



Supplement to CaGBC Credit Interpretation Request (CIR) 1125 – Alternative for calculating energy from District Energy Systems

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Any energy use from district energy systems (DES) serving the project building must be incorporated into the benchmarking. The energy used by the individual project building must therefore be metered. Teams can account for DES in either of two ways.

The team may enter the output from the DES delivered to the project building into the Portfolio Manager tool as site energy from a district system (e.g., district chilled water); Portfolio Manager then converts it to source energy based on ENERGY STAR's standard methodology.

Alternatively, the team may include the energy consumed by the DES and attributable to the project building in the energy use data. This typically requires knowing the portion of DES output delivered to the project building, as well as the total energy inputs into the DES.

To prorate the DES energy consumption to the building, multiply the thermal energy measured at the building by the ratio of the DES energy inputs to the DES energy generated. Account for thermal losses by multiplying this total by (1 + Thermal distribution losses) to determine the total energy consumption to be entered into Portfolio Manager. Ensure the units are consistent for the building-level chilled water consumption and the DES plant chilled water consumption:

- **Chilled water electricity allocation.** Multiply the building level chilled water consumption (CHW_B) by the ratio of the total annual electric energy associated with DES chilled water generation ($ELEC_{CHW}$) to the total annual DES chilled water generated (CHW_P). Multiply this total by (1 + Thermal distribution losses) ($1 + L_{CHW}$).

$$(CHW_B) \times \frac{(ELEC_{CHW})}{(CHW_P)} \times (1 + L_{CHW})$$

- **Chilled water fuel allocation (if applicable).** Multiply the building level chilled water consumption (CHW_B) by ratio of the total annual fuel energy associated with DES chilled water generation ($FUEL_{CHW}$) to the total annual DES chilled water generated (CHW_P). Multiply this total by (1 + Thermal distribution losses) ($1 + L_{CHW}$).

$$(CHW_B) \times \frac{(FUEL_{CHW})}{(CHW_P)} \times (1 + L_{CHW})$$



- **Hot water (or steam or DHW) fuel allocation.** For each DES fuel source, multiply the building-level hot water (steam, DHW water) consumption ($HEAT_B$) by ratio of the total annual fuel energy associated with DES hot water (steam, DHW) generation ($FUEL_{HEAT}$) to the total annual DES hot water (steam, DHW) generated ($HEAT_P$). Multiply this total by (1 + Thermal distribution losses) ($1 + L_{HEAT}$). If a separate loop is provided for domestic hot water, perform a separate calculation for the domestic hot water loop.

$$(HEAT_B) \times \frac{(FUEL_{HEAT})}{(HEAT_P)} \times (1 + L_{HEAT})$$

- **Hot water (or steam or DHW) electricity allocation.** Multiply the building-level hot water (steam, DHW) water consumption ($HEAT_B$) by the ratio of the total annual electric energy associated with DES hot water (steam, DHW) generation ($ELEC_{HEAT}$) to the total annual DES hot water (steam, DHW) generated ($HEAT_P$). Multiply this total by (1 + Thermal distribution losses) ($1 + L_{HEAT}$). If a separate loop is provided for domestic hot water, perform a separate calculation for the domestic hot water loop.

- $(HEAT_B) \times \frac{(ELEC_{HEAT})}{(HEAT_P)} \times (1 + L_{HEAT})$

Calculate the combined building and prorated DES monthly energy use based on the metered data:

$$(ELEC_{B2}) = (ELEC_B) + \left[(CHW_B) \times \frac{(ELEC_{CHW})}{(CHW_P)} \times (1 + L_{CHW}) \right] + \left[(HEAT_B) \times \frac{(ELEC_{HEAT})}{(HEAT_P)} \times (1 + L_{HEAT}) \right]$$

$$(FUEL_{B2}) = (FUEL_B) + \left[(CHW_B) \times \frac{(FUEL_{CHW})}{(CHW_P)} \times (1 + L_{CHW}) \right] + \left[(HEAT_B) \times \frac{(FUEL_{HEAT})}{(HEAT_P)} \times (1 + L_{HEAT}) \right]$$

- Use thermal distribution losses consistent with those required by ENERGY STAR or provide documentation to justify alternative losses:
 - L_{CHW} : chilled water, 2.5%
 - L_{STEAM} : steam, 7.5%
 - L_{HW} : district hot water, 2.5%
 - L_{CHP} : combined heat and power, 7.5%
- At the building level, chilled water consumption, hot water consumption, and domestic hot water consumption may be calculated based on the building-level DES flow rates and the building's supply and return water DES temperatures. This method would require building-level flow sensors and building-level supply and return water temperature sensors.
- At the district level, chilled water energy generated, hot water energy generated, and domestic hot water energy generated may be calculated based on the flow rates through the chillers or boilers and the chiller's or boiler's entering and leaving water temperatures.
- In the absence of metered data for heating hot water or steam pumps, trend data for pump speed may be used along with data for the pump brake horsepower and motor efficiency to calculate the annual energy use.

