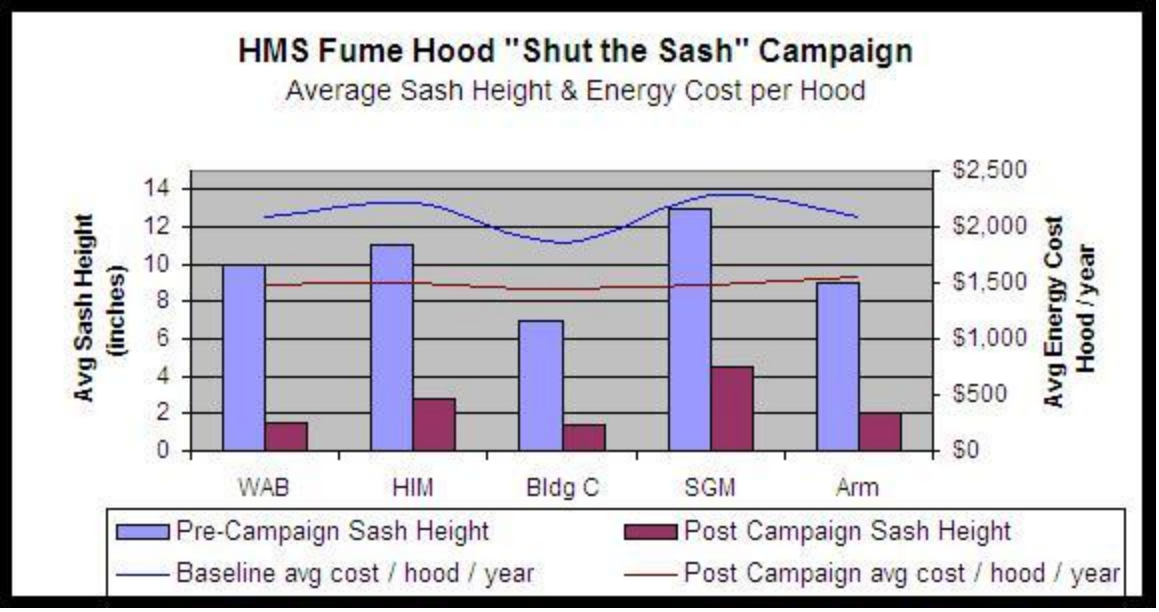

Hood Rich

"A Student's Guide: To Shut the Sash to Save Some Cash"

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ESTU 471: Campus Planning Studio

Western Washington University

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1.0 Introduction

1.1 Purpose behind the project

Western Washington University is committed to green energy and waste reduction. Students, faculty and staff alike pride themselves on the sustainable actions they practice every day. Reduction in material use and energy use helps to minimize our carbon footprint and protect the ecosystems and environment that we live in. Along with energy savings (see 4.0), this project is here to further reduce our carbon footprint and provide members of Western's community another practice to implement in their sustainable lifestyles.

1.2 What is "Hood Rich"?

Many colleges such as Harvard, UC-Irvine, UC-Davis, and Stanford have implemented a campaign to reduce sash height of fume hoods in their laboratories. Hood Rich is the term coined after reviewing other peer institutions' savings from implementing their own shut-the-sash campaign with fume hoods across campus. Hood Rich on our campus will involve an ongoing campaign that is explained in further detail in 2.4.

1.3 Significance to WWU

Western Washington University is of the mid-range state schools that would benefit greatly in energy cost reductions. By implementing a campaign to shut-the-sash when fume hoods are not in use, and to limit height during, the overall energy consumption of labs will decrease. As mentioned before and again, Western is dedicated to sustainability. One fume hood consumes as much energy as 3.5 households per year. (HTTP://fumehoodcalculator.lbl.gov/index.php)

In a cool climate such as Bellingham, WWU's steam plant is constantly providing warmth to the facilities. We hope to reduce fume hood sash height thus lowering air exchange which in turn reduces the steam plant energy consumption.

2.0 Methodology

A previous Campus Planning Studio class had done a pilot project in the chemistry building. This pilot project gathered information on how the fume hoods were used at the time. The next step was to send out an email to the lab managers and TA's requesting them to remind students to close the sash of the fume hoods. The reduction in sash height saved the school $2200 in energy savings.

Closing the sash may seem simple to do. Our objective is to get more students to close the sash. This section will outline how we plan to implement a shut-the-sash campaign here on campus. Our focus is in the Biology and Chemistry buildings.

2.1 Internet Research

Today's most widely accessible tool for research is the internet. Listservs and campus sustainability websites have provided copious amounts of data and knowledge. The greatest thing is acquiring contacts for interviews with other schools. Office of Sustainability personnel have been of tremendous help in providing information on how

their own school's campaign was started. We were able to get data, find out how well the campaigns worked, what could be changed, etc.

2.2 Peer Interviews

Meeting with members from Facilities Management at the Chemistry building we learned about the ventilation system at Western.

In our interview we gathered various details of the the ventilation system. First, it is important to note that fume hoods themselves do not have fans. To explain in simple terms, a fume hood is a enclosure where researchers and students can work on experiments without having to breath in harmful fumes. All the air that goes through the fume hood is being drawn from fans at the top of the building. All the fume hoods are tied into duct work that leads to the four fans on top of the Chemistry building. Each fan runs at 100% but not every fan will run at the same time. Sensors measure the flow rate of air in cubic feet per minute (CFM) going through the hoods. These sensors are connected to a computer system which turns the fans on the roof off and on.

The Biology building has occupancy sensors on their fume hoods which notify users to close the sash when they leave the room. These sensors are tied in with the lights and only work if the people inside leave the room. (Our goal is to have people close the sashes while in the room and have stepped away from working in the hood)

The Chemistry building is currently setup to have heat exchange technology installed. The costs are being evaluated as pricing is a hurdle. Facilities and technical management are waiting for the price to be right in order to install heat exchangers. Heat exchange has the potential to capture heat going out the exhaust and and use it to heat new fresh air. This would also reduce the reliance of steam to heat the building.

Biology and Environmental Studies building have heat exchangers already.

It is also important to not that Facilities Management has programmed the HVAC computer systems to run a peak efficiency. No changes to technically settings are required.

Our campaign uses behavioral changes to achieve new savings and gain more efficiency.

The following contacts have helped us tremendously in acquiring information about the building's ventilation system:

Lead Control Technician FM Glenn Huschka Glenn.Huschka@wwu.edu 360-650-6840

Maintenance Specialist FM Migo Remigijus.Biciunas@wwu.edu 360-650-3741

Facilities Engineer FM Don Holland 360-650-7934 PP232 don.holland@wwu.edu

Construction Project Coordinator FM Greg Hough 360-650-3311 greg.hough@wwu.edu

Facilities Engineer FM Chris Hadley Chris.Hadley@wwu.edu 360-650-4061

Phone conversations with UC schools about their projects...

“Their primary function is fire safety, and that is best when closed. In a VAV hood that slows down to 25 cfm/Square foot of deck area, that is about 250 cfm for a 5 foot wide hood, or over 100 air changes per hour, which would never lead to toxins building up. 10-15 cfm/sf will be allowed for closed sashes soon. Our "campaign" is a very simple vinyl stripe affixed to the side jamb of a fume hood. It's intuitive and effective. We may be making a bulk order and selling them to recoup expenses.”

-Allen Doyle UC-Davis EH&S

Phone conversation with Harvard's Green Labs coordinator

Jamie Bemis, FAS Green Program Coordinator, 617-384-5496 , lauren_raece@harvard.edu

“I think Outreach is key here. When we fall behind in the program for a month or two you can see that in the trends”

Harvard holds a semi-annual wine and cheese party which rewards labs who have successfully lowered there average sash height below goals. This is their biggest event. At the end of each month labs who have met their goals receive a pizza party.

Harvard stresses that education is key to the campaign. We also feel that education and behavioral change is the easiest fruit to pick in term of saving energy through fume hood use.

Harvard's incentive expenses: $200 ea pizza party and same amount on wine and cheese ~$2500 a year 2x a year wine and cheese

2.3 Contacts and Meetings

Communication is one of the most vital aspects to running a campaign such as this. Stakeholders must be involved and informed with the required data in order to successfully implement the behaviors to which energy savings can be achieved. Building managers and lab managers are the first source to department level implementation. Building managers have access to the data generated from building monitoring systems and lab managers are in direct contact with researchers and lab students. Facilities management and the Office of Sustainability will work together to provide necessary backup and maintenance of the education, maintenance and use of fume hoods.

Students, Lab TA’s, and Professors alike will be the direct implementers of this campaign. Creating a chain of education to save our nation’s… energy crisis. Facilities management and the OS will work together to provide the necessary backup and maintenance of the hoods and campaign. As a campus we are all involved to save money and energy.

Greg Hough-FM

Two lab 10x12 coordinators- Charles Wandler, Brandon Dedrick

Chemistry Club

2.4 Education Program Development

Other schools show that monthly competitions between lab groups have been a proven tool to reduce fume hood height. Coordination between the building managers, lab managers, and the office of sustainability will allow for greater data collaboration. This collaboration will provide monthly readouts to see how well the labs are meeting their minimal cfm goals. Incentives such as wine and cheese and pizza parties have been used at Harvard to reward labs that have met their minimal cfm goals. The data is compiled into monthly presentations to show how students and research personnel have directly reduced their campus' energy use.

Our plan is to install stickers on every fume hood in the Bio and Chemistry buildings. These stickers will have maximum and minimum height values that correspond with a color system. Green being good, yellow being moderate, and red bad.

In coordination with Lab Management and Facilities Management, the 10 x 12 program coordinator will send the labs their monthly readouts to see if they have met their goals.

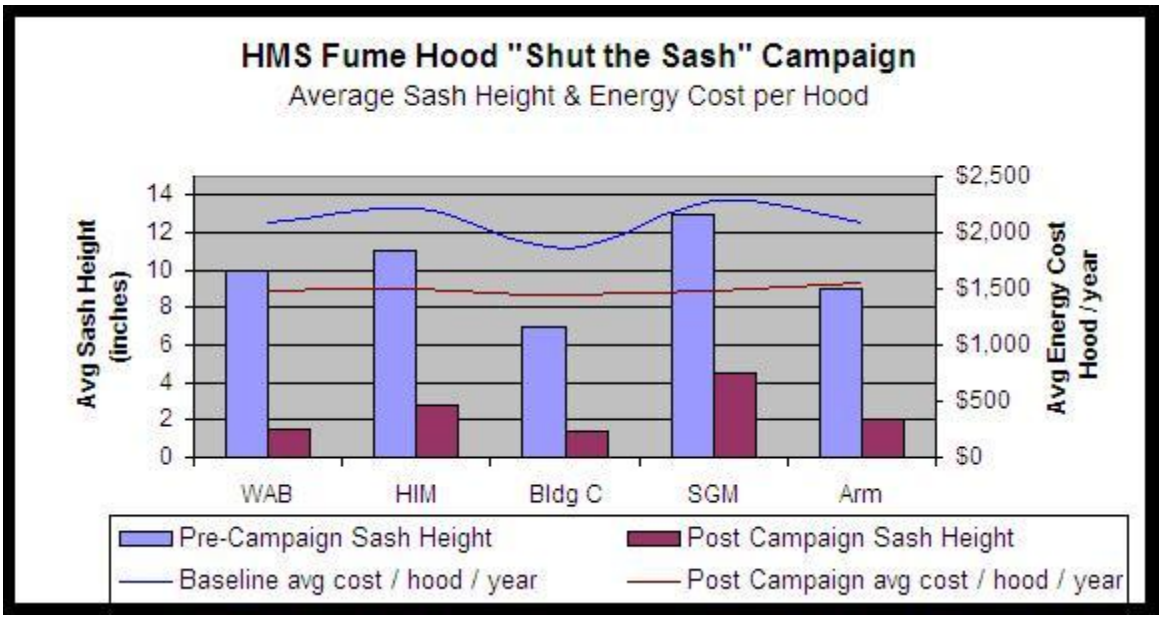
3.0 Case Studies

3.1 Case Study #1

Harvard University – Shut the Sash

The Harvard Office for Sustainability, at the time called the Harvard Green Campus Initiative, and HMS Facilities & Operations ran "Shut the Sash" campaigns in five buildings during late spring 2005, reaching out to hundreds of labs across campus. The campaign was run as a contest among labs, with a "Wine and Cheese Party" as the prize. The contest tapped into the innate competitive spirit of HMS researchers, and brought some fun to the campaign by getting people to notice the messaging and to encourage behavior change for a month, which eventually became a

habit.



"Shut the Sash" magnets were placed on each fume hood as a behavioral prompt, and other outreach was conducted through posters, fliers, and emails. Regular visual audits were conducted in the building as well, which allowed for personal contact with lab managers and strengthened the overall campaign.

As a result of the campaign, the average sash opening in the five participating HMS buildings dropped from 12 inches to 2 inches. This campaign alone saved HMS over $100,000 in energy costs per year and prevented nearly 1.2 million pounds of greenhouse gas emissions—the equivalent of removing roughly 120 cars from the road.

This project has been running ever since and is hugely successful! They are currently working on negotiations with their power provider to provide monetary rebates for the

4.0 Research & Analysis

Alright folks, so what is our potential impact? Well the price per cubic foot per minute to heat here in Washington is $3.37. With a 10in reduction in sash height this would reduce the flow rate by 431 cfm’s. Take 431 times 3.37 and this will save Western over $1400 a year per hood!

If we can get this program of closing the sash on say: 75 of the fume hoods on campus we would be saving $108,000 a year!

5.0 Conclusion

We believe that we have a well proven and strong framework to begin work on Western's Fume hood use. With our use of the previous class's 1 week study along with the results of the many other universities with successful behavior models we believe that the longer we wait to implement a project the less we save. The potential impact that this project can have on Western's energy footprint and overall budget exemplify why this project needs to, and will, continue in the near future.

6.0 Future Implementation

6.1 First and foremost, the actual campaign being implemented and carried out with a long term position in the most important step for this project to be successful.

6.2 In our study we were unable to audit all of the fume hoods on campus but a study of what we currently have and how we could improve those hoods would be very beneficial as they are very spread out and have no unifying management.

6.3 Continuing to research new technology and investigate the potential savings through the use of pilot projects.

7.0 Works Cited

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