

REVISED BY JONLIN 11/02/11

CHAPTER 11

(CONSIDER ADDING DEFINITIONS TO) CHAPTER 2 - DEFINITIONS

Data Acquisition System. An electronic system managed by the building owner to collect, tabulate and display metering information.

End Use Category. A load or group of loads that consume energy in a common or similar manner.

Energy Source Meter. A meter placed at the source of the incoming energy that measures the energy delivered to the whole building or metered space.

Meter. A device that measures the flow of energy.

Subsystem Meter. A meter placed downstream of the energy supply meter that measures the energy delivered to a load or a group of loads.

Utility Meter. A meter owned by a utility company that measures the energy delivered to a building or portion of a building, for which the utility customer is billed.

SECTION 1130 — APPLICATION TO EXISTING BUILDINGS

Additions, alterations or repairs, changes of occupancy or use, or historic buildings that do not comply with the requirements for new buildings shall comply with the requirements in sections 1130 through 1134 ~~1134~~ 1135 as applicable.

1135 Energy Metering. Existing buildings shall comply with the energy metering provisions of Section 1205.

CHAPTER 12 ENERGY METERING AND ENERGY CONSUMPTION MANAGEMENT

1201.1 General. Buildings with a gross conditioned floor area over 20,000 SF shall comply with Chapter 12. Buildings shall be equipped to measure, monitor, record and display energy consumption data for each energy source and end use category per the provisions of this chapter, to enable effective energy management.

Exception: Where portions of one building are under the control of separate owners or tenants and have utility services supplied by separate and independent utility meters, a whole-building meter is not required. If the whole building has a total gross conditioned floor area larger than 20,000 SF, each such portion shall be required to provide energy supply metering and end use metering as required for whole buildings in Sections 1202 and 1203.

1201.2 Alternate Metering Methods Where approved by the building official, energy use metering systems may differ from those required by this chapter, provided that they are permanently installed and that the source energy measurement, end use category energy measurement, data storage and data display are at least as accurate and at least as effective in communicating actionable energy use information to the building management and users, as those required by this chapter.

1201.2 Conversion Factor. Any threshold stated in kW shall include the equivalent BTU/heating and cooling capacity of installed equipment at a conversion factor of 3,412 BTU per kW at 50% demand.

1202 Energy Source Metering.

Buildings shall have a meter at each energy source. For each energy supply source listed in section 1202.1 through 1202.4, meters shall collect data for the whole building or for each separately metered portion of the building where permitted by the Exception to Section 1201.

Exceptions:

1. Energy source metering is not required where end use metering for an energy source accounts for all usage of that energy type within a building, and the data acquisition system accurately totals the energy delivered to the building or separately-metered portion of the building.
2. Separate metering is not required for fire pumps, stairwell pressurization fans and associated life safety systems that operate only during testing or emergency.
3. Solid fuels such as coal, firewood or wood pellets that are delivered via mobile transportation do not require metering.

1202.1 Electrical energy. This category shall include all electrical energy supplied to the building and its associated site, including site lighting, parking, recreational facilities, and other areas that serve the building and its occupants.

1202.2 Gas and liquid fuel supply energy. This category shall include all natural gas, fuel oil, propane and other gas or liquid fuel energy supplied to the building and site.

1202.3 District energy. This category shall include all net energy extracted from district steam systems, district chilled water loops, district hot water systems, or other energy sources serving multiple buildings.

1202.4 Site-generated renewable energy. This category shall include all net energy generated from on-site solar, wind, geothermal, tidal or other natural sources.

1203 End-Use Metering.

Meters shall be provided to collect energy use data for each end-use category listed in section 1203.1 through 1203.7. These meters shall collect data for the whole building or for each separately metered portion of the building where permitted by the Exception to Section 1201. Multiple meters may be

used for any end-use category, provided that the data acquisition totals all of the energy used by that category.

Exceptions:

1. Up to 5% of the total calculated load of each end-use category may be included in other end use categories. For example, lighting or plug loads associated with HVAC or process equipment could be included in the HVAC or process loads.
2. Groups R-2 and R-3 multi-family residential buildings with independent dwelling units shall provide a single electric sub-meter for each dwelling unit, but are not required to provide separate electrical meters for HVAC loads, plug loads, miscellaneous loads and lighting for those dwelling units, per the requirements of Section C405.7. Energy use in staff areas, common areas or other areas outside of the residential dwelling units must be separately sub-metered per the requirements of 1203.1 through 1203.6, where the total of such areas exceeds 20,000 SF.
3. Separate metering or submetering are not required for fire pumps, stairwell pressurization fans and associated life safety systems that operate only during testing or emergency.

1203.1 HVAC system energy use. This category shall include all energy including electrical, gas, liquid fuel, district steam and district chilled water that is used by boilers, chillers, pumps, fans and other equipment used to provide space heating, space cooling, dehumidification and ventilation to the building, but not including energy that serves process loads, water heating or miscellaneous loads as defined in Section 1203. Different energy sources, such as gas, electric and steam, are not required to be summed together.

1203.2 Water heating energy use. This category shall include all energy used for heating of domestic and service hot water, but not energy used for space heating. If the total water heating energy use is less than 50 kW, the water heating energy use is allowed to be included in the miscellaneous energy use.

1203.3 Lighting system electrical use. This category shall include all electricity used by interior and exterior lighting, but not including plug-in task lighting.

1203.3.1 Lighting system Submetering. The following subsystems shall have submetering where the total connected load for the subsystem is greater than 50 kW:

- (1) Lighting which is exempt from the energy code, such as theatrical performance lighting.
- (2) Building exterior facade accent lighting

1203.4 Plug load electrical use. This category shall include all electricity used by plugged-in task lighting, appliances, computers, and other equipment and devices, but not including any devices included in other categories listed in 1203.

1203.4.1 Plug load Submetering. The following subsystems shall have submetering:

(1) Electric Vehicle Recharging stations.

1203.5 Process load energy use. This category shall include all energy used by any non-building operation load (e.g. commercial-scale cooking or refrigeration equipment, industrial processes or laboratory equipment, medical imaging equipment) that accounts for over 50 kW of connected load from all fuel sources. If the total process energy use is less than 50 kW, that energy use may be included in miscellaneous total energy use.

1203.6 Data center, communication center or server room energy use. This category shall include all electricity used by dedicated data centers, communication centers or server rooms where the equipment located in a single room or adjacent rooms exceeds 50 kW of connected load. Where the total connected load is 50 kW or less, that energy use may be included in the plug load energy use.

1203.7 Miscellaneous total energy use. This category shall include energy use for permanently connected loads other than those specified in Sections 1203.1 through 1203.6, such as elevators, escalators and swimming pool heating.

1204 Measurement Devices, Data Acquisition System and Energy Display.

1204.1 Meters. Meters and other measurement devices required by this Chapter shall be configured to automatically communicate the energy data to a data acquisition system. Utility company service meters are allowed to be used for the whole building supply metering provided that their energy supply data is fully integrated into the data acquisition system and energy display required by this Chapter. Source meters shall be digital-type meters and shall provide at least hourly data. Current sensors or flow meters are allowed for end use metering, provided that they have a tested accuracy of +/- 2%. Measurement devices shall provide hourly data.

1204.2 Data Acquisition System. The data acquisition system shall store the data from the required meters and other sensing devices for a minimum of 36 months. For each energy supply and end use category required by 1202 and 1203, it shall provide real-time energy consumption data and logged data for any hour, day, month or year.

1204.3 Energy Display. For each building subject to Section 1202 and 1203, a permanent, readily accessible and visible display shall be provided in the building accessible by building operation and management personnel. The display shall graphically provide the current energy consumption rate for each whole building energy source, plus each end use category, as well as the average and peak values for any day, week or year.

1204.3.1 Energy Display for Multi-Family Residential Dwelling Units. A power usage monitor shall be provided in each multi-family residential unit per the requirements of Section C405.7, in a location easily visible to occupants, and shall display daily, weekly and annual electricity use. The power usage monitor may be either a stand-alone device or integral with a thermostat or other device. Energy use for staff areas, common areas and other areas outside of the dwelling units must provide a data acquisition and

display system per the requirements of this chapter where the total conditioned area of such areas exceeds 20,000 SF.

1204.4 Commissioning. The entire system shall be commissioned in accordance with Section 1416. Deficiencies found during testing shall be corrected and re-tested and the commissioning report shall be updated to confirm that the entire metering and data acquisition and display system is fully functional. *(We should also add this to the commissioning form in Figure 14 B)*

1205 Metering for Existing Buildings: **(CONSIDER MOVING TO CONTENT OF 1205 TO SECTION 1135)**

1205.1 Existing Buildings that were originally subject to the requirements of this Chapter. Where new or replacement systems or equipment are installed in an existing building that was constructed subject to the requirements of this Chapter, metering shall be provided for such new or replacement systems or equipment so that their energy use is included in the corresponding end-use category defined in Section 1202. This includes systems or equipment added as a result of additions or alterations to existing buildings.

1205.1.1 For existing buildings smaller than 20,000 SF that were subject to the requirements of this chapter, where an addition increases the total conditioned floor area by more than 50% of the existing building area and causes the total building conditioned floor area to exceed 20,000 SF, metering and data acquisition system shall be provided for the entire building in accordance with the requirements of sections 1202 and 1203.

1205.1.2 For existing buildings that were subject to the requirements of this chapter, where the addition of new equipment or systems or the replacement of existing equipment or systems causes a system to exceed the 50 kW metering threshold for data center, communication center or server rooms, process loads, or for water heating, meters for such new or replacement equipment or systems shall be provided and integrated with the data collection and energy use display system.

1205.2 Existing Buildings that were not subject to the requirements of this Chapter. Where new or replacement HVAC systems or equipment are installed in an existing building larger than 20,000 SF that was not subject to the requirements of this Chapter, and where those HVAC systems or equipment exceed the thresholds defined in Table 12-1, metering shall be installed for those new systems or equipment. This includes additions or alterations to buildings originally smaller than 20,000 SF that cause the buildings to exceed 20,000 SF in conditioned area. Data wiring or signal capability shall be extended from those meters to a central location in the building, but a data acquisition and display system is not required unless the threshold indicated in 1205.2.1 is exceeded.

Exception: Where metering of replacement equipment, such as distributed heat pumps or fan coil units, would be disproportionately expensive due to mixing of loads at existing electrical panels or similar conditions, and where approved by the building official, new metering of other existing building systems with equal or greater energy usage may be provided instead.

1205.2.1 Data Acquisition System. Where more than 50% of the overall connected load of the building has been provided with end use meters as required by Section 1205.2, a data acquisition system and energy use display shall be provided per the requirements of Section 1203.

TABLE 12-1

HVAC COMPONENT ENERGY SUBMETERING THRESHOLDS FOR EXISTING BUILDINGS
Where required by Section 1205.2

Component	Submetering Threshold
Chillers and heat pumps	> 70 kW (240,000 Btu/h) cooling capacity
Packaged AC unit systems	> 70 kW (240,000 Btu/h) cooling capacity
HVAC fans	> 15 kW (20 hp)
Pumps	> 15 kW (20 hp)
Cooling towers and other heat rejection systems	> 15 kW (20 hp)
Boilers, furnaces and other heating equipment systems	> 300 kW (1,000,000 Btu/h) heating capacity