given the expense of green design, this is often one of the first elements to be thrown out of the design. Developers have little monetary incentive to add green elements because they are being paid for the construction of the structure regardless of the design features that are added. Hunnicutt concludes by arguing that measures need to be taken to promote sustainable building practices within the building industry. She believes that the most important changes will be in the policy realm where sustainable practices can be encouraged.

The third project, by Yan Cheung, contends that energy saving design is an important category in sustainable technology and practice because it conserves energy and minimizes harmful emissions to the environment. By using these energy saving designs and techniques in architecture, the overall sustainability of the building industry can be improved. Cheung explored this hypothesis by analyzing a case study of the Ridgehaven office building in San Diego. Ridgehaven was completely renovated in 1995 to make it more sustainable and to minimize resource consumption. This project helped save over \$80,000 for the city of San Diego. Environmental impact was minimized by improving indoor air quality, emphasizing energy conservation, using recycled materials, and implementing other sustainable practices. The building serves as an effective example of the positive effects of sustainable building practices. Cheung argues that in order to implement energy saving designs into future buildings, it is essential that the knowledge of sustainability and green design be spread to the residential and commercial areas. Cheung believes that educating the building industry will increase the implementation of green practices in architecture. Combing a case study with scholarly research, Cheung's project identifies the costs and benefits from energy technologies and other techniques

used in the Ridgehaven building to minimize harmful emissions to the environment. The project provides greater insights into the role of sustainable architectural design in promoting green development.

The three researchers in this group contend that in order to realize wide scale implementation of green building, changes in the building industry are required. Many of these changes will be aided by policy measures that can shape the industry by restricting the use of certain materials. Modifying and enhancing training and licensing procedures for design and building professionals is also recommended since this might result in greater levels of sustainable building practices. One suggestion is curriculum alterations that emphasize the importance of green techniques and materials. Adding to this, the researchers believe that licensing procedures should include an examination that demonstrates knowledge in the area of sustainable practices. In conclusion, conventional construction measures are not sustainable, and they are detrimental to the environment. Fortunately, green awareness is increasing and solutions toward greater green implementation are evolving. Knowledge of these challenges and their solutions allow for current and future generations to take this information and change unsustainable practices.

#### **References:**

Brady, Darlene. 1996. The Education of an Architect: Continuity and Change. Journal of Architectural Education. Association of Collegiate Schools of Architecture, Inc. Carter, Joe. 2005. New Insulation Options.

Gregory, Dick. 2007. This Old House. November Edition.

Green Building Basics. Woodwork Institute, 22-27. Environmental Building News. 2001.

Spivey, Angela. 2004. *Checklist for Environmentally Responsible Design & Construction*. Brattleboro, VT.

Sustainable Development. Going Green Saves over Time. Environmental Health Perspectives. The National Institute of Environmental Health Sciences (NIEHS).

#### **Links:**

1. U.S. Green Building Council - <http://www.usgbc.org/>
2. This Old House - Green - <http://www.thisoldhouse.com/toh/green>
3. <http://www.greenbuilding.com/>
4. Green Guide - <http://www.greenguide.com/>
5. <http://www.cagreenbuilder.org/>

#### **Multimedia Archive:**

Available presentations for this group can be found on the Senior Sequence website at: [http://seniorsequence.net/?page\\_id=440](http://seniorsequence.net/?page_id=440)