



FOUR ADDITIONAL BUILDINGS MEET GUIDING PRINCIPLES FOR **HIGH-PERFORMANCE SUSTAINABLE BUILDINGS**

Argonne National Laboratory successfully documented compliance with the guiding principles for high-performance sustainable buildings (HPSBs) for three existing buildings and one new data center in fiscal year 2017 (FY 2017).

The three existing buildings are located in the Advanced Photon Source (APS) area and are all laboratory and office modules (LOMs) 431, 432, and 433. The LOM buildings are part of a group of eight combination lab/office modules situated around the APS. The LOMs provide convenient access to the beamlines and additional laboratories for researchers. The documentation for these three LOMs means that all of the fully occupied LOMs (seven of eight) are now meeting HPSB requirements.

The LOMs were originally chosen as candidates to meet HPSB requirements based on a study Argonne commissioned in 2009 to provide energy models for 10 buildings on campus. The original energy models demonstrated that HPSB compliance would be difficult. After the original models were completed, Argonne added heat recovery to the LOMs. The new heat recovery and advances in light-emitting diode (LED) lighting technology led Argonne to redo the energy models in 2015. The new models showed a path forward to HPSB compliance, with regard to energy reduction, through LED lighting upgrades. Argonne also documented the sustainable practices used while operating the buildings.



Reviewing the design documents for lighting improvements at the LOMs. Left to right: Adan Perez, (PMO), Jug Uppal (PMO), Catherine Hurley (PMO), and Terry Day (PMO).

One of Argonne's largest infrastructure projects of FY 2017 was the construction of the Enterprise Data Center (EDC). Inadequate existing infrastructure combined with a growing need for more computing power led to the decision to building the EDC. The EDC was constructed with one fully built-out data hall, another unoccupied data hall, and full infrastructure provisions for a third to be added on later, if needed. High availability, extensive power and cooling backup, and energy efficiency were the major design considerations for the EDC.



SUCCESS STORY: **GREEN BUILDINGS**

The Sustainability Program was involved from the beginning to ensure that the EDC could obtain compliance with HPSB requirements. Because the EDC is designed to be an unoccupied building, it was more difficult to implement the guiding principles than it would be in a standard office building. The design team met with industry and research subject matter experts to determine how to follow the guidelines where there were no directly applicable standards. Because of this, the EDC was designed following the guiding principles. When fully utilized, it will have a power utilization effectiveness (PUE) of less than 1.4, as directed by E.O. 13693.

In order to meet these PUE and energy reduction goals, the data center utilizes high-efficiency building materials, lighting, and mechanical equipment. In-row cooling with hot aisle containment is used to segregate high information technology loads from the existing building and increase efficiency. The EDC further encourages reduced energy usage on campus by providing a state-of-the-art new data center space into which equipment from older, less-energy-efficient data centers can be moved.

**FOR MORE INFORMATION
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**Sustainability Program Manager
sustainability@anl.gov**