



National Wildlife Federation®
CAMPUS
ecology®

Harvard University
Cambridge, Massachusetts
Energy - Shut the Sash

SCHOOL

Founded in 1636, Harvard University is a private research institution made up of 10 principal academic units - nine faculties and the Radcliffe Institute for Advanced Study. Approximately 1,900 faculty teach a student body made up of 6,700 undergraduates and more than 12,000 graduate and professional students.

ABSTRACT

Shut the Sash Campaigns

Open variable air volume fume hoods use a tremendous amount of energy (each costing >\$6,000 per year to operate, depending on building type and energy costs!). However, by closing the sash of one of these fume hoods, one can reduce the energy use by greater than 80 percent in many cases. This project was designed to educate fume hood users about fume hood energy use and create an incentive for them to close their sashes when not using the hoods, using social marketing techniques. Labs compete against each other to reduce their fume hood energy use the most. We estimate that we are currently saving ~\$180,000 and 300 MTCDE per year in the Chemistry & Chemical Biology Department (CCB) due to increased attentiveness by the users of about 150 fume hoods that are variable air volume.

In the CCB Department we have set up an electronic display that shows exhaust from the fume hoods in the building in real time. The screen was placed at the main entrance to the lab, so all users will see this on their way out the door. Providing real-time, actual data has proven to be very valuable in changing behaviors and generating interest and excitement with this project.

GOALS AND OUTCOMES

Goals

There are two projects – one at the Chemistry & Chemical Biology (CCB) Department and one at the Medical School (HMS), but this case study is focused on the project in CCB. In summer of 2005, we found the vast majority of our hoods in both locations were wide open, 24/7. In both locations we hoped to reduce fume hood energy use overnight and whenever possible during the day.

During the next 2-3 years at CCB, we hope to have on-demand data as to how well any lab is doing in the competition. We hope to retrofit as many of the old constant volume fume hoods as possible to new energy efficient variable volume hoods and add these labs to the competition.

During the next 2-3 years at HMS, we hope to have reliable access to data on how well the labs are doing, so that we can easily run an ongoing competition.



Accomplishments and Outcomes

The contests have shown to be very effective at changing behaviors in the labs, at CCB, we achieved a sustained reduction of ~30 percent in exhaust rates through the fume hoods, as a result of increased attentiveness to fume hood sash height. The total pre-competition exhaust from the 150 fume hoods we monitor was 85,000 cubic feet/minute (CFM), and the average in 2009 has been 59,000 CFM. This translates into cost savings of approximately \$180,000 per year, and a greenhouse gas emission reduction of 300 MTCDE.

Image Credit: Nathan Gauthier, OFS

Challenges and Responses

In the past some lab administrators have not been very interested in the competition and have been reluctant to forward out results announcements and allow us to post posters in certain areas. We have worked with them to find mutually agreeable locations for posters, and we have been able to find grad students who are willing to forward the results to their labs.

It is also critical to have data to support this program, as the researchers respond well to “real-time” feedback demonstrating the impacts of leaving the fume hood open.

Campus Climate Action: Your School’s Carbon Footprint

At CCB, our project has reduced annual greenhouse gas emissions by approximately 300 MTCDE.

Commentary and Reflection

Grad students at our institution are fairly competitive and have responded positively to the Shut the Sash contests and the incentive we provide (free food at a social event!) Peer pressure from fellow lab members has been helpful as well.

ENGAGEMENT AND SUPPORT

Leaders and Supporters

The buy-in of the CCB community and the HMS community was essential. The FAS Office of Physical Resources energy management team was also needed, in order to fund the competition’s incentives at CCB and to provide our team with the controls data need to track exhaust and/or fume hood usage. The support of the professors and lab administrators whose labs were in the competition was also essential. In labs where the professor told the lab that this was a priority for him, we found we had some of our best results.

Funding and Resources

At CCB, we spend about \$80 per month on beer and pizza parties, and \$500-600 per year on the wine and cheese parties. Because the savings are so great, we have had no trouble securing funding for the parties.

The real time energy displays also cost some money to install, but the CCB facilities team has made this a default for any lab with variable air volume hoods.

Education and Community Outreach

SAVE ENERGY. PROTECT YOURSELF.

SHUT THE SASH

The DIFFERENCE...
made by closing ONE fume hood sash for a year

- > \$6,000 savings (in 2009 \$)
- > 19,000lbs O=C=O
- > 100 S (always on)

green.harvard.edu/labs

FAS GREEN LABS

Credit: Mike Paterno, CCB

“Shut the Sash” magnets were placed on each fume hood as a prompt/reminder and other outreach was conducted through posters, flyers, and emails. In order to determine the winners, we use the Siemens control system to give us data on how much air passed through each lab’s fume hoods.

We host a monthly beer and pizza party for the labs that are meeting their goals. And twice a year, we host a larger wine and cheese party for all labs that have met their goals 4 out of the past 6 months. Goals are re-evaluated as research groups’ size changes and as their work changes to more or less hood-intensive research.

Each group that achieves its monthly goal is entered into a raffle where each month, it can win movie passes or a beer & pizza party. Groups that meet their goal at least 4 of the most recent 6 months are invited to highly popular bi-annual wine & cheese parties!

Feedback on performance is distributed twice a month – once to let them know if they are on track for their goal, and the other time to let them know who won the raffle that month. Real time meters at the exit to most labs allow users to quickly check whether all the hoods are closed each evening if they are the last one to leave the lab.

We have not tried to involve the local community.

CONTACT INFORMATION

Contacts

Claire Berezowitz, OFS Longwood Coordinator, Claire_berezowitz@harvard.edu

Philip Kreycik, OFS FAS Green Labs Coordinator, 617-384-5496, Philip_kreycik@harvard.edu

Jerry Connors, CCB Facilities Director, Connors@chemistry.harvard.edu

Peter Stroup, HMS Director of Facilities, Peter_stroup@hms.harvard.edu

Case study submitted by:

Philip Kreycik, OFS FAS Green Labs Coordinator, 617-384-5496, Philip_kreycik@harvard.edu

MORE ABOUT YOUR SCHOOL

Campus Sustainability History

Harvard University is dedicated to confronting the challenges of climate change and global sustainability both through academic research and by translating that research into action on campus.

Harvard's efforts are driven by three flagship sustainability commitments: Sustainability Principles that provide broad vision to guide University efforts; Green Building Requirements that require Leadership in Energy and Environmental Design (LEED) silver plus additional energy requirements; and a Greenhouse Gas Reduction Goal to reduce emissions 30 percent below a 2006 baseline by 2016 including growth. These commitments are administered through the Harvard Office for Sustainability.

As a result of these commitments, Harvard now has 62 building projects in process toward achieving LEED certification, a 55 percent recycling rate, renewable energy projects on campus, composting in residential and commercial dining halls, organic landscaping in Harvard Yard, and a drive-alone rate of only 16.5 percent, to name just a few examples.

Harvard's Office for Sustainability is advancing these efforts by bringing together thousands of students, faculty and staff across the University to translate knowledge into action. By successfully integrating sustainability principles into all Harvard practices, the University delivers tangible, positive contributions to the global environment and human well-being.

Please visit the Harvard Office for Sustainability website for more information at <http://www.green.harvard.edu>