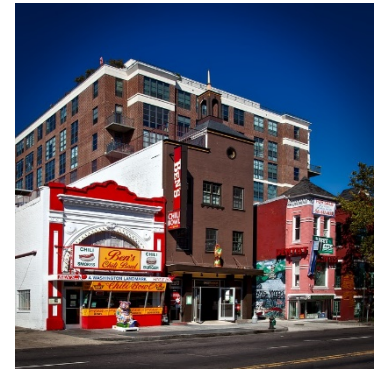


Background

Under the administration of Mayor Muriel Bowser, the District of Columbia is a leader among local governments in prioritizing building sustainability and performance. The Clean and Affordable Energy Act of 2008 (CAEA) was the first building energy benchmarking and disclosure policy in the country, requiring that energy and water efficiency of all large private and municipal buildings be reported to the District for public disclosure. Buildings are responsible for 74% of the District's greenhouse gas emissions, and energy benchmarking is critical to improving building performance and helping the District to achieve its goal of becoming the healthiest, greenest, and most livable city in the nation.



The CleanEnergy D.C. Omnibus Amendment Act (CEDC) of 2018 builds on the CAEA, expanding the number of covered buildings and requiring owners to meet specific Building Energy Performance Standards (BEPS). With a goal of reducing carbon emissions by 50% by 2032, the CEDC is one of the most ambitious clean energy laws in the country.

D.C.'s Department of Energy and Environment (DOEE) is the District's resource for energy programs, products and services. DOEE develops energy-related policies and plans and coordinates and facilitates the District's overall to achieve reliable, clean and affordable energy.

The Challenge

Benchmarking and BEPS are both programs that lean heavily on building level energy data. As the District began to amass large amounts of building data energy, unambiguously identifying building records in large databases became increasingly important. Traditionally, the District used tax lot identifiers and addresses, but tax lot identifiers often don't represent an exact building and are prone to change over time. Additionally, addresses are often prone to formatting and spelling errors.

In order to implement the District's benchmarking and BEPS policies, DOEE needed a way to uniquely identify covered buildings, associate those buildings with annual reports submitted by owners, and do so in a way that would remain consistent and persistent over time. Moving towards a unique building identification system would also enable DOEE to connect building energy data collected through BEPS with other District agency data, enabling powerful queries and otherwise hidden insights.

The Journey

Cities across the country all track buildings differently. Some use tax lot numbers, others standard addresses, and others their own internal building IDs. While any of these might suffice for tracking basic benchmarking data, the time needed to cleanse records due to issues such as duplicate or variant records is not trivial. More importantly, none of them easily allow consistent tracking of buildings' energy performance over multiple years as required by the District's BEPS requirement, effective on January 1st, 2021. DOEE needed one that could be deployed quickly, cheaply, and within their resource constraints.

The Discovery

DOEE had been a partner in the U.S. Department of Energy's (DOE) Standard Energy Efficiency Data (SEED) Platform development project since 2011. In 2019 they deployed SEED as their primary benchmarking database.

Through this relationship, DOEE joined a parallel DOE working group, the Better Buildings [Building Energy Data Analysis \(BEDA\) Accelerator](#), which was launched in order to pilot the recently developed Unique Building ID (UBIDs) in real-world applications. DOEE began joining the monthly call series and started to develop UBIDs as a potential solution to the District's needs.

The Solution: Unique Building Identifier (UBID)

UBIDs are a concept developed by DOE and the Pacific Northwest National Laboratory (PNNL) as a natural key to match building energy and attribute data between databases and to facilitate matching across datasets. UBID is a unique record number assigned to a two-dimensional space on a map. This space could correspond to a building's footprint, a tax lot, or other points of interest that cities need to track. Assigning IDs to spaces helps cities compare available information from different datasets about a building with a system that is more effective, consistent, and reliable to use than a building address, parcel ID, or other local serial numbers.

Cities that implement UBIDs can streamline systems that track changes in building ownership, tax or permit status, or other data across departments, greatly improving administrative efficiencies and capabilities. For example, tracking building data based on a UBID ensures yearly benchmarking data is matched consistently to the same building. Even if the benchmarked building were to change owners, if the reporter entering the information into ENERGY STAR® Portfolio Manager modifies or creates a new property ID, or if the data entry from property management had inconsistent syntax in the address field across years, a UBID will capture each year's reporting with a consistent and unique identifier. These data can then be paired with other city-wide datasets, like zoning codes from urban planning, special business districts from economic development, demographics from a city census, or other pertinent information to better manage and leverage analytical resources.

The Implementation

DOEE began working to create UBIDs with direct support from the PNNL research team developing them. Working together, they developed an initial set of draft UBIDs for the District's buildings. Next, they navigated the question of which building footprint files and tax lot information should be used to reach the District's goal of assigning a UBID to every building in the city, which would then be tied to tax records.

“The steps laid out by PNNL were easy to follow and didn't require anything beyond very simple code.”

DOEE then replicated this process in-house to perfect the mapping of geolocated building footprints to tax lot data. Through the spring of 2020 they spent a total of two months mapping footprints to tax lot records, creating new UBIDs using PNNL's UBID pipeline program, and assigning them to the new buildings. DOEE leaned heavily on staff expertise in GIS and Python

as a means to quickly develop the final UBIDs for publishing.

DOEE is now working to refine their processes for ongoing maintenance and assignment of UBIDs to new buildings, as well as promoting adoption of UBIDs to other city departments' datasets so that all such datasets are connected. To promote wider adoption throughout the city, DOEE is developing a handful of case studies to share with other program managers. DOEE began this by publicly publishing the UBIDs on the District's [Open Data portal](#). Additionally, DOEE is conducting multi-lateral conversations with other District agencies about how UBIDs might be leveraged to improve workflows and track building-level data.

The Results

Two full-time employees, with two months' total effort, were able to achieve:

- *Assigned UBIDs to 163,467 buildings, matching them to common ownership lot data using the UBID cross-reference tool*
- *Assigned UBIDs to benchmarking data*
- *Replicated parcel-to-building matching with in-house GIS expertise (after consulting with the Office of the Chief Technology Officer)*
- *Incorporated UBIDs and linked data into the city's open data online portal*

DOEE is now fully prepared to support current and future benchmarking and BEPS activities using the UBID, and far better equipped to leverage their building data. They look forward to persuading other District agencies to incorporate UBIDs into their own datasets to unlock even more insights and capabilities.

When asked about the biggest implementation obstacles, DOEE noted that the biggest barrier was finding time to set aside for this project – DOEE, like many sustainability offices across the country, is pursuing any number of impactful initiatives at any one time, and it can be difficult to maintain focus. It wasn't until DOEE was able to dedicate a full-time employee that UBID deployment was able to begin in earnest. The decisive factor in DOEE's UBID implementation was the presence of full-time employees willing to learn about the UBID, recognize its potential, and champion its use.

Learn More & Get Started with UBID

We invite you to learn more about how the UBID can help your city implement or improve its own benchmarking program, or make your building datasets more meaningful, actionable, and sharable. Take a look at the UBID City Implementation Guide, review other resources at <https://ubid.pnnl.gov/>, and let us know how we can help at buildingid.pnnl.gov.

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