



OCTOBER 2018



The First Net-Zero Energy Building at NIH

The NIH completed construction and began occupying its first net-zero energy building in July of 2017, located on the NIEHS campus in North Carolina. This building was designed to use solar panels to produce energy equal to or greater than the total energy used by the building.

The net-zero energy (NZE) building operates as a warehouse (Building 110) and distribution center for the NIEHS campus. Data collected from August of 2017 to August of 2018 indicates the warehouse produced 190,000 kW-hours, while consuming an equivalent of 138,000 kW-hours. This means the warehouse successfully operated at the NZE standard and actually returned surplus electricity to the local power grid. The 52,000 kW-hours of surplus energy produced by the NZE warehouse is enough to power nearly 4 average North Carolina households for an entire year (approximately 13,200 kW-hours is consumed annually per average household).¹ The NZE warehouse is also on target to be certified [LEED Platinum](#), the highest level of Leadership in Energy and Environmental Design certification.

There are many physical aspects of the NZE warehouse that allow it to achieve a net-zero energy consumption. The warehouse has a [photovoltaic \(solar\) array](#) on the roof, which supplies the majority of the building's energy needs. Throughout the first year of activity, this system produced energy roughly equivalent to the annual consumption of 14 average North Carolina households. However, energy generation is only one aspect of achieving NZE; reducing energy use is of equal importance. The need for interior lighting was reduced by installing vaulted skylights and light tubes that provide natural sunlight during the day. In addition, the natural lighting is accented with daylight harvesting systems that turn on interior lights only enough to reach the necessary level. Further, the building and roof insulation was holistically designed with mechanical and electrical systems that ensure low energy usage. To promote energy efficiency, all air conditioning and heating systems in administrative areas are the highest efficiency currently available. Areas without air conditioning and heating, such as the receiving areas, feature energy efficient natural gas heaters. All of these systems work together to lower the amount of energy needed to power the NZE warehouse.

Even more important than the physical systems of the building is the manner in which the building is operated. The best designs can make a building *capable* of reaching NZE, but the operations and the habits of the occupants *actually make* the building NZE. Some of these aspects are programmed into the buildings operations, such as reducing air conditioning and heating during non-occupancy hours and using occupancy sensors to turn off lights when a room is empty. Other operations are dependent on the habits of the individuals that occupy the building, such as keeping the loading dock doors closed when they aren't needed and the outside temperature is below 65 °F. Other examples include turning off task lighting, computers and printers when they aren't needed and eliminating personal refrigerators, microwaves and printers to minimize electrical receptacle usage. Proper operation of an NZE building requires a complete shift in employee perspectives, behavior and cultures towards minimizing energy usage. Given the early returns on the NIEHS Building 110 warehouse, it is clear the occupants are embracing their roles efficiently!

October is nationally recognized as Energy Awareness Month. The NIEHS Building 110 warehouse is a perfect example of the change that is possible by prioritizing energy conservation. Not only does the Building 110 warehouse meet NZE, it actually produces extra energy! To learn more about the Building 110 warehouse, please visit this [article in the Environmental Factor](#). Our hope is that this warehouse will serve as the foundation for future building designs at NIH, encompassing office and laboratory buildings as well. But remember, buildings will only ever be as efficient as our habits allow them to be!

TAKE ACTION



Reducing Energy Usage in the Laboratory

Laboratory spaces are routinely some of the largest consumers of energy when compared to household or office spaces. The equipment demands, ventilation requirements and around-the-clock operation play a large role in laboratory energy use. However, there are still many ways to improve this aspect of your lab. Read inside to learn more!

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STAFF SPOTLIGHT



2018 Federal Energy Management Program Award Winners at the NIH

Federal Energy and Water Management Awards are distributed annually to recognize individuals, groups and agencies for their outstanding contributions in the areas of energy efficiency, water conservation, and the use of advanced and renewable energy technologies at federal facilities. In 2018, the NIH received two of these awards! Read inside to learn more!

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NEMS TRAINING

Did you know? Laboratory spaces can use up to 5 times the energy of office spaces, per square foot.¹ To learn more about energy conservation in labs at the NIH, please visit the [NEMS Training webpage](#) to view a short (20 minute) NIH environmental awareness training video.