

Utility Metering Requirements (Building and Sub-level)

Purpose

1. This document consolidates, modifies, and supersedes any conflicting or less-rigorous metering requirements and guidance in multiple LANL Standards locations.¹
2. It supersedes the technical material in VAR-10538.

Requirements

In DOE-owned new facilities, additions, and existing buildings undergoing a modernization or major renovation²:

1. Install building-level energy and water meters. (Requirement 14a2-001)
 - a. Install electric, natural gas, and steam meters except when any of the following apply:
 - i. The building is less than 1,000 square feet
 - ii. The existing building is planned to be razed within 5 years
 - iii. The building does not have an energy-consuming heating or cooling system
 - iv. The building is between 1,000 and 5,000 square feet and does not house or serve significant energy-consuming equipment or processes including any of the following Facility Information Management System (FIMS) usage codes:
 - 210 – Hospital
 - 291 – food service areas greater than 1,000 square feet
 - 297 – Data center
 - 3xx – laboratory functions
 - 5xx – Industrial*
 - 5xxx – Industrial*

** Note: Industrial codes 5xx and 5xxx include chiller plants, steam plants, and pumping stations (among many other types of industrial facilities)*
 - v. The Site Sustainability Program in Utilities and Infrastructure (UI) FOD (email [here](#)) has approved a heating hot water (hydronic) meter in lieu of a steam meter. Otherwise, all other applicable meter types discussed herein shall be installed.
 - b. Install potable water meters except when any of the following apply:
 - i. the existing building is planned to be razed within 5 years
 - ii. the building does not house or serve high water-consuming equipment or processes; i.e., consuming more than 500 gallons per day
 - iii. when the building is less than 5,000 gross square feet

¹ Including but not limited to:

ESM Chapter 3 Civil, Section G30 Site Civil/Mechanical Utilities, rev. 3
ESM Chapter 6 Mechanical, Section D10-30GEN General Mechanical Requirements, rev. 5
ESM Chapter 7 Electrical, Section D5010 Electrical Service & Distribution, rev. 5
Tailored Standards Manual, STD-342-600, rev. 0 and rev. 1
LANL Master Specification Section 26 2713, Electricity Metering, rev. 5

² Terms defined in Ch. 14's main document. Other terms may be in [Conduct of Engineering Glossary](#).

- c. Exceptions to these requirements must be approved by the appropriate utility system engineering representative. Form 2137 CoE Variance or Alternative Method may be required to document the decision; contact Chapter POC.
2. Sub-meters (in addition to building-level meters) are required for (Requirement 14a2-002):
 - a. Renewable energy systems, such as a photovoltaic or solar thermal water heating, whether roof-mounted or on-the-ground. These must be metered independently to allow for reporting energy generation separately from building usage.
 - b. Potable make-up water for cooling towers, or other high-potable-water-using process.
 - c. Potable water for permanent irrigation systems when the irrigated landscape is 25,000 square feet or greater.
 - d. The following systems' electricity, when buildings are over 25,000 gross square feet:
 - i. HVAC systems
 - ii. interior lighting
 - iii. exterior lighting
 - iv. receptacle circuits

Data from these submeters shall be collected and recorded a minimum of every 15 minutes.⁴ See Communications Requirements below for data collection options. See ASHRAE 90.1-2019 for exceptions.
3. Shared meters: Where an existing building is metered with shared infrastructure (i.e., two or more buildings with one meter), a separate or sub-meter may not be required depending on the size, function, and complexity of the building(s). Email umetering@lanl.gov with questions about such situations. Form 2137 CoE Variance or Alternative Method may be required to document the decision; contact Chapter POC.
4. Communications Requirements
 - a. Building-level meters shall be connected to the LANL UI FOD owned and managed Metering Program Power Monitoring Expert (PME) system via an active yellow network connection.⁵ (Requirement 14a2-003)
 - i. Electric meters may be connected directly.
 - ii. Water, gas, and steam meters require a gateway device for cyber security and device firmware management purposes. The gateway device, connection to power with a class 2 power output to the meter, and yellow network connection shall be in an enclosure separate from the meter. Enclosures and connections are dependent on installation location (indoors or outdoors). Email umetering@lanl.gov to request current approved model selection, required communication gateway device information, and additional direction. *Note: Gateway lead time may be as much as 6-8 months.*
 - b. Where sub-meters (not building-level meters) are installed, they may or may not be in conjunction with a building-level utility meter; however, all sub-meters shall be connected to one or more of the following monitoring systems (Requirement 14a2-004):
 - Building Automation System (BAS)

³ ASHRAE 90.1-2019 Section 8.4.3. Note that each sub-metered system will therefore require a dedicated lighting or power panel feeding it.

⁴ 15 minutes is a minimum requirement. More frequent readings are preferable.

⁵ At the time of this writing, this is the only method available for connection. LANL-UI is also investigating using a 900 MHz backbone so that smart meters can be used for small facilities.

- Supervisory Control and Data Acquisition (SCADA) System
- Equipment Surveillance Systems (ESS)
- Metering Program’s “Power Monitoring Expert (PME)” System

5. Building-level meter specifics

Meter make/model shall be determined by LANL-UI (due to rapid changes in available products, acceptable models may change frequently). To request current make/model for all utility meters (and any required communication equipment), email umetering@lanl.gov. UI must review, commission, and accept meter installations. (Requirement 14a2-005)

- a. Electricity
 - i. Refer to Specification Section 26 2713, *Electricity Metering*, for additional material installation details and yellow network connection requirements.
 - ii. Refer to LANL Standard Drawings ST-D5010-3, *Meter Connection Diagram*; ST-D5010-4, *Meter Installation Detail*; and ST-D5010-5, *Meter Connection Diagram*, for meter installation details and connection requirements.⁶
- b. Natural Gas
 - i. The meter shall incorporate pressure and temperature compensation.
 - ii. The meter may be installed upstream or downstream of the regulator station. Location approval by umetering@lanl.gov required.
- c. Steam
 - i. Email umetering@lanl.gov and site-sustainability@lanl.gov for requirements since steam metering will only apply to existing buildings and will vary based on the scope of work.
- d. Water
 - i. Refer to Mechanical Drawing(s) ST-D2020-1, *Site/Building Water Component Diagram*, for building water meter location.

REVISION RECORD

Rev	Date	Description	POC	OIC
0	09/06/2022	Initial issue.	Dalinda Bangert, <i>UI-OSI</i>	Michael Richardson, <i>ES-DO</i>
1	12/24/2024	Minor clarifications throughout.	Dalinda Bangert, <i>UI-OSI</i>	Michael Richardson, <i>ES-DO</i>

⁶ Revision planned for 2025; contact umetering@lanl.gov for latest drafts.