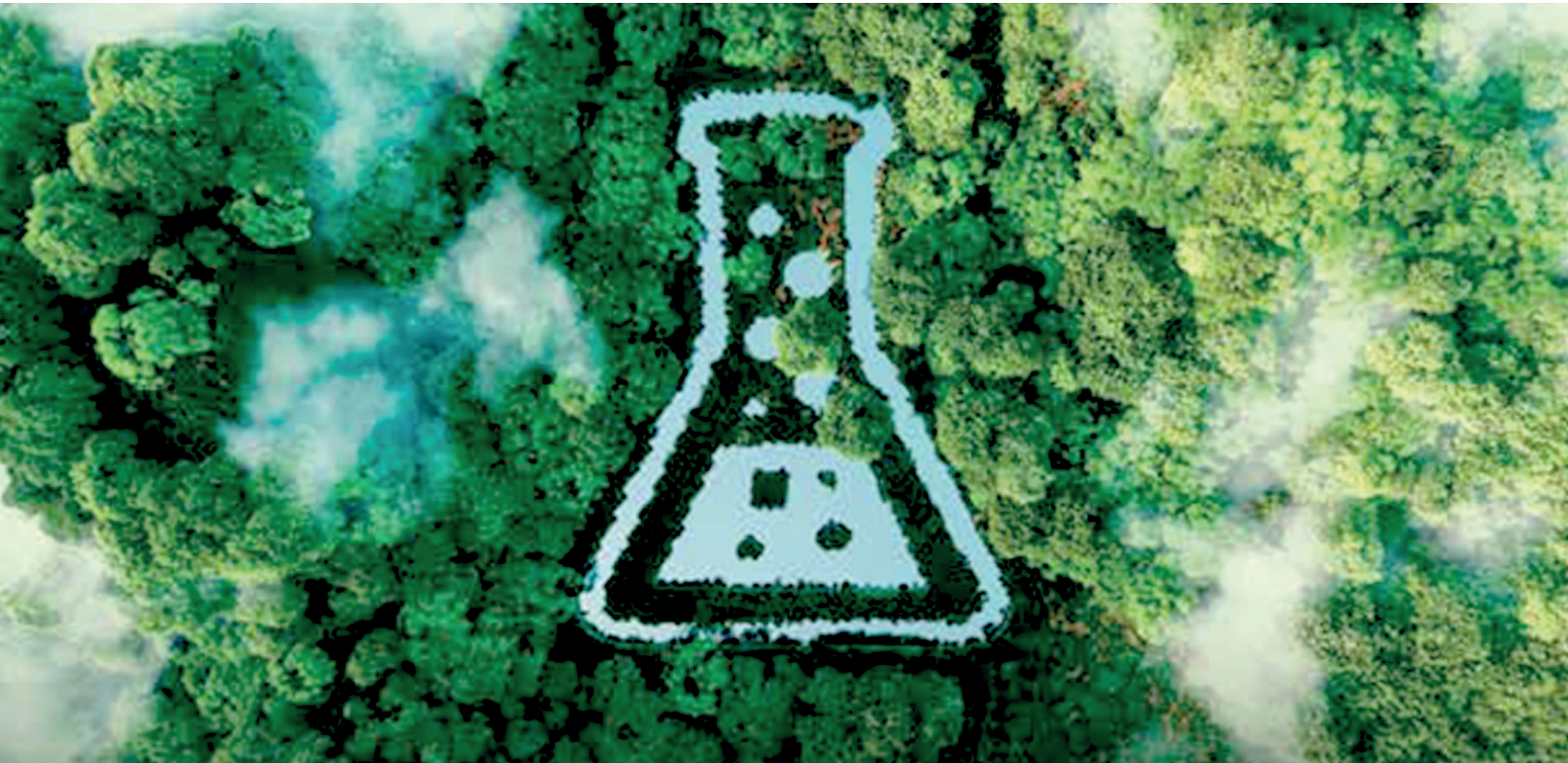




Breathing New Life: Stories of Sustainable Lab Transformations



How ductless fume hoods can reduce energy consumption and enhance air quality in and around your lab. Typical labs use five to ten times as much energy per square foot as an office building, with some specialty labs using up to 100 times this amount.

This high energy usage can be attributed to the need for specialized equipment, controlled environments like clean rooms and climate-controlled storage, and continuous operation of ventilation systems. These factors all significantly impact the environment and operational costs of research facilities.

Additionally, labs pose unique challenges regarding air quality due to the common use of hazardous materials. These materials can release airborne contaminants, posing health risks to lab personnel and polluting the surrounding air. Therefore, maintaining high air quality standards is essential for ensuring the safety and well-being of those in and outside of the lab. This can be achieved with engineered controlled systems, such as fume hoods and specialty containment enclosures; however, these systems are often major contributors to a lab's carbon footprint due to their power consumption or overall energy use intensity.

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Breathing New Life

Stories of Sustainable Lab Transformations



To create a truly sustainable lab, lab managers must take both energy efficiency and air quality into account. This involves a strategic approach that leverages advanced technologies and adheres to industry standards, particularly those set by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE). ASHRAE standards, such as Standard 90.1 for energy-efficient building design, Standard 62.1 for indoor air quality, and Standard 241-2023 for control of infectious aerosols, provide a framework for creating lab environments that are both sustainable and safe.

AIR QUALITY AND SAFETY

The balance between sustainability and the health and safety of lab personnel often hinges on engineered controlled systems and containment devices, as these traditionally rely on energy-intensive ventilation systems. However, dependence on these systems can be reduced by adopting proper air filtration systems, such as ductless fume hoods. Ductless fume hoods purify contaminated air within the enclosure using integrated filters before ejecting clear air back into the lab, eliminating the need for energy-demanding external exhausts. Labs can also benefit from reducing their chemical usage and adopting green chemistry practices.



For Alsym™ Energy, a manufacturer of lithium and cobalt-free rechargeable batteries, the decision to switch to ductless fume hoods was driven by their concern for the environment and the well-being of their personnel and neighbors. Occupying leased space, they were particularly concerned about the potential impact of chemical vapors on their fellow tenants. A representative from Alsym Energy shared, “[The] Erlab products have improved the safety of our lab by allowing us to contain operations which may not have been conducted in hoods in the past due to severely limited hood space. The Erlab hoods have also improved staff comfort and confidence as we know that hazardous vapors are being mitigated properly and our staff do not feel cramped into inadequate fume hood space.”

Another analogous situation unfolded at a prestigious racing tire technology center in Akron, Ohio. Here a lab manager was tasked with designing a new lab facility that would maximize flexibility, efficiency, and innovation. Given the facility’s proximity to both a residential neighborhood and a ball field, limiting environmental pollutants and creating a positive impact on the local community were critical considerations. In response to these concerns, the lab manager opted for ductless fume hoods, a decision initially met with skepticism from some board members. Following purchase, the lab proceeded to test 306 chemicals over 20 months, generating results that not only validated the lab manager’s belief in the product but also contributed to cleaner air for the nearby community. The success of these hoods was so pronounced that the accounting department questioned whether they had begun operation, as there was no notable increase in utility expenses—a common occurrence with new lab set-ups. The energy performance and innovation of the new lab space further contributed to LEED Gold certification.



ASHRAE and LEED standards share a common goal of promoting energy efficiency and sustainability in building design and operation. ASHRAE sets standards and guidelines for building systems which are often used as benchmarks or references in LEED certification criteria. Therefore, adhering to ASHRAE standards can help labs achieve LEED certification.

SUSTAINABLE BUILDING AND DESIGN APPROACHES

Whether renovating an old lab space or building a new one, the design should focus on minimizing the carbon footprint and pollution. This process starts with assessing a lab's function, how it may evolve, and its overall energy consumption. Such an evaluation highlights opportunities for energy savings, with ventilation systems frequently emerging as a prime candidate.

Driven by a commitment to sustainable practices, **Wellesley College** initiated a renovation of their science center, identified as the campus's largest energy consumer. The project aimed to address this by upgrading to more durable and insulated window framing and glass and installing modular filtered fume hoods. These enhancements improved the building's energy efficiency, contributing to the college's efforts toward LEED certification.

Similarly, **Bristol Community College** faced the challenge of designing a new Zero Net Energy (ZNE) teaching lab. While their initial design achieved LEED Silver Plus, it would have consumed over half of the energy generated by their recently installed solar panels and still not have come close to achieving ZNE.

When revisiting their strategy, the college discovered that the lab's air exhaust system was the main culprit. While many technologies were chosen to help achieve ZNE, the filtered fume hoods were vital to this goal. These hoods allowed for numerous energy conservation and cost-saving measures, including a reduction in air exchange rates, which for Bristol meant that the required air intake was reduced by two-thirds. This approach also made it feasible to implement [enthalpy wheel heat recovery systems](#), which are highly efficient in capturing and reusing heat from exhausted air. These systems are rarely used in traditional lab designs due to the risk of contaminating the fresh air supply.



The Wellesley College Science Complex

ERLAB SUSTAINABILITY INITIATIVES

The advanced solutions highlighted in these case studies reflect Erlab's commitment to fostering safe and sustainable lab environments, a mission that includes helping labs around the globe minimize their toxic gas emissions. Erlab achieves this through innovative and reliable approaches to zero-release filtration, detection, and real-time reporting.

Erlab's ductless filtering products are designed to safeguard against chemicals, particles, and biological hazards (Class 1) by employing a combination of carbon and HEPA filters. This minimizes the requirements for HVAC demands and, when used with Erlab's HALO ceiling mounted air filtration system, adds equivalent air change rates.

However, Erlab's vision for sustainability reaches beyond providing clean indoor air. Recognizing the importance of addressing global environmental issues, Erlab has partnered with CleanHub, an organization dedicated to plastic waste management. Through this partnership, Erlab contributes to the critical task of safely collecting and recovering ocean-bound plastic waste. This work is part of a broader initiative to support cleaner environments and foster sustainable employment opportunities in the global south.

Through these concerted efforts, Erlab has established itself as a leader in promoting environmentally responsible practices within the scientific community and beyond.



LEARN MORE

The Erlab Research and Development laboratory

Since 1968, **Erlab** has been a specialist, inventor and world leader in **ductless, zero-emission filtering fume hoods for laboratories** to provide total safety in chemical handling.

1 Erlab filtration

We provide technologies to protect laboratory staff from inhaling chemicals. This is made possible thanks to our **Research and Development (R&D) department**, which has continuously improved our filtration technology **for more than 50 years**. That's why, in 2009, we invented the **ERLAB ABOVE** label for tried and tested filtration technology.

2 The AFNOR NF X 15-211: 2009 standard

Erlab's filtration technology conforms to the **NF X 15-211: 2009 standard**, the industry's most demanding standard for molecular filtration, developed by a committee of independent scientists and specialized manufacturers.

This text imposes performance criteria linked to:

- Filtration efficiency
- Containment efficiency
- Air face velocity
- Documentation: **chemical listing**

3 The ESP programme

A set of three services included with the purchase of each device designed to ensure your safety.



eValiQuest

Risk analysis – Determination of protection needs – Determination of ergonomic needs.



ValiPass

Certified installation – Total safety for handling.



ValiGuard

Ongoing monitoring – Preventative and maintenance inspections – Device reconfiguration based on protection needs – Development of handling.

4 Flex technology

The combination of molecular and particulate filtration technologies allows a single device to meet laboratories' protection needs. This innovation from Erlab's R&D department offers unprecedented **flexibility, versatility and value**. A single device can be reconfigured over time and easily reassigned to other applications.

5 Smart technology

Smart technology is a **simple and innovative** means of communication that improves safety. This technology uses a light and sound signal to indicate the user's level of protection. The advantages of the technology are:

- 1/ Light pulsation:** Real-time communication via LED light pulses intuitively alerts the user to the device's operating status.
- 2/ Simplicity:** One-touch activation.
- 3/ Detection system:** The exclusive detection system continuously monitors filtration performance.
- 4/ Built-in monitoring:** This service provides direct access to the **status, settings and history** of your device.

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