

# ENERGY STAR Score for Museums

## You Can Manage What You Measure

By Joyce Lee

**M**useum institutions, whether they be major tourist attractions or small house collections, are part of our accumulated knowledge from childhood through adulthood. Museums are viable, and often valuable, community enterprises whose boards are frequently headed by key philanthropists and business leaders.

There are an estimated 35,000 museum institutions in the United States. The larger buildings, with their expressive, iconic designs and blockbuster exhibitions, can also be critical economic engines occupying prime locations in cities. What is often not on display, however, is their energy use.

Until a decade ago, sustainability and museums were rarely mentioned in the same sentence. Now, however, more than 200 museums have registered for LEED certification—no small feat for this building type.

In 2016, *The New York Times* reported on green art museums. A Pic Green network is active at the American Alliance of Museum. The International Association of Museum Facility Administrators conducts an annual survey workshop each fall. The Association of Science-Technology Centers pointed to the United Nations’ Sustainable Development Goals during its International Day. With increased interest within the museum community, the Environmental Protection Agency’s ENERGY STAR Frequently Asked Questions has added content for museum participation. Aiding this effort has been the rapid growth of the City Energy Project and 2030 Districts, as many leading museums are located in these cities.

Thanks to the transparency afforded by benchmarking legislation, our firm, in collaboration with the Institute for Market Transformation, conducted energy-consumption reviews in this unique building type. These institutions, selected from various cities’ reporting documents, were assembled into a single museums’ list (Figure 1).

### Initial Findings

The Energy Use Intensity (EUI, measuring energy use per square foot) of museums in cities with public benchmarking and transparency laws is generally well above the EUI of other buildings. As larger museums have cafes and restaurants, energy and water consumption could be especially significant on a per-square-foot basis. In Figure 1, the high end of EUI is six or seven times that of the lowest consumers. This wide performance range, from under 50 to over 300, points to multiple opportunities for efficiency improvement and design innovation.

“From the Paris flood in January 2018, affecting the Louvre Museum, Musee d’Orsay and surrounding transit,” says Christ Castro, Director of Sustainability for the City of Orlando, Florida, “to the recent Hurricane Irma which

WHY, RAFAEL GAMO



*The Speed Art Museum in Louisville, Kentucky.*

EXPLORATORIUM



*The Exploratorium, San Francisco, California.*

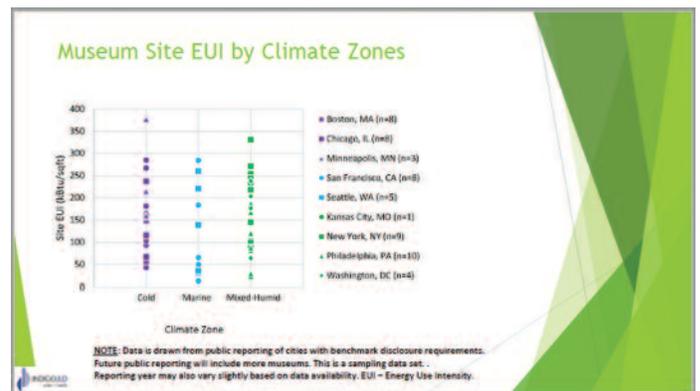


Figure 1. Museum Site EUI by Climate Zones.

SOURCE: A. NAMNUM AND J. LEE

affected our entire region, benchmarking museums provides us with an opportunity to better understand how these cultural buildings perform during day-to-day operations, as well as through extreme weather events. This includes actionable information and intelligence about ways to reduce operational costs, identify anomalies in building performance, measure and verify savings from recent retrofits and renovation, improve occupant comfort, and reduce our environmental impact.”

Another takeaway: there is not a significant difference in energy efficiency among asset sizes (under 100K sq. ft., 100K–400K sq. ft., over 400K sq. ft.) or building age. For example, an older building could have upgraded and efficient systems, while newer buildings may have inefficient envelopes or building facades. Moreover, operational protocols could yield “low-hanging fruit” savings. The types of museums (history, science, or art), however, could vary in energy use.

## Unique Challenges in Museums

Museums have many building characteristics that differ from other public buildings such as performance halls, convention centers and libraries. While energy efficiency may not dominate any staff or board meetings, dollars saved could become a revenue source for mission-driven budgets. When a donor is planning to make a gift to a museum, resource consumption is a perfectly legitimate issue, as many donors want to ensure that their support

goes to an institution’s mission and activities, rather than its physical upkeep.

Feedback from museum administrators has resulted in a few shared observations:

- Museums may not have adequate facility staff or the budgets to handle aging infrastructure or deferred maintenance.
- Not all museum staff may be aware of the benefits of energy and water efficiency.
- Lack of zone control for building systems may result in wasted resources.
- Unexpected visitor surges could burden systems designed for different parameters.
- Due to collection care requirements, many museums need to maintain a regulated range of temperature and humidity around the clock.
- Energy-efficient, quality artificial lighting and day-lighting inside galleries and public areas are moving beyond established practices.
- Green leases could help overall performance.

## What’s Next?

Although developing the 1-100 ENERGY STAR Score for museums is a major undertaking, voluntary reporting of energy and water use and other key data from museums of different types, sizes, and in different U.S. climatic regions would support such an effort. Outside of cities where benchmarking and transparency are already required, individual institutions are making voluntary efforts. Early leaders include the Buffalo Bill Center of the West in Cody, Wyoming; the Sciencenter in Ithaca, N.Y.; the KMAC Museum in Louisville, Kentucky; and the Grand Rapids Art Museum in Grand Rapids, Michigan. To reach critical mass for scoring analyses, a minimum of 300 museums is necessary.

If your museum is already involved in Portfolio Manager, and is willing to share data for this Museum ENERGY STAR project, please contact us. If you need help to enroll in Portfolio Manager, please engage with a local U.S. Green Building Council chapter or a local American Institute of Architects Committee on the Environment (COTE) supporting AIA 2030 goals. 🏛️

**Note:** *The author would like to thank Peter Bardaglio of the Ithaca 2030 District and Aurora Namnum of Cornell University for their assistance. The three museums illustrated here have achieved LEED Silver, Gold or Platinum ratings.*

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KEVIN REEVES/DLR GROUP



The Renwick Gallery in Washington, D.C.