Data Access: How to Compile and Deliver Aggregate Whole-Building Data

EPA's Benchmarking and Building Performance Standards Policy Toolkit *aims to inform and support state and local government decision makers who are exploring adopting policies focused on reducing energy use and greenhouse gas (GHG) emissions from existing commercial and multifamily buildings in their communities. This fact sheet describes technical considerations that utilities must work through to successfully compile and deliver aggregate whole-building data to support building owners subject to benchmarking requirements. For more information on data access, see* Section 4 *of the toolkit.*

In order to provide aggregate whole-building data to facilitate benchmarking, utilities will need to ensure that all energy meters and/or service points measuring consumption can be "rolled up" to a building's complete and accurate energy usage. This is generally referred to as "meter-to-building mapping." Few if any utility data systems are currently set up to associate meter/account-level data with whole properties, as they are defined in EPA's ENERGY STAR Portfolio Manager. Therefore, "meter-to-building mapping" may require a combination of data system queries rather than a single look-up. To effectively perform this process, utilities typically work with the data requestor to:

- Understand the physical location of the property for which energy consumption data is requested
- Identify all the meter/service points within that location
- Confirm the accuracy and completeness of this meter list
- Establish an association in the utility data system between the multiple "real-world" meter/service points and the "virtual" record being used to capture aggregate data
- Maintain accurate meter-to-building mapping over time, to ensure that the aggregate consumption value reflects all the meters that track energy consumption during a given period

One utility strategy is to require that the data requestor proactively provide all meter numbers for which data will be aggregated by the utility. This effectively transfers the responsibility for data accuracy to the building owner and removes the need for the utility to develop advanced queries to identify every single meter on their back end. However, this can place a burden on the data requestor both during the initial data request and on an ongoing basis since building owners would be responsible for informing the utility when tenants or meters change to update the meter-to-building mapping. This may negatively impact customer experience and customer satisfaction. Further, a property owner may not be aware of every meter or service point at which energy consumption data are being tracked within their property.

For this reason, the predominant approach for meter-to-building mapping in the context of utility-led data access is for the utility to identify the meters associated with a given property based on a limited set of data points and identifiers provided by the requestor. Typically, this would be the main property address and any secondary addresses (e.g., an additional entrance on a cross street). Additional identifiers could include other values that the property owner would be expected to know, and that could help the utility fine-tune its query or confirm the identity of the requestor. Examples of these values are the utility account number for the "house meter" or common area meter controlled by the building owner. With this basic information the utility can conduct a lookup of all meter/service points and accounts associated with the indicated address(es) and then return this list to the requestor for review, confirmation, and fine-tuning as needed. The confirmation step is critical in ensuring the completeness and accuracy of the aggregate data. Utilities are encouraged to provide requestors with an "itemized receipt" or other persistent documentation identifying

all constituent meters that are rolled up into a given aggregate consumption value. Many utilities handle this by developing a dedicated web module to facilitate the initial meter-to-building mapping process and any ongoing mapping review as tenants move in and out of the property.[i] Once a process for identifying the constituent meters is established, the utility will need to consider:

- **Calendarization of the constituent meter data before aggregation.** In a multimeter setting, different meters may have different start and end dates for each reading. Therefore, when providing aggregate whole-building consumption values to the building owner for entry into a benchmarking tool, the utility will need to calendarize each component record in order to accurately assign a single start and end date for each monthly aggregate meter consumption value. There are different approaches to calendarizing energy data, but a recommended methodology is to assign the energy consumption recorded for each constituent meter reading to a given calendar month based on the proportion of days in a given meter reading period that fall into that calendar month.
- **Provision of total/gross electricity consumed from the grid for properties with interconnected onsite renewable energy generation.** If a property's onsite renewable energy system is connected to the grid, and therefore can "sell back" to the utility any excess onsite production, the utility may bill for "net-metered" consumption. This amount is equal to total grid energy consumption for a given period minus the amount of energy sold back to the grid during the same period. Regardless, the aggregate energy consumption value delivered to the building owner for the purpose of benchmarking should reflect the *gross* (rather than net) amount of grid electricity delivered to the building for a given time period. This is important given that all grid-connected buildings will need to consume at least some grid electricity, *even if* their net-metered consumption for the period is negative. The use of net-metered consumption data—rather than gross consumption—can lead to inaccurate benchmarking results given that benchmarking metrics are based on total energy required to operate a building.[ii]
- **Maintenance of historical data.** The primary concern for many building owners may be to obtain whole-building energy consumption for the most recent calendar year in order to comply with an upcoming annual benchmarking reporting deadline. However, access to historical whole-building consumption data (e.g., 5+ years old) may also be needed in other situations. This includes situations where significant "re-bills" have taken place based on corrected data; instances in which a new building owner seeks to establish a historical performance record for the property; and/or a building owner needs to establish a historical baseline in order to understand the target they need to achieve under a BPS.

The technical process of meter-to-building mapping, and the effort required to develop this approach, will differ from utility to utility based on the structure of their existing data system. The deployment of advanced metering infrastructure may provide an opportunity to use GIS platforms to assist with meter-to-building mapping, and/or the use of different data systems (e.g., meter data management systems instead of billing information systems) may facilitate calendarization and accurate accounting of gross energy consumption for properties with onsite renewables.

[i] Generally speaking, the best practice is for utilities to automatically update meter-to-building mapping on their end as needed, without requiring the building owner to note when a given tenant or meter has changed. Furthermore, the meter-to-building mapping should be available for review by the building owner—not just upon initial data request, but on an ongoing basis. In the first quarter of 2021, EPA anticipates the launch of functionality that will allow meter-to-building mapping information to be tracked and maintained over time as meter-level metadata in Portfolio Manager. This will serve as a mechanism by which utilities and other data providers can provide the information necessary to validate the accuracy of the whole-building aggregate data, while maintaining individual tenant/resident data privacy.

[ii] For more information, see EPA's white paper on *Commercial Buildings and Onsite Renewable Energy*, available at https://www.energystar.gov/buildings/reference/research_and_reports/portfolio_manager_datatrends/renewable_report.