

**Sub-committee recommendations
11/3/10**

**SECTION 604
ENERGY METERING, MONITORING AND REPORTING**

604.1 Purpose. *Buildings* that consume energy shall comply with Section 604. The purpose of this section is to provide requirements that will ensure that *buildings* are constructed or altered in a way that will provide the capability for their energy use, production and reclamation to be measured, monitored and reported. This includes the design of energy distribution systems so as to isolate load types, the installation of or ability to install in the future *meters*, devices and a data acquisition system, and the installation of or the ability to provide for public displays and other appropriate reporting mechanisms in the future.

All forms of energy delivered to the *building* and *building site*, produced on the *building site* or in the building and reclaimed at the *building site* or in the *building* shall be *metered* and all energy load types measured in accordance with this Section.

~~604.1.1 Buildings with Tenants. In buildings with tenants, the metering required by Section 604.4 shall be collected for the entire building and for each tenant individually. Tenants shall have access to all data collected for their space.~~

Comment [h1]: Committee feels that continuing issues with sub-metering of smaller tenants presents cost and complications that should wait for later versions

604.2 Intent. The intent of these requirements is to provide for the ongoing ~~meterability, metering,~~ measuring, reporting and display of the energy use, energy demand and emissions associated with the energy use of the whole *building* and its systems ~~as required in Section 612 and, where required by Section 613.2,~~ to verify ongoing compliance with the provisions of Sections ~~602 and 603.~~

Comment [h2]: Deemed redundant by group. Should be maintained wherever possible in other changes: Do not sub-reference if just reiterating what is said elsewhere.

604.3 Energy distribution design requirements and load type isolation. Energy distribution systems within, on or adjacent to and serving a *building* shall be designed such that each primary circuit, panel, feeder, piping system or supply mechanism supplies only one energy use type as defined in Sections 604.3.1 through 604.3.4. The load type served by each supply mechanism shall be clearly designated with the use served, and adequate space shall be provided for installation of *metering* equipment or other data collection devices, temporary or permanent, to measure these loads. The energy distribution system shall be designed to facilitate the collection of data for each of the *building* energy use categories in Section 604.4 and for each of the end use categories listed in Sections 604.3.1 through 604.3.4. Where there are multiple *buildings* on a *building site*, each *building* shall comply separately with the provisions of Section 604.

Comment [h3]: Will revisit during review of 602 and 603. May need review before full committee.

Exception: *Buildings* designed and constructed such that the total usage of each of the load types described in Sections 604.3.1 through 604.3. shall be permitted to be measured through the use of installed sub-*meters* or other equivalent methods as *approved*.

604.3.1 HVAC system total energy use. This category shall include all energy used to heat, cool, and provide *ventilation* to the *building* including, but not limited to, fans, pumps, boiler energy, chiller energy and hot water.

604.3.2 Lighting system total energy use. This category shall include all interior and exterior lighting used in occupant spaces and common areas.

604.3.3 Plug Loads. This category includes all energy used by devices, appliances and equipment connected via convenience outlets.

604.3.4 Process & Large Miscellaneous Loads. This category includes the energy used by any end-use activity -such as, but not limited to elevators, escalators, data centers, manufacturing equipment, swimming pools, and commercial kitchens-that exceed 5% of the total connected peak demand for each energy type..

~~604.3.3 Energy used for building operations. This category includes all energy use by vertical transportation systems, automatic doors, motorized shading systems, ornamental fountains and fireplaces, swimming pools, snow melt systems, and all other building operations.~~

Comment [h4]: Removes 3.4 and 3.5 to clarify plug loads and misc. loads. Reflects a version of an NBI proposal to the IGCC for modifications. However, simplified to have measurement of any non-plug load over 5% of the total building energy use. NOTE to sub committee: should clarify whether the 5% is the total annual use or an instantaneous or connected load.

~~604.3.4 Miscellaneous loads. Loads other than those specified in Sections 604.3.1 through 604.3.3.~~

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604.4 Energy type metering. *Buildings* shall be provided with the capability to determine energy use and peak demand as provided in this section for each of the energy types specified in Sections 604.4.1 through 604.4.7. Utility energy *meters* shall be permitted to be used to collect whole *building* data, but, shall be equipped with a local data port connected to a data acquisition system in accordance with Section 604.5. Each energy use type metering shall be determined at a minimum of one hour intervals. Electric power shall also determine peak electrical provided to the building at 15-minute intervals.

604.4.1 Gaseous fuels. Gaseous fuels including, but not limited to, natural gas, LP gas, coal gas, hydrogen, landfill gas, digester gas and biogas shall be capable of being *metered* at the *building site* to determine the gross consumption and peak demand of each different gaseous fuel by the *building* and each *building* on a *building site*. The installation of *gas meters* and related piping shall be in accordance with the Oregon Mechanical Specialty Code *International Fuel Gas Code*.

604.4.2 Liquid fuels. Liquid fuels including, but not limited, to fuel oil, petroleum based diesel, kerosene, gasoline, bio diesel, methanol, ethanol and butane shall be capable of being *metered* at the *building site* to allow a determination of the gross consumption and peak demand of each liquid fuel use by the *building* and each *building* on a *building site*. The installation of *meters* and related piping shall be in accordance with the Oregon Mechanical Specialty Code *International Mechanical Code*.

604.4.3 Solid fuels. Solid fuels including, but not limited to coal, charcoal, peat, wood products, grains, and municipal waste shall be capable of having their use determined at the *building site* to allow a determination of the gross consumption and peak demand of each solid fuel use by the *building* and each *building* on a *building site*.

604.4.4 Electric power. Electric power shall be capable of being *metered* at the *building site* to allow a determination of the gross consumption and peak demand by the *building* and each *building* on a *building site*. The installation of electric *meters* and related wiring shall be in accordance with Oregon Electrical Specialty Code *NFPA 70*.

604.4.5 District heating and cooling. Hot water, steam, chilled water, and brine shall be capable of being *metered* at the *building site*, or where produced on the *building site*, to allow a determination of the gross consumption of heating and cooling energy by each *building* on a *building site*. Energy use associated with the production of hot water, steam, chilled water or brine shall be determined based on the fuel used.

604.4.6 Combined heat and power. Equipment and systems with a connected load greater than 125,000 *Btu/hr* providing combined heat and power (CHP) shall be capable of being *metered* to allow a determination of the gross consumption of each form of delivered energy to the equipment. The output of CHP shall be *metered* in accordance with the applicable portions of Section 604 based on the form(s) of output from the CHP.

604.4.7 Renewable and waste energy. Equipment and systems providing energy from renewable or waste energy sources in accordance with (Section 603.1.1.1), or from which energy is included in the determination of *(the building TANEU)* shall be capable of being *metered* to allow a determination of the output of such equipment and systems in accordance with sections 604.4.7.1 through 604.4.7.5.

604.4.7.1 Solar electric. Equipment and systems providing electric power through conversion of solar energy directly to electric power shall be capable of being *metered* such that the peak electric power (kW) provided to the *building* and its systems or to off-site entities can be determined at 15 minute intervals and the amount of electric power (kWh) provided to the *building* and its systems can be determined at a minimum of hourly intervals.

604.4.7.2 Solar thermal. ~~Equipment and systems providing heat to fluids or gases through the capture of solar energy shall be capable of being *metered* such that the peak thermal energy (*Btu/hr*) provided to the *building* and its systems or to off site entities can be determined at 15 minute intervals and the amount of heat captured (*Btu*) for delivery to the *building* and its systems can be determined at a minimum of hourly intervals.~~

Comment [h5]: Reference to TANEU section. Final wording based on outcome of TANEU or other energy measure. Placeholder.

Comment [h6]: Final wording to include "energy use measurement" system that comes out of Chapter 1-3 Discussions. Left in as placeholder.

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~~604.4.7.3 Waste energy recovery.~~ Equipment and systems providing energy through the capture of waste heat shall be capable of being *metered* such that the amount of heat captured and delivered to the *building* and its systems can be determined at a minimum of hourly intervals.

604.4.7.4 Wind Power Systems. Equipment and systems providing electric power through conversion of wind energy directly to electric power shall be capable of being *metered* such that the peak electric power (kW) provided to the *building* and its systems or to off-site entities can be determined at 15 minute intervals and the amount of electric power (kWh) provided to the *building* and its systems can be determined at a minimum of hourly intervals.

~~604.4.7.5 Other renewable energy electric production systems.~~ Equipment and systems providing electric power through conversion of other forms of renewable energy directly to electric power shall be capable of being *metered* such that the peak electric power (kW) provided to the *building* and its systems or to off-site entities can be determined at 15 minute intervals and the amount of electric power (kWh) provided to the *building* and its systems can be determined at a minimum of hourly intervals.

604.5 Energy load type sub-metering. For *buildings* that are 25,000 square feet in *total building floor area* and larger, all of the Energy Load Types as defined in Section 604.3 shall be *metered* through the use of sub-meters or other *approved*, equivalent methods meeting the capability requirements of section 604.4.

Comment [h7]: Square footage should equal the "performance"/modeled building size.

604.5.1 Buildings less than 25,000 square feet. For *buildings* that are less than 25,000 square feet in *total building floor area*, the energy distribution system shall be designed and constructed in such a way as to accommodate the future installation of sub-meters and other *approved* devices in accordance with Section 604.5. This includes, but is not limited to, providing access to distribution lines and ensuring adequate space for the installation of sub-meters and other *approved* devices.

604.6 Minimum energy measurement and verification. *Meters* sub-meters, and other *approved* devices installed in compliance with Sections 604.4 and 604.5 shall be connected to a data acquisition and management system capable of storing not less than 36 months worth of data collected by all *meters* and other *approved* devices and transferring the data in real time to a display as required in Section 604.7.

~~604.6.1 Annual emissions.~~ The data acquisition and management system shall be capable of providing the data necessary to calculate the annual *CO₂e emissions* associated with the operation of the *building* and its systems using the results of annual energy use measured in accordance with Section 604.6. The calculation shall be based on energy measured for each form of energy delivered to the site on an annual basis. Where reporting of emissions is required, it shall be in accordance with ~~Section 603.~~

Comment [h8]: Outside of BCD scope

604.7 Energy display. A ~~permanent~~, readily accessible and visible display shall be provided adjacent to the main ~~building entrance~~ or on a publicly available internet website shall be made available to the Owner and building Tenants. The display shall be capable of providing all of the following:

1. The current energy demand for the whole *building* level measurements, updated for each fuel type at the intervals specified in 604.4
2. The average and peak demands for the previous day and the same day the previous year,
3. The total energy usage for the previous eighteen (18) months.

Comment [h9]: More than one year recommended; allows comparison to previous year.