

GREEN TEAMS: UNIVERSITY-NATIONAL PARK ENERGY PARTNERSHIP PROGRAM



Kings Mountain National Military Park & Georgia Institute of Technology

OVERVIEW. A group of professors and students from the Georgia Institute of Technology (GIT) teamed up with personnel from Kings Mountain National Military Park (KIMO) during the summer of 1999 to conduct a thorough energy assessment of the park's architecturally unique Visitors Center. The assessment provided recommendations for energy conservation measures at the facility that could provide over \$10,000 savings in annual energy expenditures.

The team first visited KIMO in May 1999 to assess the facility and study historical energy usage patterns. Upon returning to campus, the students employed computer models to analyze opportunities for energy conservation measures. They presented their technical report in the summer of 1999.

"Results were certainly gratifying," said Bill Meffert, engineering professor and project leader. "Annual utility costs could be shaved by over 30 percent."

The report identified annual savings in the all-electric Visitors Center of \$5,761, or 32 percent of the facility's annual utility bill. The report also recommended measures that would reduce air conditioning load by 4.5 tons, which would provide an additional \$4,400 in savings. The reduced air conditioning load also substantially drops the capital cost of a new mechanical system scheduled for installation.

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- **Leon Folsom, Energy Coordinator, Southeast Region**

RECOMMENDATIONS. The report outlined several recommendations for lighting, building envelope, windows, and the mechanical system of the Visitor Center.

Lighting. Some of the students' recommendations for more efficient lighting included the installation of energy-efficient T8 lamps with electronic ballasts and the use of occupancy sensors (for both lights and fans). The energy savings (in dollars) from these measures would recoup the measure installation costs in just over one year.

Building Envelope. To reduce both heating and air-conditioning loads, the students recommended an increase in the Visitor Center roof insulation, from R-9 to R-30. The report also recommends an increase from R-3 to R-19 for the exterior walls.

Partnership Successes

- Thorough assessment of energy use at the Kings Mountain National Military Park Visitor Center.
- Energy conservation measure recommendations for lighting, building envelope, windows and mechanical systems that could provide over \$10,000 savings in annual energy costs.

A side benefit of the added insulation in the roof would be to conceal the piping for a planned sprinkler system, thereby preserving the architectural beauty of the building.

Windows and Doors. To reduce air infiltration, the team targeted 18 single-paned, loose-fitting windows (such as the 25-year-old windows in the lobby area) for replacement with Low-emissivity, insulated windows. The report also noted that the lobby doors should be replaced with tight-fitting doors with updated weather-stripping and thresholds.

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- **Dr. Bill Meffert, Faculty Advisor, GIT**

Mechanical System. The students assessed different options for replacing the facility's 30-year-old HVAC system. Their cost analysis showed that a split system air conditioner with a propane furnace would provide optimal savings--approximately \$4,400 per year.

SUMMARY. "This was an interesting, real-world problem for the students," said Meffert. "They had to understand the balance between energy efficiency, appealing design, and cost. We look forward to working with the Park Service on other projects in the future."

Park personnel expressed their satisfaction with the study. "The timing of this partnership was most fortunate for us," said Leon Folsom, Energy Coordinator for the Southeast Region. "With a major renovation already planned for the building, the energy analysis performed by the students proved very useful--and the results won't be filed away in a drawer somewhere!"

Personnel. Personnel involved in this project included: Bill Meffert, Faculty Advisor; John Adams, GIT student; Garrett Jones, GIT student; Rick Good, GIT student; and Leon Folsom, NPS Energy Coordinator for the Southeast Region.