Electric Submetering System for Leased Spaces

A quick-reference guide for landlords and tenants considering an electric submetering system[1] for leased spaces.

Essential Features

Feature	Basic Requirements[2]	Enhanced Requirements
Data Types Measured *Type of resource (electricity, gas, water etc.) and variables (kWh, kW, kVar, etc.) measured by the submeter*	Monitor and record at a minimum electricity use in kWh	Monitor and record electricity use in kWh as well as electric demand in kW
Data Measurement Interval *Time interval between measurements*	Record data at intervals of 15 minutes or less with time stamp resolution to the second	-
Measurement Accuracy *Difference between a measured value and the true value*	• Maintain accuracy within 2% of the true value for kWh • No annual recalibration by users should be required to maintain this accuracy • Accuracy tests should be conducted automatically in accordance with NEMA/ANSI C12	Maintain accuracy within 1% of the true value for kWh with a supporting NIST traceable calibration certificate
Data Communication *Ability for the meter to relay stored data/information to a device or a system (e.g. online dashboard) for retrieval and analysis*	Relay collected data to a central repository	Use open communication protocols (e.g. Zigbee, modbus, BACnet, HTTPS) to ensure better communication capabilities and provide wider choice of devices to connect with
Security *Ability to securely store and transmit the data and prevent access by unauthorized entities and personnel*	Encrypt all data sent wirelessly using 128-bit (or greater) Advanced Encryption Standard (AES-128)	-
Data Storage *Ability to store data on the meter and/or on a central system*	Internal data storage for at least 128 measurements. In the event of loss of communications between a measurement device and the base station, the measurement device should continue to measure and store data without interruption. For communication losses exceeding the backup storage capabilities, the most recent data should be stored.	The system should be capable of maintaining all data collected for a minimum of 36 months in accordance with ASHRAE 90.1-2016
Data Visualization *Ability to analyze and display data in a user-friendly manner*	• Display real-time consumption (15 min intervals or less) with comparison to prior period (e.g. day/week/month and/or year) • Show monthly total energy use	Mobile device-enabled display
Data Export *Ability to export data in a format that is readable by other systems and devices*	Export time series data in 15 minute intervals or less in csv format	Export data in Green Button standard format. Application Programming Interface (API) to export data to external applications.

Additional Features

In addition to the essential features above, you may also be interested in these additional features	
Benchmarks	Ability for the analysis system to calculate weather-normalized energy use benchmarks to compare and assess the performance of the building over time
Alerts	Ability for the analysis system to generate alerts to indicate special events such as unusually high energy consumption or when demand exceeds set thresholds

Cost Considerations

Costs can include more than just the submeter itself. Be sure to request information about the following cost factors	
Total Cost of Ownership — 5 years	Total cost to operate and maintain the submetering system for 5 years, including initial and recurring costs
Hardware Costs	Costs related to submeters, gateways, and other peripheral hardware required to collect and transmit data
Software Costs	Costs related to firmware, data collection, cleansing and analysis of data, subscription support
Installation Costs	Cost of installing a submeter and any other devices, including the costs to program the system to communicate with other equipment, to ensure proper data collection, storage and analysis
O&M Costs	On-going costs for hardware and software to ensure proper operation. These costs include meter calibration, software license, data storage, software subscription for access to data and information

Resources

Energy Management Information Systems (EMIS) Specification and Procurement Support Materials
Templates for specification, procurement, and selection of submetering system
https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/emis_proc_spec_BBA_FINAL_021815_508.pdf

Metering Best Practices: A Guide to Achieving Utility Resource Efficiency, Release 3.0
Effective submetering strategies, technologies, and programs
https://www.energy.gov/sites/prod/files/2015/04/f21/mbpg2015.pdf

Submetering: Providing the Information Necessary to Manage Energy Consumption
Benefits and case studies for submetering
http://www.imt.org/uploads/resources/files/Commercial_Energy_Policy_Fact_Sheet_-_Submetering.pdf

Energy information systems (EIS): Technology costs, benefit, and best practice uses
Comprehensive market assessment of submetering costs and benefits
http://eta-publications.lbl.gov/sites/default/files/6476e.pdf

Endnotes

1. A sub metering system in this context refers to a system that measures energy use at the leased space level. It does not refer to end use sub metering (e.g. lighting, plug loads). The submetering system includes meters, data communication gateways, and software for analyzing and visualizing the data.

2. Basic requirements are the minimum requirements for Green Lease Leader applications. Enhanced requirements are additional requirements that may be beneficial for the landlord and tenant and/or required by other programs.

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