



Advancing Science and Ecological Leadership

Sustainable laboratory design is key to creating scientific spaces that prioritize environmental stewardship, energy efficiency, and occupant well-being.

Sustainable laboratory design goes beyond traditional considerations of functionality and efficiency and encompasses ecologically conscious practices and design strategies that minimize resource consumption, reduce waste, shrink the ecological footprint of research activities, and promote a healthier working environment.

Perhaps most meaningfully, it also aligns with scientific values and principles of understanding and preserving the natural world and ensuring that research is conducted in an ethical and responsible manner and contributes to the advancement of scientific research and innovation by fostering a culture of sustainability in the scientific community.

Put simply, sustainable design is efficient, resilient, and healthier for occupants. As laboratories are known for their intensive resource consumption and potential environmental impacts, designing them with sustainability in mind is crucial for mitigating these effects and promoting a greener future.



ENERGY EFFICIENCY & COST SAVINGS

Sustainable design and energy efficiency are synonymous. Efficient lab design and planning incorporates energy-efficient strategies that result in significant cost savings in operations and maintenance as well as energy through:

Reduced Power Consumption

Implementing energy-efficient lighting systems, equipment, and HVAC systems helps laboratories minimize their energy usage, resulting in lower utility bills and reduced environmental impact.

Ventilation and Air Quality

Laboratories require specialized ventilation systems to maintain air quality and ensure the safety of occupants. Sustainable designs incorporate energy-efficient ventilation systems equipped with high-efficiency particulate air (HEPA) filters to remove airborne contaminants. Heat recovery systems can also be employed to reduce the energy needed for conditioning incoming air.

Optimization of Lab Layout

Precise planning and design, including placement of equipment, fume hoods, and workstations, can enhance airflow, maximize natural lighting, and reduce the need for excessive artificial lighting and ventilation.

Flexibility and Adaptability

Sustainable laboratories are designed with flexibility in mind, allowing for future changes and adaptations to the research and equipment needs. Modular casework and flexible lab layouts enable reconfiguration of spaces, minimizing material waste and optimizing space utilization. This adaptability reduces the need for new construction or renovations, saving resources in the long run.

Renewable Energy Integration

Incorporating renewable energy sources, such as solar panels or geothermal systems, can offset a lab's energy demand, lower dependence on fossil fuels, and contribute to a greener energy mix for the entire facility.



HEALTH & WELL-BEING OF LAB PERSONNEL

Sustainable lab design prioritizes the health and well-being of lab personnel, leading to increased productivity and job satisfaction.

Indoor Air Quality

Efficient ventilation systems and air filtration promotes indoor air quality, reducing exposure to harmful chemicals and pollutants and improving the overall health of lab occupants.

Natural Lighting and Biophilic Design

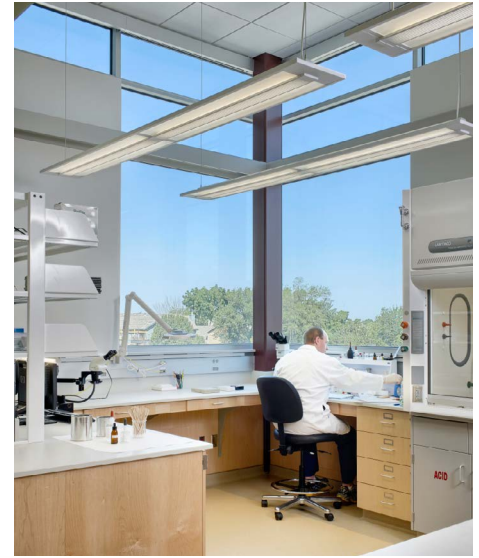
Maximizing natural light with windows, skylights, or light wells enhances the visual environment, reduces reliance on artificial lighting, and improves the well-being, mood, and productivity of lab personnel. Incorporating biophilic design elements, such as indoor plants or natural materials, further enhances the connection with nature. Even in environments where daylighting isn't practical, tunable white LED lighting can be utilized to save energy and can be programmed to simulate the 24-hour cyclical circadian color temperature shift.

Ergonomic Considerations

Integrating ergonomic design principles into lab workstations, seating, and equipment promotes comfort, reduces the risk of musculoskeletal injuries, supports the long-term health and well-being of lab personnel, and welcomes a diversity of bodies into the lab environment, supporting diversity, equity, and inclusion of the sciences.

Outdoor Environment and Landscaping

Integrating outdoor green spaces and landscaping not only enhances the aesthetics of a laboratory facility but also promotes biodiversity and the well-being of occupants. Incorporating native plants, green roofs, rain gardens, and outdoor seating areas can provide benefits such as improved air quality, reduced stormwater runoff, and spaces for relaxation and collaboration.



WASTE REDUCTION AND ENVIRONMENTAL STEWARDSHIP

Sustainable lab design emphasizes waste reduction and responsible resource management via:

Material Selection

Choosing environmentally friendly materials, such as low-toxicity chemicals, recycled or recyclable products, and sustainable construction materials, minimizes waste generation, supports a circular economy, and has added benefits for long-term user health.

Water Conservation

Implementing water-efficient systems, such as water-saving fixtures and equipment, as well as rainwater harvesting or greywater recycling, reduces water consumption and promotes responsible resource management.

Waste Management

Designing dedicated spaces for waste segregation, recycling, and hazardous waste disposal ensures proper waste management, reduces landfill contributions, and protects human health and the environment.

INNOVATION AND COLLABORATION

Sustainable lab design choices also carry the added benefit of supporting innovation and collaboration among researchers and lab personnel.

Flexibility and Adaptability

Designing labs with modular layouts and adaptable spaces reduces waste and allows for easy reconfiguration as research needs evolve, promoting interdisciplinary collaboration and enhancing the sharing of resources.

POSITIVE PUBLIC IMAGE AND FUNDING OPPORTUNITIES

Addressing global environmental challenges requires scientific contributions, and a sustainable scientific and laboratory environment sets a positive example for broader sustainability efforts. Sustainable practices enhance the credibility and reputation of scientific institutions, attracting funding and partnerships via:

Certifications and Recognition

Pursuing applicable sustainable design certifications demonstrate the institution's commitment to sustainability and carbon footprint reduction, and can lead to positive publicity, increased credibility, potential funding incentives, and attract like-minded partners.

Funding Prioritization

Many funding agencies and organizations prioritize projects with sustainable design elements, recognizing the long-term benefits and alignment with environmental goals. Sustainable lab design could even increase the likelihood of securing funding for certain research projects.

Sustainable design of the laboratory environment offers numerous benefits, including efficiency, enhanced health and well-being, alignment with organizational and brand values, and even stimulating new funding opportunities – all while demonstrating responsibility and leadership and contributing to a more sustainable future.



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