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Develop Your Facility Energy Use Profile

All ECM content was independently developed and reviewed to be vendor, product and service provider-neutral.

Description

Identify energy waste and track performance by developing an energy use profile for your facility. An energy use profile disaggregates energy consumption by end use. Energy use profiles will help establish detailed energy baselines for facilities, thus helping to inform any future energy conservation measures (ECMs) and identify energy waste related to specific processes. Depending on the intensity of your analysis, an energy use profile can allow for a detailed look at facility consumption by end use.

Project Talking Points

- Data is the central focus of an energy use profile. There are several types of data that can be used for establishing a profile:
 - Meter-level utility interval data
 - Building automation system (BAS) equipment trending
 - Facility submetering
- End use profiles allow facility owners and decision makers to benchmark different energy end uses at the facility, for example:
 - Chilled water (CHW) plant energy use
 - Air handling unit (AHU) energy use
 - Hot water energy use
 - Lighting use
- The more granular the measurement at a facility, the better the energy use profile will be.
- Energy savings can be obscured in non-weather normalized data. Tools like the ENERGY STAR Portfolio Manager® automatically weather normalize data based on geographical location. For individualized analyses, employ International Performance Measurement and Verification Protocol (IPMVP).

Benefits

- **Cost benefits:** Understanding where energy is used in a facility helps identify waste and opportunities for improvement. Reducing energy use reduces associated costs.
- **Environmental benefits:** Reducing the amount of energy used in a facility always reduces emissions and benefits the environment.





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- **Societal benefits:** When a hospital spends less on energy, savings can be redirected to patient care.

Purchasing Considerations

Consider any hardware or software submetering or BAS integrations required to meet the goal of establishing a comprehensive facility energy profile. Leverage existing preventative maintenance (PM) contracts with BAS vendors and ensure they are tracking energy use via virtual points and other techniques if necessary.

How-To

1. Assemble a group of relevant stakeholders, including the facility manager, BAS technician, energy manager and external consultants.
2. Determine the desired granularity of your energy use and the profiles that need to be tracked. Here are some potential systems to track and integrate into the BAS:
 - CHW plant energy use and efficiency
 - AHU energy use
 - Boiler plant energy use
 - Lighting energy use
 - Plug loads

Using data from equipment submetering or BAS trending provides the opportunity for more detailed calculations. For example:

- CHW plant energy use and efficiency
 - Chiller-by-chiller energy use and efficiency
 - CHW plant and CW pump energy use
 - Cooling tower energy and water usage
- AHU energy use
 - Fan energy use
 - CHW plant consumption by AHU
 - Reheat energy consumption by AHU
- Lighting use
 - By space type or building area
 - Outdoor versus indoor lighting

If the data is available, it can be tracked!





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3. Once you have identified the desired granularity of your energy use profile, trend your data to see how energy usage looks during daytime hours, evening hours and over the weekends. Also look at how your overall gas and electric data performs by season via regular facility benchmarking.
 - Energy usage trends observed during regular facility benchmarking can be easily explained if energy use profiles are tracked. Energy bill increases could be tracked to specific AHUs or other pieces of equipment.

Once you have established a solid energy use profile, determine areas of waste and targets for energy savings. Track year-over-year profile trends to watch for significant changes in facility end uses.

Resources

- The American Society for Health Care Engineers (ASHE): [Energy to Care](#)
- ASHE: [Reducing Operational Costs through Energy Efficiency](#)
- The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE): [The Advanced Energy Design Guide: 30% Savings for Small Hospitals and Healthcare Facilities](#)
- ASHRAE: [The Advanced Energy Design Guide: 50% Savings for Large Hospitals](#)
- [ENERGY STAR Portfolio Manager](#)
- [International Performance Measurement and Verification Protocol](#)
- National Renewable Energy Laboratory (NREL): [Healthcare Energy End-Use Monitoring](#)
- [LEED v4. for BD + C: Healthcare](#)
 - Water efficiency
 - Prerequisite: Building-level water metering
 - Credit: Cooling tower water use
 - Credit: Water metering
 - Energy and atmosphere
 - Prerequisite: Fundamental commissioning and verification
 - Prerequisite: Building level energy metering
 - Credit: Enhanced commissioning
 - Credit: Optimize energy performance
 - Indoor air quality
 - Prerequisite: Minimum indoor air quality performance
 - Credit: Indoor air quality assessment
 - Credit: Thermal comfort
- [LEED v4. for Operation and Maintenance: Existing Buildings](#)
 - Water efficiency





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- Prerequisite: Indoor water use reduction
- Prerequisite: Building-level water metering
- Credit: Outdoor water use reduction
- Credit: Indoor water use reduction
- Credit: Cooling tower water use
- Credit: Water metering
- Energy and Atmosphere
 - Prerequisite: Energy efficiency best management practices
 - Prerequisite: Minimum energy performance
 - Prerequisite: Building-level energy metering
 - Credit: Existing building commissioning analysis
 - Credit: Existing building commissioning implementation
 - Credit: Ongoing commissioning
 - Credit: Optimize energy performance
 - Credit: Advanced energy metering
- Indoor Environmental Quality
 - Credit: Thermal comfort
 - Credit: Interior lighting

Regulations, Codes and Standards, Policies

There are no relevant regulations or codes for this ECM. However, the [International Performance Measurement and Verification Protocol](#) is always a useful guideline when measuring and verifying data.