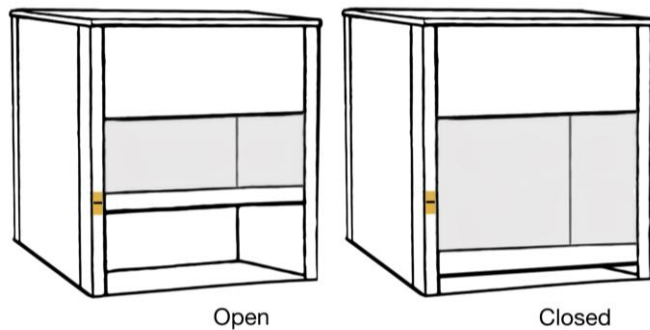


Laboratory Fume Hood Energy Use at OSU Corvallis

Oregon State University’s Corvallis campus (OSU) is home to hundreds of laboratory chemical fume hoods built to keep research and teaching labs safe from materials that may be harmful to human health. Fume hoods are one of the single largest consumers of energy at OSU. **A typical six-foot fume hood uses as much energy as three US homes¹.** Consistent attention to fume hood operation and function is critical to support OSU’s ambitious [carbon emissions reduction goals, improves safety](#) and also helps reduce operating costs.

There are two major kinds of fume hoods. Constant air volume (CAV) hoods remove the same amount of air, no matter whether the glass barrier or “sash” is open or closed. Variable air volume (VAV) hoods remove less air from the laboratory when the sash is partially or completely closed. When VAV hoods are left open, a significant amount of energy is wasted. When VAV hoods are left open past the normal 18-inch working sash height, the hood is longer safe for use.



To gauge chemical fume hood use, we surveyed all the hoods in one building on the OSU main campus. The Linus Pauling Science Center (LPSC) is home to 75 VAV fume hoods. When surveyed during summer 2022, we found that many hoods were left open when not actively in use (i.e., no user at or near the hood). Figure 1 summarizes a snapshot of how

many fume hoods were left open on the 2nd and 3rd floors. Surveys conducted on other days yielded similar results.

Operational fume hoods remove conditioned indoor air 24 hours a day, all year long. Variable air volume hoods remove significantly less indoor air when the sash is closed, resulting in lower energy cost to heat and cool the lab space. Table 1 shows the energy cost differences for a fully open versus fully closed variable volume fume hood. These numbers are specific to OSU: they were calculated using the average fume hood size among all 75 hoods in LPSC and OSU 2022 utility and carbon emission rates.

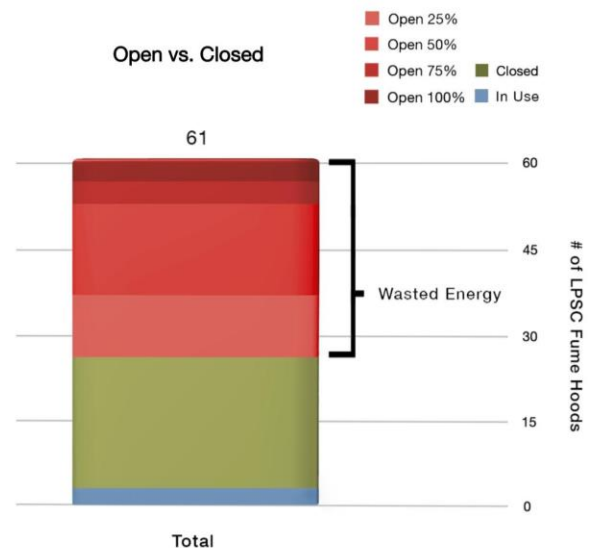


Figure 1 | LPSC fume hood status on August 31, 2022.

¹ Calculated using data from OSU Linus Pauling Science Center average fume hood size and airflow, OSU campus typical laboratory HVAC systems energy use, and average US home energy consumption from the US Energy Information Administration (EIA) and the US Census.

Fume Hood Sash Position	Annual Cost	Annual CO ₂ Emissions
Fully Open - 18" sash height	\$3,975	18 tons
Fully Closed - 3" sash height	\$660	3 tons

Table 1 | Annual energy cost for average LPSC fume hood.

The financial savings in Table 2 are estimates for LPSC based on the survey findings of Sustainability Office staff. The numbers represent the annual cost savings if all 75 fume hoods were closed versus the observed sash heights during surveys. The table rows represent different scenarios for how often the 75 fume hoods are open versus closed.

Hours Fume Hood Sashes are Closed	<i>Savings Compared to Survey Results</i>	
	Annual Energy Savings (whole building)	Annual CO ₂ Emission Savings (whole building)
Weekends & Mon-Fri 18 hours per day	\$126,275	559 tons
Weekends & Mon-Fri 12 hours per day	\$108,035	478 tons
Weekends only	\$43,895	194 tons

Table 2 | Energy savings in LPSC for closing fume hood sashes compared to survey results.

Independent of the energy costs and environmental impact, ensuring that all fume hoods are closed when not in use is also a safety issue. The “Close the Sash” initiative is designed to benefit each of these three concerns: energy costs, environmental impact, and personnel safety. The initiative educates and encourages fume hood users to close the sash when fume hoods are not in use at OSU facilities.

To learn more or contact us with any questions, please see: [Carbon Commitment Committee](#).