How Much Energy Do Your Biosafety Cabinets Use?

For National Energy Awareness Month (recognized annually throughout October), we would like to discuss the energy use of biosafety cabinets (BSC). Biosafety cabinets are ventilated enclosures that provide safe workspaces for biomedical research. These cabinets use high airflow to create a negative pressure differential inside the cabinet to create an isolated, safe workspace for researchers. The ventilation requirements of biosafety cabinets rely on the constant operation of air pumps, which consume a significant amount of energy.

Biosafety cabinets, along with other plug-in lab equipment like freezers and refrigerators, contribute to the energy-intensive nature of the lab space, consuming 5 to 10 times more energy per square foot than office space.[1] The International Institute for Sustainable Laboratories reports that plug-in laboratory equipment accounts for as much as 50 percent of the total energy use in a laboratory.[2] To assess the amount of this energy use associated with biosafety cabinets, the NIH and the University of Colorado Boulder measured the energy consumption of BSCs in their laboratories. The measured BSCs consumed between 2.34 kWh/day to 18.8 kWh/day.[3] The upper end of this range amounts to more than half the daily energy consumption of an average U.S. household to operate a single BSC unit. There are approximately 2,600 BSCs in operation at the NIH, which adds up to significant energy consumption. For this reason, lab staff are encouraged to prioritize energy efficiency of BSCs whenever possible.

There are many manufacturers that list their BSC units as energy efficient. However, there are not currently any third-party standards or certifications to verify these claims. This makes it very hard to evaluate the energy efficiency of any potential BSC purchases. The EPA is expected to investigate expanding the Energy Star Certification to BSCs in the near future. The NIH will monitor the potential development of an Energy Star certification and other energy standards for BSCs and provide updates as they become available. When purchasing a BSC at the NIH, all purchases must be cleared by the Division of Occupational Health and Safety (DOHS). DOHS also provides a number of additional services for BSCs at the NIH, including certification, maintenance, repair and decontamination. DOHS has also developed policies for ordering A2, B1 and B2 cabinets at the NIH.[4] Until standards for BSC energy efficiency are developed and available for consumer use, DOHS is an excellent resource for gauging the energy efficiency of a prospective BSC purchase.