**TRN Resource: Energy and Water Daily Use Estimation Approaches**

Daily load profiles depict how much energy or water a facility uses over the course of a day. Ideally, daily load profiles are measured or estimated for the combined set of critical loads within a facility, rather than the entire facility. This is used to quantify daily average and peak energy and water requirements. For energy, average daily energy consumption in kWh and peak demand in kW are determined. For water, average daily load and peak daily loads in gallons per day are determined. These average and peak loads are used to estimate the runtime duration of current redundant systems in *Action 3: Establish Baseline Conditions of Redundant and Primary Systems*. In addition, average and daily loads are used to properly size any new redundant systems proposed during Solution Development.

* **Facility interval data:** Use building interval metered energy and water consumption data and, if available, submetered interval data at the highest resolution available (e.g.,5 minutes, 30 minutes, or 1 hour) to develop daily average and peak load profiles for critical loads. Information from building automation systems and energy management and control systems may provide interval consumption data that can be utilized in this process.
* **Modeled estimates:** Use results from energy modeling programs when metered data is not available. For energy, [Facility Energy Decision System](https://www.pnnl.gov/FEDS/) estimates hourly load profiles for buildings and systems, which can be used to estimate energy requirements of critical loads. Audits of critical facilities may be completed to identify opportunities for load reduction, as well as redundant sources. When this occurs, building energy models can be constructed to support the development of load profiles. Currently, no water modeling software estimates facility daily water demand.
* **Engineering estimates:** When modeling buildings for energy and water use is not an option, engineering estimating techniques can be used to calculate consumption.The Federal Energy Management Program (FEMP) provides the FEMP Water Balance Tool, which estimates water consumption by specific water end uses using engineered methods.
* **Manually read meters:** Manually read meters on buildings/systems at a regular interval to develop a trend of energy and water usage. Meters can be read daily to capture daily usage of a short period of time (e.g., 30-60 days) and on a more frequent basis to characterize daily trends (e.g., hourly for 1-2 days).
* **Temporary meters:** Install temporary meters on the buildings/systems to record the usage over a short period of time (e.g., 30-60 days) to develop a general trend of energy and water usage. It should be noted that unless installed for an entire year or more, the trends captured by the temporary meters will not account for seasonal changes in usage. Temporary meters can also be utilized to refine data collected through other meters by providing additional insight to systems/subsystems (e.g., If only a single meter exists for the entire facility, use a temporary meter to isolate loads that directly support critical functions).
* **Benchmark data from similar buildings and systems:** Use benchmark data from similar buildings and systems within the same site/organization to approximate the energy and water requirements. If no site/organization benchmark data is available, use of other available benchmarking tools may be considered (e.g., [Energy Information Agency](https://www.eia.gov/consumption/commercial/) Commercial Building Energy Consumption Survey). When utilizing benchmark data to approximate energy and water requirements, make adjustments for different climates, operational hours, or occupancy.