Energy metering

EA3.1 | Possible point

Intent

To provide information to support the ongoing accountability and optimization of building energy performance and identify opportunities for additional energy-saving investments.

To provide accurate energy-use information to support energy management and identify opportunities for additional energy-saving improvements.

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To support energy management and identify opportunities for additional energy savings by tracking building-level and system-level energy use.

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Requirements

Have in place a computer-based building automation system (BAS) that monitors and controls major building systems, including at a minimum, heating, cooling, ventilation and lighting. Have a preventive maintenance program in place that ensures BAS components are tested and repaired or replaced according to the manufacturer's recommended interval. Demonstrate that the BAS is being used to inform decisions regarding changes in building operations and energy-saving investments.

Develop a breakdown of energy use in the building, either through EA Credits 2.1 and 2.2 or by using energy bills, spot metering or other metering to determine the energy consumption of major mechanical systems and other end-use applications. This analysis of major energy-use categories must have been conducted within 2 years prior to the date of application for LEED 2009 for Existing Buildings: Operations & Maintenance certification.

Based on the energy-use breakdown, employ system-level metering covering at least 40% or 80% of the total expected annual energy consumption of the building. Permanent metering and recording are required. All types of submetering are permitted.

Demonstrate that system-level metering is in place covering the percentage of total expected annual energy consumption of the building as outlined in the table below.

System Level Metering Requirements

Percentage of Total Annual Energy Consumption to be Metered	Number of Largest Energy Use Categories to be Covered by 80% or more	Points
40%	1 of 2	1
80%	2 of 3	2

Demonstrate that the number of the largest energy-use categories from the breakdown report outlined in the table are covered by at least 80% (i.e., if energy use in the 2 or 3 largest categories is each 100 Btus/year, at least 80 Btu/year in 1 or 2 of them must be metered).

Have in place a computer-based building automation system (BAS) that monitors and controls key building systems, including, but not limited to, heating, cooling, ventilation and lighting. Have a preventive maintenance program in place that ensures BAS components are tested and repaired or replaced according to the manufacturer's recommended interval. Demonstrate that the BAS is being used to inform decisions regarding changes in building operations and energy-saving investments.

Develop a breakdown of energy use in the building, either through EA Credits 2.1 and 2.2 or by using energy bills, spot metering or other metering to determine the energy consumption of major mechanical systems and other end-use applications. This analysis of major energy-use categories must have been conducted within two years prior to the date of application for LEED for Existing Buildings: O&M certification.

Based on the energy-use breakdown, employ system-level metering covering at least 40% or 80% of the total expected annual energy consumption of the building. Permanent metering and recording are required. All types of submetering are permitted.

- **EA Credit 3.2** (1 point): Demonstrate that system-level metering is in place covering at least 40% of the total expected annual energy consumption of the building. Further, at least one of the two largest energy-use categories from the breakdown report must be covered to the extent of 80% or more (i.e., if energy use in the two largest categories is each 100 BTUs/year, at least 80 BTUs/year in one of them must be metered).
- **EA Credit 3.3** (1 point): Demonstrate that system-level metering is in place covering at least 80% of the total expected annual energy consumption of the building. Further, at least two of the three largest energy-use categories from the breakdown report must be covered to the extent of 80% or more.

Metering must be continuous and data logged to allow for an analysis of time trends. The project must compile monthly and annual summaries of results for each system covered. Meters must be calibrated within the manufacturer's recommended interval if the building owner, management organization or tenant owns the meter. Meters owned by third parties (e.g., utilities or governments) are exempt.

Develop a breakdown of energy use in the building, either through EA Credits 2.1 and 2.2 or by using energy bills, spot metering or other metering to determine the energy consumption of major mechanical systems and other end-use applications. This analysis of major energy-use categories must have been conducted within two years prior to the date of application for LEED for Existing Buildings: O&M certification.

Based on the energy-use breakdown, employ system-level metering covering at least 40% or 80% of the total expected annual energy consumption of the building. Permanent metering and recording are required. All types of submetering are permitted.

- **EA Credit 3.2** (1 point): Demonstrate that system-level metering is in place covering at least 40% of the total expected annual energy consumption of the building. Further, at least one of the two largest energy-use categories from the breakdown report must be covered to the extent of 80% or more (i.e., if energy use in the two largest categories is each 100 BTUs/year, at least 80 BTUs/year in one of them must be metered).
- **EA Credit 3.3** (1 point): Demonstrate that system-level metering is in place covering at least 80% of the total expected annual energy consumption of the building. Further, at least two of the three largest energy-use categories from the breakdown report must be covered to the extent of 80% or more.

Metering must be continuous and data logged to allow for an analysis of time trends. The project must compile monthly and annual summaries of results for each system covered. Meters must be calibrated within the manufacturer's recommended interval if the building owner, management organization or tenant owns the meter. Meters owned

by third parties (e.g., utilities or governments) are exempt.

Install advanced energy metering for the following:

- all whole-building energy sources used by the building; and
- any individual energy end uses that represent 10% or more of the total annual consumption of the building.

The advanced energy metering must have the following characteristics.

- Meters must be permanently installed, record at intervals of one hour or less, and transmit data to a remote location.
- Electricity meters must record both consumption and demand. Whole-building electricity meters should record the power factor, if appropriate.
- The data collection system must use a local area network, building automation system, wireless network, or comparable communication infrastructure.
- The system must be capable of storing all meter data for at least 36 months.
- The data must be remotely accessible.
- All meters in the system must be capable of reporting hourly, daily, monthly, and annual energy use.

Install meters for future tenant spaces so that tenants will be capable of independently metering energy consumption (electricity, chilled water, etc.) for all systems dedicated to their space. Provide a sufficient number of meters to capture total tenant energy use with a minimum of one meter per energy source per floor.

Install advanced energy metering for all base building energy sources used by the building.

The advanced energy metering must have the following characteristics.

- Meters must be permanently installed, record at intervals of one hour or less, and transmit data to a remote location.
- Electricity meters must record both consumption and demand. Whole-building electricity meters should record the power factor, if appropriate.
- The data collection system must use a local area network, building automation system, wireless network, or comparable communication infrastructure.
- The system must be capable of storing all meter data for at least 36 months.
- The data must be remotely accessible.
- All meters in the system must be capable of reporting hourly, daily, monthly, and annual energy use.

Establishment

Install advanced energy metering for the following:

- all whole-building energy sources used by the building; and
- major end uses that represent 20% or more of the total annual consumption of the building minus plug load use.

The advanced energy metering must have the following characteristics.

- Meters must be permanently installed, record at intervals of one hour or less, and transmit data to a remote location.
- Electricity meters must record both consumption and demand. Whole-building electricity meters should record the power factor, if appropriate.
- The data collection system must use a local area network, building automation system, wireless network, or comparable communication infrastructure.
- The system must be capable of storing all meter data for at least 36 months.
- The data must be remotely accessible.
- All meters in the system must be capable of reporting hourly, daily, monthly, and annual energy use.

Performance

Program the facility’s energy management system to set an alarm whenever the energy consumption and peak demand rise above the anticipated amount by more than 5%. The anticipated consumption and peak should be determined by analyzing historical facility performance and weather and operating conditions and should be set on at least monthly, preferably daily.

Demand measurements must be taken in time increments no longer than the increments used for utility billing or in one-hour increments, whichever is less time.

On at least a monthly basis, report the facility’s utility peak demand and total consumption and compare it with the data for the previous month and the same month from the previous year.

Option 1. Metering (1 point)

Install new or use existing tenant-level energy meters to provide tenant-level data representing total tenant energy consumption (electricity, natural gas, chilled water, steam, fuel oil, propane,biomass, etc.). Utility-owned meters are acceptable.

Commit to sharing with USGBC the resulting energy consumption data and electrical demand data (if metered) for a five-year period beginning on the date the project accepts LEED certification. At a minimum, energy consumption must be tracked at one-month intervals.

This commitment must carry forward for five years or until the space changes ownership or lessee.

Option 2. Advanced metering (2 points)

Install advanced energy metering for the following:

- all energy sources used in the tenant space; and
- any individual energy end uses that represent 10% or more of the total annual consumption of the tenant space.

The advanced energy metering must have the following characteristics.

- Meters must be permanently installed, record at intervals of one hour or less, and transmit data to a remote location.
- Electricity meters must record both consumption and demand. Whole-building electricity meters should record the power factor, if appropriate.
- The data collection system must use a local area network, building automation system, wireless network, or comparable communication infrastructure.
- The system must be capable of storing all meter data for at least 18 months.
- The data must be remotely accessible.
- All meters in the system must be capable of reporting hourly, daily, monthly, and annual energy use.

Install new or use existing building-level energy meters, or submeters that can be aggregated to provide building-level data representing total building energy consumption (electricity, natural gas, chilled water, steam, fuel oil, propane, biomass, etc). Utility-owned meters capable of aggregating building-level resource use are acceptable.

Commit to sharing with USGBC the resulting energy consumption data and electrical demand data (if metered) for a five-year period beginning on the date the project accepts LEED certification or typical occupancy , whichever comes first. At a minimum, energy consumption must be tracked at one-month intervals.

This commitment must carry forward for five years or until the building changes ownership or lessee.

Install new or use existing base building-level energy meters, or submeters that can be aggregated to provide base building-level data representing total building energy consumption (electricity, natural gas, chilled water, steam, fuel oil, propane, etc.). Utility-owned meters capable of aggregating base building-level resource use are acceptable.

Commit to sharing with USGBC the resulting energy consumption data and electrical demand data (if metered) for a five-year period beginning on the date the project accepts LEED certification or typical occupancy, whichever comes first. At a minimum, energy consumption must be tracked at one-month intervals.

This commitment must carry forward for five years or until the building changes ownership or lessee.

Establishment

Install new or use existing building-level energy meters or submeters that can be aggregated to provide building-level data representing total building energy consumption (electricity, natural gas, chilled water, steam, fuel oil, propane, etc). Utility-owned meters capable of aggregating building-level resource use are acceptable.

Performance

Compile meter data into monthly and annual summaries; meter readings can be manual or automated.

Commit to sharing with USGBC the resulting energy consumption data and electrical demand data (if metered) for a five-year period beginning on the date the project accepts LEED certification or typical occupancy, whichever comes first. At a minimum,

energy consumption must be tracked at one-month intervals.

This commitment must carry forward for five years or until the building changes ownership or lessee.