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Exception: Where site lighting and other exterior non-building electrical loads are served by an electrical service and meter that are separate from the building service and meter, the metering data from those loads is permitted to be either combined with the building’s electrical service load data or delivered to a separate data acquisition system.

XYZ.2.2 Site-generated renewable energy. This category shall include all electricity generated from on-site solar, wind, geothermal, tidal, or other natural sources. Net data shall be provided when energy is supplied to the grid.

XYZ.3 End-use metering. Meters shall be provided to collect energy use data for each end-use category listed in Sections XYZ.3.1 through XYZ.3.7. These meters shall collect data for the whole building or for each separately metered portion of the building where not exempted by the exceptions to Section XYZ.1. Not more than 10 percent of the total connected load of any of the end-use metering categories in Sections XYZ.3.1 through XYZ.3.6 is permitted to be excluded from that end-use data collection. Not more than 10 percent of the total connected load of any of the end-use metering categories in Sections XYZ.3.1 through XYZ.3.6 is permitted to consist of loads not part of that category. Multiple meters may be used for any end-use category, provided that the data acquisition system totals all of the energy used by that category. Full-floor tenant space sub-metering data shall be provided to the tenant in accordance with Section XYZ.3.7, and the data shall not be required to be included in other end-use categories. Minimum requirements for separation of electrical loads are included in Table XYZ.3-A.

Exceptions:

1. HVAC and water heating equipment serving only an individual dwelling unit does not require end-use metering.
2. Separate metering is not required for fire pumps, stairwell pressurization fans or other life safety systems that operate only during testing or emergency.
3. End use metering is not required for individual tenant spaces not exceeding 2,500 square feet (232 m²) in floor area when a dedicated source meter meeting the requirements of Section XYZ.4.1 is provided for the tenant space.
4. Healthcare facilities with loads in excess of 150 kVA are permitted to have sub-metering that measures electrical energy usage in accordance with the normal and essential electrical systems identified in Article 517 of the National Electrical Code, except that sub-metering is required for the following load categories:
 - 4.1. HVAC system electricity use per the requirements of Section XYZ.3.1.
 - 4.2. Water heating electricity use per the requirements of Section XYZ.3.2.
 - 4.3. Process load system electricity per the requirements of Section XYZ.3.6 for each significant facility not used in direct patient care, including but not limited to food service, laundry, and sterile processing facilities, where the total connected load of that facility exceeds 50 kVA.
5. End-use metering is not required for electrical circuits serving only sleeping rooms and guest suites in multifamily buildings where the residents are

96 primarily transient in nature. This exception does not apply to common areas or
97 to equipment serving multiple sleeping rooms.
98

99 **XYZ.3.1 HVAC system energy use.** This category shall include all electricity that is used
100 by boilers, chillers, pumps, fans and other equipment used to provide space
101 heating, space cooling, dehumidification and ventilation to the building, but not
102 including energy that serves process loads, water heating or miscellaneous loads
103 as defined in Section XYZ.3.
104

105 **Exceptions:**

- 106
- 107 1. All 120 volt equipment.
 - 108 2. 208/120 volt equipment in a building where the main service is 480/277
109 volt power and the HVAC loads are isolated and metered at 480/277
110 volts.

111

112 **XYZ.3.2 Water heating energy use.** This category shall include all electricity used for
113 heating of domestic and service hot water, but not electricity used for space
114 heating.
115

116 **Exception:** Water heating electricity use less than 50 kVA does not
117 require end-use metering.
118

119 **XYZ.3.3 Interior lighting system energy use.** This category shall include all electricity
120 used by interior lighting, but not including plug-in task lighting.
121

122 **XYZ.3.4 Exterior lighting system energy use.** This category shall include all electricity
123 used by exterior lighting, including lighting in parking structures and lots.
124

125 **XYZ.3.5 Plug load system energy use.** This category shall include all electricity used by
126 appliances, computers, plugged-in task lighting, and other equipment and
127 devices, but not including vertical transportation equipment or equipment
128 covered by other end-use metering categories listed in Section XYZ.3. In a
129 building where the main service is 480/277 volt, each 208/120 volt panel is
130 permitted to be assumed to serve only plug load for the purpose of Section XYZ,
131 unless it serves nonresidential refrigeration or cooking equipment.
132

133 **Exception:** Where the total panel main capacity of connected plug load
134 circuits is less than 20 kVA, end-use metering is not required.
135

136 **XYZ.3.6 Process load system energy use.** Meters shall collect data for electricity used by
137 any non-building process load, including but not limited to nonresidential
138 refrigeration and cooking equipment, laundry equipment, industrial equipment,
139 and stage lighting.
140

141 **Exception:** Where the total panel main capacity of process load circuits
142 is less than 50 kVA, end-use metering is not required.
143

144 **XYZ.3.7** **Elevators, escalators, moving walks, and transit systems.** Meters shall collect
 145 data for electricity used by any elevators, escalators, moving walks, and transit
 146 systems.

147
 148 **XYZ.3.8** **Renewable power source (net and total).** Meters shall collect data for
 149 electricity for renewable energy systems. Loads specifically fed by renewable
 150 are also metered.

151
 152 **XYZ.3.9** **Charging stations for electric vehicles.** Meters shall collect data for electricity
 153 for charging stations for electric vehicles.

154
 155 **XYZ.3.10** **Full-floor tenant space electrical sub-metering.** In a multitenant building, where
 156 more than 90 percent of the leasable area of a floor is occupied by a single
 157 tenant, an electrical energy use display shall be provided to the tenant in
 158 accordance with the requirements of Section XYZ.4.3. Electrical loads from areas
 159 outside of the tenant space or from equipment that serves areas outside of the
 160 tenant space shall not be included in the tenant space submetering. A single
 161 display is permitted to serve multiple floors occupied by the same tenant.

162 *TABLE XYZ.3-A: MINIMUM REQUIREMENTS FOR SEPARATION OF ELECTRICAL LOAD*

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 164

| Electrical Load Type | Electrical Services rated 50 kVA or less | Electrical Services rated more than 50kVA and less than or equal to 250 kVA | Electrical Services rated more than 250 kVA and less than or equal to 1000kVA | Electrical Services rated more than 1000kVA |
|--|--|---|---|---|
| Lighting including exit and egress lighting and exterior lighting | Not required | All lighting in aggregate | All lighting disaggregated by floor, type or area | All lighting disaggregated by floor, type or area |
| HVAC systems and components including chillers, fans, heaters, furnaces, package units, cooling towers, and circulation pumps associated with HVAC | Not required | All HVAC in aggregate | All HVAC in aggregate and each HVAC load rated at least 50 kVA | All HVAC in aggregate and each HVAC load rated at least 50kVA |
| Domestic and service water system pumps and related systems and components | Not required | All loads in aggregate | All loads in aggregate | All loads in aggregate |
| Plug load including appliances rated less than 20 kVA | Not required | All plug load in aggregate; Groups of plug | All plug load separated by floor, type or area; | All plug load separated by floor, type or area |

| | | | | |
|--|------------------------|--|---|---|
| | | loads exceeding 20 kVA connected load in an area less than 5000 sf | Groups of plug loads exceeding 20 kVA connected load in an area less than 5000 sf | All groups of plug loads exceeding 20 kVA connected load in an area less than 5000 sf |
| Elevators, escalators, moving walks, and transit systems | Not required | All loads in aggregate | All loads in aggregate | All loads in aggregate |
| Other individual non-HVAC loads or appliances rated 50 kVA or greater | Not required | All | Each | Each |
| Industrial and commercial process load centers 50 kVA or greater including theatrical lighting installations and commercial kitchens | Not required | All | Each | Each |
| Renewable power source (net or total) and dedicated loads. | Each group | Each group | Each group | Each group |
| Charging stations for electric vehicles | All loads in aggregate | All loads in aggregate | All loads in aggregate | All loads in aggregate |

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XYZ.4 Measurement devices, data acquisition system and energy display.

XYZ.4.1 Meters. Meters and other measurement devices required by this section shall have local displays or be configured to communicate electrical energy data to a data acquisition system. Source meters may be any digital-type meters that collect data of actual electricity use. All meters shall have an accuracy of +/- 2%, including current sensor error. All required metering systems and equipment shall provide at least 15-minute incremental data that is fully integrated into the data acquisition and display system per the requirements of Sections XYZ.4.2 and XYZ.4.3.

XYZ.4.2 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

180 each energy supply and end-use category required by Sections XYZ.2 and XYZ.3,
181 it shall provide real-time energy consumption data and logged data for any 15-
182 minute increment, day, month or year.

183
184 **XYZ.4.3 Energy display.** For each building subject to Sections XYZ.2 and XYZ.3, either a
185 readily accessible and visible display, or a web page or other electronic
186 document accessible to building management or to a third-party energy data
187 analysis service shall be provided in the building accessible by building operation
188 and management personnel. The display shall graphically provide the present
189 energy consumption data for each whole building energy source, plus each end-
190 use category, as well as the average and peak values for any day, week or year.

191
192 **XYZ.4.4 Commissioning.** The entire system shall be commissioned in accordance with
193 Section XYZ.5. Deficiencies found during testing shall be corrected and retested
194 and the commissioning report shall be updated to confirm that the entire
195 metering and data acquisition and display system is fully functional.

196

197 **XYZ.5 Metering for existing buildings.**

198

199 **XYZ.5.1 Existing buildings that were constructed subject to the requirements of this**
200 **section.** Where new or replacement systems or equipment are installed in an
201 existing building that was constructed subject to the requirements of this
202 section, metering shall be provided for such new or replacement systems or
203 equipment so that their energy use is included in the corresponding end-use
204 category defined in Section XYZ.2. This includes systems or equipment added in
205 conjunction with additions or alterations to existing buildings.

206

207 **XYZ.5.1.1 Small existing buildings.** For existing buildings that were constructed
208 subject to the requirements of this code, but were exempt from the
209 requirements of Section XYZ due to being smaller than the thresholds
210 set forth in Section XYZ.1, metering and data acquisition systems shall
211 be provided for additions over 10,000 square feet (929 m²) in
212 accordance with the requirements of Sections XYZ.2, XYZ.3, and XYZ.4.

213

214 **XYZ.5.2 Metering for HVAC equipment replacement.** Where permits are issued for new
215 or replacement HVAC equipment that has a total heating and cooling capacity
216 greater than 1,200 kBtu/hour and greater than 50 percent of the building's
217 existing HVAC heating and cooling capacity, within any 12-month period, the
218 following shall be provided for the building:

219

- 220 1. Energy source metering required by Section XYZ.2.
- 221 2. HVAC system end-use metering required by Section XYZ.3.1.
- 222 3. Data acquisition and display system per the requirements of Section
223 XYZ.4.

224

225 Each of the building's existing HVAC chillers, boilers, cooling towers, air
226 handlers, packaged units, and heat pumps that has a capacity larger than 5 tons
227 or that represents more than 10 percent of the total heating and cooling

228 capacity of the building shall be included in the calculation of the existing
229 heating and cooling capacity of the building. Where heat pumps are configured
230 to deliver both heating and cooling, the heating and cooling capacities shall both
231 be included in the calculation of the total capacity.

232
233 Each of the building's existing and new HVAC chillers, boilers, cooling towers, air
234 handlers, packaged units, and heat pumps that has a heating or cooling capacity
235 larger than 5 tons or that represents more than 10 percent of the total heating
236 and cooling capacity of the building shall be included in the HVAC system end-
237 use metering.

238
239 Construction documents for new or replacement heating and cooling
240 equipment projects shall indicate the total heating and cooling capacity of the
241 building's existing HVAC equipment and the total heating and cooling capacity
242 of the new or replacement equipment. Where permits have been issued for
243 new or replacement heating and cooling equipment within the 12-month period
244 prior to the permit application date, the heating and cooling capacity of that
245 equipment shall also be indicated. For the purpose of this tabulation, heating
246 and cooling capacities of all equipment shall be expressed in kBtu/hour.

247
248 **XYZ.5.3** **Tenant space electrical sub-metering for existing buildings.** For tenant
249 improvements in which a single tenant will occupy a full floor of a building, the
250 electrical consumption for the tenant space on that floor shall be separately
251 metered, and the metering data provided to the tenant with a display system
252 per the requirements of Section XYZ.4.3. For the purposes of this section,
253 separate end-use categories need not be segregated.

254
255 **Exception:** Where an existing branch circuit electrical panel serves
256 tenant spaces on multiple full floors of a building, only the specific
257 circuits feeding the tenant shall be monitored. The other circuits served
258 by the panel are not required to be monitored.

259
260 **XYZ.5.4** **Metering for complete electrical system replacement.** If all, or substantially all,
261 of the existing electrical system is replaced under a single electrical permit or
262 within a 12-month period, all of the provisions of Section XYZ shall be met.