

SWATeam Recommendation

Name of SWATeam: Energy Conservation and Building Standards

SWATeam Chair: Marian Huhman

Date Submitted to iSEE: November 29, 2016

Specific Actions/Policy Recommended (a few sentences):

The ECBS SWATeam recommends funding a full-time Green Labs Coordinator position. The coordinator would implement, with the help of students, a Green Labs Program. Major components of the program would include energy conservation through analysis of fume hood usage (needs and possible consolidation), a Shut the Sash fume hood initiative, freezer and refrigerator management, space efficiency and utilization, water conservation, recycling (e.g., batteries, Styrofoam) and collaboration and education of effective energy efficiency and sustainable methods for management of lab chemicals and hazardous waste disposal.

Rationale for Recommendation (a few sentences):

Of the 175 most energy-consuming buildings on campus, 9 of the top 10 are lab-related and account for ~23% of the energy usage among the 175. In the ~ 43 lab-related buildings are approx 1700 fume hoods. Depending upon system type and fume hood size, each fume hood costs approx. \$3000- \$5000 a year to operate. A pilot project done in spring 2015 in Madigan Lab showed that lab personnel often do not close the sash on fume hoods allowing conditioned room air to escape through the fume hood. Lab users responded positively to a subsequent Shut the Sash-type of program that reminded, reinforced and rewarded lab personnel to shut the sash on the fume hood. A Green Labs program at Harvard showed that their Shut the Sash program resulted in utility savings estimated at \$200K - \$250K per year with a greenhouse gas emissions savings at 300-350 metric tons of carbon dioxide equivalent. Recent audits of fume hood usage have shown that many fume hoods are not being used regularly and could possibly be taken out of service. Fume hoods could be consolidated in certain areas. Recent audits of lab freezers and refrigerators in some buildings showed that many freezers are still set at -80 degrees C, instead of the recommended -70 degrees C, and that lab personnel often do not know what is in the freezers or even which researchers are using certain freezers. Again, the Harvard program found that tuning of temperatures on freezers is saving them \$300-\$400/yr. per freezer. Removal of unneeded fume hoods and freezers/refrigerators could also enhance efforts at space efficiency that are underway at UIUC. In response to these problems which are common at other universities, many universities (e.g., UT Austin, Yale, Harvard, Stanford, UC Davis, UC Riverside) have implemented Green Labs programs, overseen, in many cases, by a full-time staff person, plus students; faculty assist part-time as well. The F&S Safety and Compliance group offered the Cornell program as a proposed example of what we should be doing for lab ventilation management going forward. A description of the Cornell program is attached.

Connection to iCAP Goals (a few sentences):

The iCAP specifies energy conservation as a main category in which to achieve numerous goals contributing to the carbon neutrality target specified in the iCAP. The energy conservation objectives that connect to a Green Labs program include:

- Strengthen centralized conservation efforts focusing on building systems, to achieve a 30% reduction in total campus building energy use by FY20.
- Engage and incentivize the campus community in energy conservation, including a comprehensive energy conservation campaign, with at least 50% of units participating by FY20.
- Maintain or reduce gross square footage (through space efficiency and space utilization).

Perceived Challenges (a few sentences):

In talking with other universities' Green Labs program coordinators, they have stressed that these behavioral change initiatives are time and labor intensive. They require a coordinator who has the interpersonal skills to build working relationships with faculty, PI's, lab managers, building managers and students. Some coordinators also monitor mechanical systems associated with fume hoods, autoclaves, freezers, etc that require specialized knowledge to troubleshoot problem areas. Consistent follow up is needed with current lab personnel and students who turn over regularly. Many programs use a self-assessment tool, like we use in our Certified Green Office program. Implementation of the assessment has to be adapted for the needs of the labs. Close work with safety and compliance personnel is also needed.

While creating a new position is always a challenge in times of financial constraints, the universities we have talked to say that, as the program progresses, the coordinator position may begin to pay for itself through energy savings.

We note that the responsibility for most of the equipment (fume hoods, freezers, autoclaves, etc.) affected by this program are a departmental responsibility. Departments fund the upkeep of most of this equipment. How can the departments be motivated to participate in this proposed program? Generally speaking, we think that departments will be approachable on this item, based upon our retro-commissioning experiences, but there will be challenges. The best probability of a positive outcome is for one on one interaction to occur, raising energy awareness and producing real changes in lab users' behavior. One of our theories is that equipment/labs are forgotten over time and there is always the hope that a research grant might arrive in the near future and lab space will be needed at that point in time. We can't afford to operate labs for long periods of time (say 3 years plus) in anticipation of further funding or usage.

Suggested unit/department to address implementation:

- Facilities and Services. iSEE can help support the communication aspect, i.e., messaging about energy savings. (Collaboration will be needed among several groups, e.g., lab managers, faculty, safety and compliance staff.)

Anticipated level of budget and/or policy impact (low, medium, high):

- Moderate. We ask iSEE to advise on the funding. Could DRS and/or the Provost office be approached?

Individual comments are required from each SWATeam member (can be brief, if member fully agrees):

Team Member Name	Team Member's Comments
Marian Huhman	After much discussion and research on ways to maximize energy conservation and build sustainable and consistent practices among lab users, I believe a position dedicated to Green Labs management is needed.
Yun Yi	Task layout on the document is a critical and fundamental role in campus sustainability. It requires a significant amount of collaboration, specific knowledge on each equipment usages, specifications and so on. I recommend a new hire to firstly works on an in-depth campus-wide survey on current fume hoods and refrigerator conditions and develop a strategical document that recommends how to maintain systems sustainably
Fred Hahn	Objectives and goals are clear. Move forward.
Karl Helmink	In my opinion, this proposed work is consistent with the ICAP document, and an increased effort is needed in this area. Collaboration between depts. will be needed.
Dhara Patel	A green labs initiative is crucial to reducing energy consumption at a university that prides its STEM programs, and cost savings easily justify a paid position to give such an initiative proper attention.
Alex Dzurick	This is a huge area to save energy and a great goal for this research university.

Comments from Consultation Group (if any; these can be anonymous): From Paul Foote, Academic Hourly, F&S. The biggest factor benefitting from this position is energy consumption per square foot, consumption in labs can be as much as five times greater than other campus spaces. Collaborating Green Lab initiatives will significantly impact all major components

previously mentioned, create further awareness among the university community and develop lasting behavioral change throughout society.

From Olivia Webb: I fully support this recommendation. It is anomalous for such a preeminent research university as ours to be without a sustainable labs program, and I have met several faculty members who expressed surprise and disappointment at our lack of comprehensive programming. This effort does need a dedicated staff member in order to succeed. I would also support the inclusion of those involved in shaping this recommendation in the hiring process, especially the composition of a job description.

Explanation and Background (can be supplied in an attachment):

- FY16 Energy Consumption Table- - Top 175 Buildings on UIUC Campus—Buildings with Labs Highlighted
- Other Universities:
 - Cornell Lab Ventilation Management Program
 - Validating Cost and Energy Savings from Harvard's Shut the Sash Program