2011-2012 Bren School GP Proposal

1. **Project Title**

   *Best Practices in Evaluating the Performance of Climate Friendly Buildings*

2. **Proposers**

   Faculty proposer: Oran Young, BH 4518, oran.young@gmail.com, (805) 893-8747
   
   Student proposer: Joel Cesare, MESM 2012, jcesare@bren.ucsb.edu, (610) 972-4528

3. **Bren Faculty Sponsor**

   This project is part of Professor Young’s collaborative activities linking the Bren School with our partners at the School of the Environment at Nanjing University (NJU) in China under the general theme of *low carbon development*.

   Because he is retiring at the end of this academic year, Professor Young cannot serve as the faculty advisor for this project. But he will be available for consultation during the life of the project.

4. **Proposed Project**

   a. **Context.** This proposal is part of a broader effort to strengthen collaborative relationships between the Bren School and the School of the Environment at NJU. Our intention is to build on the Bren School’s GP program by introducing similar research activities for students at the NJU School of the Environment. GPSs at the Bren School are year-long activities starting in the spring term, involving 4-6 students working together as a team, addressing a practical problem of interest to a “client,” and culminating in a report suitable for delivery to the client as well as for circulation to a wider audience. Our basic approach will be to initiate at least one GP in each annual cycle at the Bren School and the NJU School of the Environment that can be twined or coordinated in the sense that students at each school will conduct research on a common theme and be provided with opportunities to interact with each other as they carry out their research and prepare their analyses. Each group will produce a self-contained report conforming to the requirements of the Bren School or the School of the Environment to avoid any problems that might arise from differences in expectations or in the performance of the two teams. But the students in the two groups will be encouraged to interact regularly and to engage in vigorous debates about models, methods, and interpretations of relevant data pertaining to their shared topic.
b. **Topic for 2011-2012.** For this cycle, we propose a project dealing with “Best Practices in Evaluating the Performance of Climate Friendly Buildings.” The goals of this project will be to (i) develop workable procedures for assessing the extent to which owners make and implement choices that comply with mandatory standards regarding climate friendly or green buildings and adopt voluntary measures in this realm, (ii) formulate similar procedures for assessing the extent to which builders adhere to these standards/measures during the construction phase, and (iii) devise procedures for assessing the extent to which owners/tenants conform to climate friendly standards/measures as occupants of buildings following the construction phase. The project may encompass both residential and commercial buildings and consider command-and-control regulations (e.g. building codes), incentive systems operated by governments (e.g. rebates or tax incentives connected to specific forms of climate-friendly construction), and voluntary measures (e.g. LEED certification). The project will be designed to shed light on the debate between those who argue that performance in the construction and operation of low carbon buildings is generally good and those who assert that the gap between relevant standards/measures and reality is very large. For example, while the popularity of the LEED process has grown rapidly since its introduction in 1998, critics assert that it lacks quantitative metrics for evaluating building efficiency. The situation came to a head last year when a class-action lawsuit was filed on behalf of a mechanical designer who argues that LEED is harming the environment by leading consumers away from using proven energy-saving strategies and that LEED buildings are actually less efficient than average.

In addition to developing practical procedures for measuring the gap between the ideal and the actual regarding the construction and management of buildings, the project will explore factors that determine the size of the gap in the two countries and in different settings. A discussion of possible methods for narrowing the gap will conclude the analysis. The emphasis in each case will be on the development and application of procedures that are easy to use and that offer reasonable approximations of actual conditions rather than on the formulation of more fine-grained procedures that are hard to use or prohibitively costly in practice.

This theme is broad and may provide the basis for Group Projects over a period of several years. To make the project manageable in 2011-2012 cycle, the student teams in consultation with their faculty advisors and with the client may focus the work using one or more of the following criteria:

- Type of building – commercial, public/governmental, residential
• Location – buildings in a particular city or industrial park
• Time period – the present or some longer span of time
• Activity – new construction vs. renovation
• Phase – construction vs. management of use following construction
• Type of code/regulation – mandatory/voluntary

c. Deliverables. Once the focus is set, the project will endeavor to produce three deliverables: (i) a tool or tool kit for measuring the gap between the ideal and the actual in the given area, (ii) an assessment of the factors that determine the size of this gap, and (iii) a discussion of practical measures that could be introduced to narrow this gap under real-world conditions prevailing in China and the US.

d. Background information. Together, China and the US account for about 40% of anthropogenic emissions of greenhouse gases (GHGs). There is no prospect of making progress in addressing the problem of climate change without finding ways for these two countries to cooperate in efforts to reduce GHG emissions. While intergovernmental negotiations aimed at strengthening the UNFCCC and the Kyoto Protocol will continue to go forward and occupy the attention of national policymakers, we are convinced that bottom up efforts that deal with GHG emissions at the local and regional levels will constitute a crucial part of the effort to come to terms with climate change during the near future. Initiatives of this sort have become increasingly prominent in both countries, and the theme of low carbon development is now a major focus of attention both in China and in the US. Nowhere is this more evident than in California and Jiangsu Province which have entered into a cooperative agreement designed to encourage communication and collaboration in this realm. Our goal is to make a contribution to this effort by engaging in applied research and analysis on a collaborative basis.

5. References


c. Lawrence Berkeley National Laboratory, “Berkeley Lab Awarded $12.5 to Lead US-China Clean Energy Research Center,” news release, 7 October 2010
6. **Client**

AECOM Environment will serve as the client for this project. A major engineering and design firm with extensive operations in China as well as the US, AECOM served as the client for the Bren GP project on “low-carbon communities” in the 2009-2010 cycle.

The contact person at AECOM Environment is Craig S. Whan, Senior Project Manager, craig.whan@aecom.com

7. **Commitment**

There will be no restrictions regarding the use of data or the publication of the project’s findings. In the event that the project produces results that raise IP issues, the members of the project team and the client will negotiate mutually agreeable arrangements regarding these issues.

8. **Finances**

We intend to maximize interaction between the Chinese students and the American students working on this project. Ideally, the two teams should meet face-to-face in one of the countries at an early stage in their work on the development of research designs and at the conclusion of the project to compare results and discuss next steps. During the course of the project, the students would hold regular virtual meetings using the videoconferencing facilities available at the Bren School and the NJU School of the Environment.

The Sino-American Working Group on Climate Change based at the Bren School will cover the costs associated with this collaboration.

9. **Internships/Employment Opportunities**

AECOM Environment is prepared to offer one or more internships during the summer of 2011 to members of the team working on this project.

AECOM has hired a number of Bren School graduates over the years (including one member of the 2009-2010 GP team) and is interested in considering employment opportunities for more graduates in the future.