



STATE OF WASHINGTON

# STATE BUILDING CODE COUNCIL

155-2018  
Revised 6/22/18  
Second Revision  
8/01/18

## Washington State Energy Code Development Standard Energy Code Proposal Form

Code being amended:  Commercial Provisions  Residential Provisions

Code Section # C409.3

Brief Description:

Require end-use metering for more than just HVAC and service water heating, similar to 2015 Seattle Energy Code.

Proposed code change text: (Copy the existing text from the Integrated Draft, linked above, and then use underline for new text and ~~strikeout~~ for text to be deleted.)

**C409.3 End-use metering.** Meters shall be provided to collect energy use data for each end-use category listed in Sections C409.3.1 through ~~C409.3.2~~ C409.3.6. These meters shall collect data for the whole building or for each separately metered portion of the building where not exempted by the exception to Section C409.1. Not more than 10 percent of the total connected load of any of the end-use metering categories C409.3.1 through C409.3.5 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 C409.3.1 through C409.3.5 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 submetering data shall be provided to the tenant in accordance with Section C409.3.6 and the data shall not be required to be included in other end-use categories.

### Exceptions:

1. HVAC and service water heating equipment serving only an individual dwelling unit or sleeping 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 in floor area when a dedicated source meter meeting the requirements of Section C409.4.1 is provided for the tenant space.
4. Healthcare facilities with loads in excess of 150 kVA are permitted to have submetering that measured electrical energy usage in accordance with the normal and essential electrical systems identified in Article 517 of the Seattle Electrical Code, expect that submetering is required for the following load categories:
  - 4.1. HVAC system energy use per the requirements of Section C409.3.1.
  - 4.2. Service water heating energy use per the requirements of Section C409.3.2.
  - 4.3. Process load system energy per the requirements of Section C409.3.5 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 the facility exceeds 100 kVA.

5. End-use metering is not required for electrical circuits serving only sleeping rooms and guest suites within Group R-1 occupancies. This exception does not apply to common areas or to equipment serving multiple sleeping rooms.

**C409.3.1 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, service water heating or miscellaneous loads as defined in Section C409.3. Multiple HVAC energy sources, such as gas, electric, and steam, are not required to be summed together.

**Exceptions:** This category shall not be required to include electrical energy consumed by:

1. All 120 volt equipment.
2. ~~208/120 volt equipment in a building where the main service is 480/277 volt power.~~ An HVAC branch circuit where the total MCA of equipment served equates to less than 10 kVA.
3. ~~Electrical energy fed through variable frequency drives that are connected to the energy metering data acquisition center.~~ Individual fans or pumps that are not on a VFD.

**C409.3.2 Service 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.

**Exception:** Service water heating energy use less than 50 kW kVA does not require end-use metering.

**C409.3.3 Lighting system energy use.** This category shall include all energy used by interior and exterior lighting, including lighting in parking structures and lots, but not including plug-in task lighting.

**C409.3.4 Plug load system energy use.** This category shall include all energy used by appliances, computers, plugged-in task lighting, and other equipment or equipment covered by other end-use metering categories listed in C409.3. In a building where the main service is 480/277 volt, each 208/120 volt panel is permitted to be assumed to serve only plug load for the purpose of Section C409, unless it serves nonresidential refrigeration or cooking equipment.

**Exception:** Where the total connected load of all plug load circuits is less than 50 kVA, end-use metering is not required.

**C409.3.5 Process load system energy use.** This category shall include all energy used by any non-building process load, including but not limited to nonresidential refrigeration and cooking equipment, laundry equipment, industrial equipment and stage lighting.

**Exception:** Where process load energy use is less than 50 kVA, end-use metering is not required.

**C409.3.6 Full-floor tenant space electrical submetering.** In a multi-tenant building where more than 90 percent of the leasable area of a floor is occupied by a single tenant, an electrical energy use display shall be provided to the tenant in accordance with the requirements Section C409.4.3. Electrical loads from areas outside of the tenant space or from equipment that serves areas outside of the tenant space shall not be included in the tenant space sub-metering. A single display is permitted to serve multiple floors occupied by the same tenant.

Purpose of code change:

Additional end-use metering will provide more insight into how buildings consume energy, which will benefit multiple stakeholders throughout the building's lifecycle. Examples include:

- 1) Allows building owners to identify and correct system inefficiencies, resulting in reduced operating costs
- 2) Assist Commissioning Agents during the Cx process
- 3) Assist with post-occupancy measurement & verification (M&V) efforts
- 4) Provides a direct feedback loop of building performance to the design team / energy modelers
- 5) Assists with data collection efforts for future state laws (such as City of Seattle Building Tune-Up requirement)

The cost of requiring additional sub-meters is difficult to quantify, as it's dependent on multiple factors (building circuiting, metering technology, data collection strategy, etc.).

Your amendment must meet one of the following criteria. Select at least one:

- |   |  |
|---|--|
| <input type="checkbox"/> Addresses a critical life/safety need.   | <input type="checkbox"/> Consistency with state or federal regulations.        |
| <input type="checkbox"/> Addresses a specific state policy or statute.<br>(Note that energy conservation is a state policy) | <input checked="" type="checkbox"/> Addresses a unique character of the state. |
|   | <input type="checkbox"/> Corrects errors and omissions.                        |

Check the building types that would be impacted by your code change:

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> Single family/duplex/townhome         | <input checked="" type="checkbox"/> Multi-family 4 + stories | <input checked="" type="checkbox"/> Institutional |
| <input checked="" type="checkbox"/> Multi-family 1 – 3 stories | <input checked="" type="checkbox"/> Commercial / Retail      | <input checked="" type="checkbox"/> Industrial    |

Your name	Michael Baranick, PE	Email address	michael.baranick@hargis.biz
Your organization	Hargis Engineers, Inc.	Phone number	206-436-0448

Other contact name [Click here to enter text.](#)

**Instructions:** Send this form as an email attachment, along with any other documentation available, to: [sbcc@des.wa.gov](mailto:sbcc@des.wa.gov). For further information, call the State Building Code Council at 360-407-9278.

## **Economic Impact Data Sheet**

Briefly summarize your proposal's primary economic impacts and benefits to building owners, tenants and businesses.

See "Purpose of code change" section above for the benefits of requiring additional end-use metering.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). [Webinars on the tool can be found Here and Here](#))

Requiring end-use metering for lighting, plug loads, and process equipment (in addition to HVAC and water heating) will increase first cost of projects.

Best case: all end-uses are separated/isolated at the main electrical switchgear. Cost estimate: \$2,000 meter + \$1,000 controls + \$2,000 markups/Cx = \$5,000 per meter. Total cost for three additional meters (lighting, plug, process) = \$15,000 per building

Worse case: electrical distribution requires multiple sub-meters throughout the building in order to distinguish between load types. Cost will vary greatly depending on the size and type of building, as well as the design of the electrical distribution system.

[Click here to enter text./square foot](#) (For residential projects, also provide [Click here to enter text./ dwelling unit](#))

Show calculations here, and list sources for costs/savings, or attach backup data pages

[See above](#)

Provide your best estimate of the annual energy savings (or additional energy use) for your code change proposal?

Meters will hopefully be used for post-occupancy measurement and verification. Therefore, savings are highly dependent on analysis and whether deficiencies are discovered. Additional end-use meters will provide building owner's with long-term benefit by giving them better insight into how energy is being consumed.

[Click here to enter text.KWH/ square foot](#) (or) [Click here to enter text.KBTU/ square foot](#)

(For residential projects, also provide [Click here to enter text.KWH/KBTU / dwelling unit](#))

Show calculations here, and list sources for energy savings estimates, or attach backup data pages

[See above](#)

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

[N/A](#)

**All questions must be answered to be considered complete. Incomplete proposals will not be accepted.**