

End-Use	Data Collection Requirements	Data Trend Type
Building Electrical:		
building electrical (main bldg. feed)	<p>Total building electrical consumption data shall be sub-metered through the building EMCS or SCADA system. This trend data can sometimes be supplied by the utility provider depending on the capability of the existing building meter. It is often possible for EMCS to receive meter (pulse) signals directly from the utility provider's meter. Such meters are generally referred to in the industry as "smart" meters. Agencies should explore these possibilities before installing a separate sub-meter. However, when separate meters are required, they must be calibrated by the sub-meter manufacturer to match the reading of the utility provider's meter.</p>	<ul style="list-style-type: none"> • kWh (consumption) • kW (demand) • power factor
HVAC Cooling:		
chilled water systems	<p>This consumption data requires EMCS/SCADA sub-metering to collect. Cooling load data shall be collected for the main building system with one BTU meter installed in the chilled water piping where possible, preferably on the secondary side of primary/secondary distribution systems. For other types of distribution systems, BTU meters shall be installed on every chiller where conditions dictate.</p> <p><i>Note: kWh (consumption) and kW (demand) data collection via an electric sub-meter will <u>not</u> be considered an acceptable alternative to cooling ton-hours and tons for chiller systems. The Agencies may consider installing kW meters in addition to BTU meters as a means to monitor chiller performance, but such kW meters can be installed temporarily in the form of test equipment. BTU meters are required.</i></p>	<ul style="list-style-type: none"> • ton-hours (consumption) • tons (demand)
water-cooled air-conditioning systems	<p>This consumption data requires EMCS/SCADA sub-metering to collect. For centralized condenser water or cooling tower systems, cooling load data shall be collected for the main building system with one BTU meter where possible.</p> <p><i>Note: kWh (consumption) and kW (demand) data collection via an electric sub-meter will be considered an acceptable alternative to cooling ton-hours and tons when BTU meters are not practical for water-cooled heat pump systems.</i></p>	<ul style="list-style-type: none"> • ton-hours (consumption) • tons (demand)

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air-cooled DX systems	This consumption requires EMCS/SCADA sub-metering to collect. However, large commercial buildings are not typically cooled with these types of systems. Large facilities with such systems are challenging to sub-meter due to the potential number of separate meters required. Possible exceptions include: <i>Situations where a single device can meter multiple HVAC units -or- Facilities that have a relatively small number of HVAC units.</i>	<ul style="list-style-type: none"> • kWh (consumption) • kW (demand)
purchased HVAC cooling	This applies to circumstances where the Agency purchases chilled water from an outside entity. In these situations, the Agency shall sub-meter cooling loads in the same fashion as required for chilled water systems. The Agency shall also report the costs monthly.	<ul style="list-style-type: none"> • ton-hours (consumption) • tons (demand)
HVAC Heating (Boiler Systems):		
steam boilers	This consumption data requires EMCS/SCADA sub-metering to collect. Steam consumption data requires the installation of a steam-rated flow meter.	<ul style="list-style-type: none"> • steam lbs. (consumption) • steam lbs./hour (demand)
hot water boilers	This consumption data requires EMCS/SCADA sub-metering to collect. Heating hot water consumption requires the installation of a BTU meter, similar to cooling tons and ton-hours.	<ul style="list-style-type: none"> • BTUs (consumption) • BTUs per hour (demand)
steam converters	This consumption data requires EMCS/SCADA sub-metering to collect. Steam converters are heat exchangers that utilize steam for the purpose of heating water. Steam consumption data requires the installation of a steam-rated flow meter.	<ul style="list-style-type: none"> • steam lbs. (consumption) • steam lbs./hour (demand)
purchased HVAC heating	This applies to circumstances where the Agency purchases steam or heating hot water from an outside entity. The Agency shall sub-meter heating loads in the same fashion as required for steam systems or boilers. The Agency shall also report costs monthly.	<i>see steam systems or boilers</i>
HVAC Heating (Unitary Equipment):		
water-cooled heat pump systems	This consumption data requires EMCS/SCADA sub-metering to collect. For centralized condenser water or cooling tower systems, cooling load data shall be collected for the main building system with one BTU meter where possible. <i>Note: kWh (consumption) and kW (demand) data collection via an electric sub-meter will be considered an acceptable alternative to cooling ton-hours and tons when BTU meters are not practical for water-cooled heat pump systems.</i>	<ul style="list-style-type: none"> • ton-hours (consumption) • tons (demand)

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air-cooled heat pump systems	This consumption requires EMCS/SCADA sub-metering to collect. However, large commercial buildings are not typically heated with these types of systems. Large facilities with such systems are challenging to sub-meter due to the potential number of separate meters required. Possible exceptions include: <i>Situations where a single device can meter multiple HVAC units -or- Facilities that have a relatively small number of HVAC units.</i>	<ul style="list-style-type: none"> • kWh (consumption) • kW (demand)
electric reheat	This consumption requires EMCS/SCADA sub-metering to collect. Large facilities with such systems are challenging to sub-meter due to the potential number of separate meters required. Possible exceptions include: <i>Situations where a single device can meter multiple HVAC units -or- Facilities that have a relatively small number of HVAC units.</i>	<ul style="list-style-type: none"> • kWh (consumption) • kW (demand)
Domestic Water Heating (High-Use Facilities Only):		
electric water heaters	This consumption data requires EMCS/SCADA sub-metering to collect. Domestic water heating consumption (kWh) shall be collected with an electric sub-meter. For circulating systems, a BTU meter may be utilized.	<ul style="list-style-type: none"> • kWh (consumption) -or- • BTUs (consumption)
gas water heaters	This consumption data requires sub-metering to collect. Domestic water heating consumption (CCF or therms) shall be collected with a conventional or EMCS/SCADA gas sub-meter. For circulating systems, a BTU meter may be utilized.	<ul style="list-style-type: none"> • CCF (consumption) -or- • BTUs (consumption)
steam water heaters	This consumption data requires sub-metering to collect. Domestic water heating consumption (steam pounds) shall be collected with a conventional or EMCS/SCADA steam sub-meter. For circulating systems, a BTU meter may be utilized.	<ul style="list-style-type: none"> • steam lbs. (consumption) -or- • BTUs (consumption)
solar water heaters	This consumption data requires sub-metering to collect. A BTU meter may be utilized for solar water heating systems when the agency deems it appropriate to do so. However, solar water heating systems are typically installed to supplement conventional type water heaters. Therefore, sub-metering conventional water heating systems in accordance with this section will capture the benefit of reduced operation due to supplemental solar water heaters.	<i>refer to other water heater types as necessary</i>

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Domestic Water & Sewer:		
domestic water	<p>This consumption data is supplied by the utility provider in monthly billing statements. For facilities with high monthly domestic water usage or for facilities that utilize domestic water for process cooling, the installation of an EMCS/SCADA flow meter should be explored in order to identify and prevent excessive consumption and leaks. At a minimum, the consumption data (gallons) provided in the utility bill shall be collected monthly.</p>	gallons (consumption)
irrigation systems	<p>This consumption data is typically supplied by the utility provider in monthly billing statements. Irrigation systems supplied by domestic water must be separately metered by the utility provider and consumption data (gallons) shall be collected and reported separately from normal domestic water.</p>	gallons (consumption)
Ground Water:		
irrigation systems	<p>Ground water is commonly used for irrigation. Ground water irrigation systems must be separately metered by the Agency and the consumption data (gallons) shall be collected monthly. Large systems may require EMCS/SCADA metering and reporting.</p> <p><i>Note: Ground water permits often require ground water withdrawal/consumption rates to be reported to specific governing authorities. Building owners should collect daily withdrawal/consumption data and review it on a monthly basis in order to ensure permit compliance and to prevent excessive consumption.</i></p>	gallons (consumption)
air-conditioning	<p>Ground water is commonly used instead of cooling tower systems to operate air-conditioning systems. In such cases, ground water is pumped from the aquifer through the air-conditioner condensers and then returned to the aquifer through an injection well. There is virtually no consumption because the water is returned to the aquifer. However, ground water supply well pumps can represent a large electrical load. Flow meters for such applications are easily incorporated into most building EMCS systems. Conventional consumption meters shall be the minimum standard.</p> <p><i>Note: Ground water permits often require ground water withdrawal/consumption rates to be reported to specific governing authorities. Building owners should collect daily withdrawal/consumption data and review it on a monthly basis in order to ensure permit compliance and to prevent excessive consumption.</i></p>	gallons (consumption)

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Reuse Water:		
reuse water	<p>Reuse water is recycled water that is provided by the utility provider. The most common use for reuse water is irrigation, but it can be used for other non-potable purposes. Data collection for reuse water shall be based on the monthly utility bill statement. EMCS/SCADA sub-metering should be considered for high-use applications or process cooling. EMCS/SCADA systems should also be considered to monitor systems that can be supplied from both domestic water and reuse water in order to prevent cross connections. The consumption data (gallons) shall be reported separately from all other water types.</p>	gallons (consumption)
Natural Gas:		
general building usage	<p>This energy consumption data is intended for all non-vehicular fuel consumption that is related to the operation of a building, including emergency generators, boiler systems, and space heating systems. This consumption data is supplied by the utility provider in monthly billing statements. Total natural gas consumption (CCF or therms) shall be collected monthly.</p> <p><i>Note: This consumption data shall not be used as a substitute for heating load data when a building's boiler is fired with natural gas. See the HVAC Heating Section for heating system data requirements.</i></p>	CCF (consumption)
Other Fuels (Fuel Oil, Diesel, & Propane):		
general building usage	<p>This energy consumption data is intended for all non-vehicular fuel consumption that is related to the operation of a building, including emergency generators, boiler systems, and space heating systems. This consumption data will require the installation of an in-line fuel meter to collect if none exists.</p> <p>Fuel consumption (gallons) shall be collected on a monthly basis. Total fuel consumption shall be read manually from a conventional in-line fuel meter or collected from an EMCS/SCADA sub-meter per the Agency's discretion.</p> <p><i>Note: This consumption data shall not be used as a substitute for heating load data when a building's boiler is fired with fuel oil. See the HVAC Heating Section for heating system data requirements.</i></p>	gallons (consumption)

Trash & Recyclables:		
building trash & recyclables generation	Trash and recyclables quantity and cost shall be reported monthly. The quantities for trash and recyclables may need to be estimated. In such cases, the size of the container(s) shall be determined in cubic yards and the quantity of trash/recyclables generated shall be estimated as a percentage approximation of the container's fullness.	cubic yards (generation)