

# CU SEAM Project

---

## Saving Energy And Money: Energy Audits for Student Rentals

**Organizational Information:** This project is a “sister project” to the CU Environmental Center’s SCORE program. It represents a partnership between the Environmental Center and the Building Systems Program, a graduate-level program focused on building energy efficiency housed in the civil engineering department.

**Primary Contacts:**

Sara MacAlpine, Building Systems Program graduate student: [sara.macalpine@colorado.edu](mailto:sara.macalpine@colorado.edu)

Lesley Herrmann, Building Systems Program graduate student: [lesley.herrmann@colorado.edu](mailto:lesley.herrmann@colorado.edu)

Robert Hall, Energy Program Manager, CU Environmental Center: [robert.hall@colorado.edu](mailto:robert.hall@colorado.edu)

## **1. Project Description**

The goal of the University of Colorado's SEAM (Saving Energy And Money) Project is to reduce energy consumption in student rentals, and make them more comfortable to live in.

This project will have several components. First, members of the SEAM Team, which includes students from CU's graduate-level Building Systems Program (BSP), Architectural Engineering department, and Environmental Engineering program, will perform comprehensive, professional energy audits of student rentals. The goal is to provide 30 free audits during the 2010 Spring semester and then more in future semesters depending on funding. The audits will include evaluation of the building's mechanical systems and structure, thermal imaging, and a blower-door pressurization test to evaluate the leakiness of the building, which is the primary cause of energy waste in most homes.

Second, at the time of the audit, the SEAM Team will offer installation of simple, inexpensive energy upgrades such as window/door weatherization, CFLs, faucet aerators, low flow showerheads, and pipe insulation. Team members will instruct the landlords and tenants on how to install these things and provide demonstrations. They will also educate the landlords and tenants about energy saving practices and behaviors.

Third, for each building the SEAM Team will compile the audit results into detailed reports, which will include information on the condition of the building and its energy use, potential energy efficiency upgrades and their estimated costs and benefits, and rebates and other opportunities for funding energy efficiency upgrades such as the ClimateSmart loan program. These reports will be made available to landlords, so that they can determine which upgrades are most effective and will have the most impact, and also to the City of Boulder and other groups such as LPEC, OCSS, and the GEO, so that they can develop a baseline characterization of the current state of rental property efficiency in student neighborhoods. Audit results will also be communicated to CU's BSP and Energy Center to enhance the quality of further audits.

## **2. Student Involvement**

All students in the Building Systems Program are encouraged to be a part of the SEAM Team, as it provides valuable hands-on energy auditing experience. The auditing methodology and procedure have been completely developed by students who have taken the program's energy auditing class. Some students from other related programs, including architectural and environmental engineering, are also participating in the audits. At present the program has 14 students who will be advertising, scheduling, and conducting the energy audits.

## **3. Detailed Budget**

Student funding for the SEAM Project has been generously provided by grant from Wells Fargo. However, to allow as many students as possible to participate in the project, this grant does not cover some of the expensive equipment necessary to perform energy audits. Therefore the funds requested for the SEAM Project Budget will be applied toward the following:

Item	Function	Cost
Blower Door System	Testing for Building Airtightness	\$3000
Thermal Imaging Camera	Testing for Building Insulation and Airtightness	\$7500
TOTAL COST:		\$10,500

The blower door system and thermal imaging camera are essential when conducting a detailed energy audit, both to obtain results and to communicate these results to the building owner and occupants. This equipment may be used for the SEAM project and also as a learning tool for the Building System Program's future energy audits class and student research.

The SEAM Project respectfully requests funds in the amount of \$7500 from Sustainable CU to help fund equipment necessary for energy audits of student rentals. If we are able to obtain educational or other discounts not yet shown on the items listed above, money will be refunded to Sustainable CU as appropriate.

#### 4. Matching Funds

Matching funds will provided for the SEAM Project from the Building Systems Program and College of Engineering in the amount of \$3000. With these funds, combined with a contribution from Sustainable CU, we will be able to purchase both a blower door system and a thermal imaging camera.

#### 5. Feasibility

Planning for the SEAM Project began in Fall 2009, and the project is well on its way to success. The following have already been completed:

- Development of Energy Audit Methods and Procedures
- Training of Energy Auditors
- Collection of First Set of Residences to Audit

The remaining project timeline as is follows:

- Energy audits will commence the week of February 8<sup>th</sup> and will finish in mid-April. They will be done on evenings and weekends to accommodate student and landlord schedules. Audit reports will be delivered to the landlords within 2 weeks of completion of their individual audits.
- Solicitation of residences to audit will be ongoing until at least 30 audits are scheduled.
- A compilation of the audit results will be delivered to the city/other officials at the end of the semester when all reports have been completed.
- A presentation on the program results will be given at a Building Systems Program Seminar at the beginning of the 2010 Fall Semester
- Further audits will be conducted in the 2010 Fall Semester, pending funding.

#### 6. Student Impact

The CU SEAM Project is predominately run and coordinated by students, with oversight and guidance from the CU Environmental Center. All energy audits will be entirely conducted by students. This project has the potential to benefit *all* of the students in the Building Systems Program (depending on

their interests), including both those who gain hands-on auditing experience now and those who are able to use the auditing equipment for future educational and research opportunities. It is estimated that over 75% of CU students live in off campus rental housing, and it is our hope that this project will benefit many of these students as well, as they will have the opportunity to live in more energy efficient homes.

## 7. Sustainability

This project addresses all three aspects of sustainability listed in the request for proposals:

- **Environmental Protection:** Buildings consume ~40% of the total energy used in the United States, and rental properties tend to be the worst offenders. Information provided by this project to landlords will enable them to make the best choices to upgrade energy efficiency on their properties. Information provided to other groups and government officials will enable them to understand the state of student rentals and make informed decisions regarding future energy requirements and incentives. All of these things will reduce greenhouse gas emissions.
- **Economic Benefit:** The SEAM Team will be providing free energy audits to landlords, which will encourage them to actually have audits done (normal price is \$100-300), and encourage them to do energy upgrades making use of current federal and local incentives. Results of the audits should translate into lower energy bills for students, which is a significant economic benefit for them. Energy upgrades made as a result of this program will also increase the value of rental properties.
- **Social Equity:** There is high demand for rental homes in Boulder and students are often forced by market conditions to live in housing that is not comfortable or energy efficient. Once they find this out, usually after they have signed a lease, they have no recourse. This program should increase comfort in student rentals and decrease energy bills, which will decrease the number of students living in uncomfortable, energy-wasting homes. Additionally it is possible that information from the SEAM Project audits could eventually become part of a CU database for rental energy use, which students could use to help determine where they would like to live.

## 8. Innovation

Most programs focusing on rental energy use concentrate solely on the renters and their behaviors, rather than the energy efficiency of the building itself. The SEAM Team members have the unique expertise and experience to offer suggestions from both perspectives, and there are no other programs in Boulder that offer free energy audits without certain income qualifications.

### \*\*\*Equipment Use and Maintenance\*\*\*

The SEAM Project will have first priority for use of any equipment purchased with Sustainable CU funds. Maintenance of the equipment will be the responsibility of the BSP and will be performed as needed; requests will be handled through the BSP lab manager. Both the blower door and thermal imager come with full two-year warranties, and the warranty on the thermal imager is extendable, if desired.