



seeds

## Energy & Environment Glossary

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### Advanced Power Strip (APS)

Advanced power strips save energy by controlling the power supplied to plug-in devices during unoccupied periods. A variety of APS technologies exist on the market that vary in complexity, control strategies, data collection abilities, and costs.

Potential barriers for APSs include: occupant acceptance, communications, lack of personnel time for analysis, and complex controls in some instances. These devices may require operations and maintenance to update controls, manage data, and troubleshoot incorrect operations and communication failures on a regular basis.

### Avoided Costs

Avoided cost is the marginal cost for the same amount of energy acquired through another means, such as construction of a new production facility or purchase from an alternate supplier. For example, the avoided cost of a megawatt-hour is the relative amount it would cost a customer to acquire this energy through the development of a new generating facility or acquisition of a new supplier. Short run avoided cost refers to avoided cost calculated based on energy acquisition costs plus ongoing expenses. Long run avoided cost factors in necessary long-term costs including capital expenditures for facilities and infrastructure upgrades.

### Bare Soil Land Cover

Areas mapped as bare soil typically include vacant lots, construction areas, and baseball fields.

### Baseline

The baseline is the selected period of consumption data (e.g. 12-months) against which future energy cost and energy use are judged.

### Benchmarking

Benchmarking is the practice of comparing the measured performance of a device, process, facility, or organization to itself, its peers, or established norms, with the goal

of informing and motivating performance improvement.

## Biogenic Volatile Organic Compounds (BVOC)

Gases emitted from trees, like pine trees, which create the distinct smell of a pine forest. When exposed to sunlight in the air, BVOCs react to form tropospheric ozone, a harmful gas that pollutes the air and damages vegetation.

## British Thermal Unit (BTU or Btu)

BTU is a standard unit measure of energy or the heat content of a fuel or energy source. All forms of energy and fuels can be expressed in terms of BTUs. The British thermal unit (BTU or Btu) is a traditional unit of work equal to about 1.055 kilojoules. It is the amount of work needed to raise the temperature of one pound of water by one degree Fahrenheit. The notation kBtu or KBTU is often used for thousand BTU, in sizing of heating systems and in the Energy Use Intensity (EUI) expressed as thousand BTU annual energy use per square foot of building.

## Canopy Cover

The area of land surface that is covered by tree canopy as seen from an aerial perspective.

## Capacity

Capacity is the maximum output of electricity that a generator can produce under ideal conditions. Capacity levels are normally determined as a result of performance tests and allow utilities to project the maximum electricity load that a generator can support. Capacity is generally measured in megawatts or kilowatts.

## Carbon Dioxide Equivalent (CO<sub>2</sub>e)

CO<sub>2</sub>e is a metric used to describe different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO<sub>2</sub>e signifies the amount of carbon dioxide which would have the equivalent global warming impact.

Carbon dioxide is the most prevalent gas contributing to the greenhouse effect. It is emitted in greatest quantity from fossil fuel combustion. However two other products of fossil fuel combustion, methane and nitrous oxide, are also emitted to the air and are more potent contributors to the greenhouse effect per unit mass. The combined global warming impact of these combustion gases can be expressed as CO<sub>2</sub>e, or the the amount of carbon dioxide which would have the equivalent global warming impact. This is typically reported as MT CO<sub>2</sub>e or metric tons of carbon dioxide equivalents.

## Clean Energy

The combination of tactics for conservation, efficiency, and renewable generation.

## Cordon Pricing

A form of congestion pricing, cordon pricing focuses on congestion pricing specifically in highly condensed urban centers.

## Efficiency

Efficiency is a comparison of the amount of energy used compared to the amount of output produced. In the built environment, this means using the least amount of energy (electricity, natural gas, etc.) to operate a facility appropriately. Steps that can help a building run efficiently include: ensuring there are no air leaks, using sensors or timers to ensure the building isn't operating when vacant, and using energy-efficient equipment.

## Energy Cost Intensity (ECI)

Energy Cost Intensity is the sum of all energy costs per unit of gross building area per year. Generally, a low ECI signifies efficient energy use and optimal performance. However, certain property types will always use more energy than others.

## ENERGY STAR

ENERGY STAR is a voluntary program developed by the U.S. Environmental Protection Agency (EPA). The goal of the program is to offer the necessary guidance and tools to assist communities in protecting our climate through attaining optimal energy efficiency as well as saving money.

## Energy Service Company (ESCO)

ESCOs develop, design, build, and fund projects that save energy, reduce energy costs, and decrease operations and maintenance costs at their customers' facilities. In general, ESCOs act as project developers for a comprehensive range of energy conservation measures and assume the technical and performance risks associated with a project.

## Energy Use Intensity (EUI)

When you benchmark your building in Portfolio Manager, one of the key metrics you'll see is energy use intensity, or EUI. Energy Use Intensity is the sum of all energy use per unit of gross building area per year. Both site and source EUI are available in Portfolio Manager, though EPA relies on source EUI as the basis for the ENERGY STAR score. Generally, a low EUI signifies good energy performance. Remember that certain property types will always use more energy than others. For example, an elementary school uses relatively little energy compared to a hospital.

## Externalities, Value of

Externalities are any consequences of the use of a particular energy technology that is not reflected in its cost. These externalities can be positive or negative, meaning that at least in theory it is possible to account for the cost of negative externalities such as pollution, or the value of positive ones such as the reduced need for costly transmission infrastructure. In terms of renewable generation, the avoided cost of pollution could be accounted for as a positive externality.

## Extreme Risk Tree

Applies in situations where tree failure is imminent, there is a high likelihood of impacting the target, and the consequences of the failure are “severe.” In some cases, this may mean immediate restriction of access to the target zone area in order to prevent injury.

## GHG Emissions

Greenhouse Gas (GHG) Emissions are the carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) gases released into the atmosphere as a result of energy consumption at the property. GHG emissions are expressed in carbon dioxide equivalent (CO<sub>2</sub>e), a universal unit of measure that combines the quantity and global warming potential of each greenhouse gas. Emissions are reported in four categories, each is available as a total amount in metric tons (Metric Tons CO<sub>2</sub>e) or as an intensity value in kilograms per square foot (kgCO<sub>2</sub>e/ft<sup>2</sup>):

- Direct Emissions – Direct Emissions are emissions associated with onsite fuel combustion (e.g. combustion of natural gas or fuel oil).
- Indirect Emissions – Indirect Emissions are emissions associated with purchases of electricity, district steam, district hot water, or district chilled water.
- These emissions occur at your utility’s plant, but they are a result of your property’s energy consumption and therefore contribute to your overall GHG footprint.
- Biomass Emissions– Biomass Emissions are emissions associated with biogenic fuels such as wood or biogas (captured methane). The only biomass fuel currently available in Portfolio Manager is wood. Biogenic fuels are combusted onsite, but do not contribute to direct emissions.
- Total Emissions – Total Emissions is the sum of Direct Emissions and Indirect Emissions.

## Impervious Land Cover

Area that does not allow rainfall to infiltrate the soil and typically includes buildings, parking lots, and roads.

## Kilowatt Hour (kWh)

The kilowatt hour is a derived unit of energy equal to 3.6 megajoules. If the energy is being transmitted or used at a constant rate (power) over a period of time, the total energy in kilowatt-hours is the product of the power in kilowatts and the time in hours. Often used with respect to electricity.

## Parasitic Loads

Parasitic loads, or standby power, are the power draw of electrical equipment, including computers, printers, task lights, etc., when in the "off" state. Some research defines parasitic loads as the power draw of a plug load, in any state, that is not performing useful work. This power is consumed by power supplies, the circuits and sensors needed to receive a remote signal, soft keypads and displays including miscellaneous light-emitting diode (LED) status lights.

Parasitic loads present a large opportunity for plug load energy savings. All parasitic loads waste energy and should be transitioned to the lowest power state possible, preferably completely powered down.

## Payback Period

Related to return on investment (ROI), the payback period is the time which it takes for the savings from a project to equal the initial investment.

## Plug Loads

Plug loads are the electrical loads in a building due to the various devices that are plugged into receptacles. Examples of plug-load devices include, but are not limited to, the following: computers, printers, task lights, vending machines, desk fans, etc. Recent research shows that desk-based technologies and electronics in office settings can consume significant amounts of energy that are often not taken into account in energy monitoring and reduction strategies. These technologies are generally under the control of individual workers rather than centrally operated, making plug loads "orphans." They are usually not managed until there is a plan in place to do so. Workstation plug-loads are not the only challenge. Electronic equipment in shared spaces—such as print/copy rooms and break rooms—can also be a significant energy consumer, and with no one person responsible for turning it off, shared equipment is often left "on" indefinitely.

Plug loads as a share of overall building energy use is higher in energy efficient buildings. In minimally code-compliant office buildings, plug loads may account for up to 25% of total energy consumption. But in high efficiency buildings, plug loads may account for more than 50% of the total energy consumption.

## Power Purchase Agreement (PPA)

A Power Purchase Agreement is a financial arrangement in which a third-party developer owns, operates, and maintains a renewable energy generation system and a host customer agrees to site the system on its property and purchases the system's electric output from the services provider for a predetermined period. This financial arrangement allows the host customer to receive stable and often low-cost electricity, while the services provider or another party acquires valuable financial benefits, such as tax credits and income generated from the sale of electricity.

## Renewable Energy Certificate (REC)

A REC is a market-based instrument that represents the property rights to the environmental, social and other non-power attributes of renewable electricity generation. RECs are issued when one megawatt-hour (MWh) of electricity is generated and delivered to the electricity grid from a renewable energy resource.

## Retrofitting

Retrofitting replaces outdated equipment and materials with more efficient upgrades in a building. This can sometimes mean even changing the structure of a building.

## Retrocommissioning

Retrocommissioning improves the efficiency of existing features in a building by systematically pinpointing the less efficient parts of a building and tuning up the equipment.

## Return on Investment (ROI)

ROI is the total amount of money and/or labor saved by a given investment (energy or efficiency) project over a period of time, less costs and labor to complete the project. If, for example a lighting efficiency upgrade cost \$1400 and 2 hours of labor, but also saved \$2000 in energy and replacement hardware and 12 hours of labor over the course of one year, the ROI over that one year would be \$600 and 10 hours of labor. The ROI may increase each year based on the lifecycle of the investment.

## Savings-to-Investment Ratio (SIR)

The savings-to-investment ratio is the ratio of the present value (PV) of future savings to the current investment costs of an energy or water conservation measure.

$$SIR = \frac{PV \text{ of Energy Cost Savings}}{\text{Initial Investment Cost}}$$

A SIR of less than 1.0 indicates that the present-day value of savings the investment will generate is less than the actual investment cost. It is common to assume a 3% rate of inflation for present value calculations.

## Simple Payback

An energy investment's Simple Payback is the time it would take to recover the initial investment in energy savings.

## Site Energy

Site Energy is the end use energy that is recorded at the electricity or gas meter, or alternatively at the gas station pump. Use Site Energy to understand how the energy use for an individual property has changed over time.

## Source Energy

Also known as primary energy, source energy includes the energy lost or wasted during extraction, conversion, transmission, and distribution of the energy through the grid.

Put another way, source energy is the total amount of raw fuel that is required to operate a home, property, or other end use. In addition to what a property consumes on-site, source energy includes losses that take place during generation, transmission, and distribution of the energy, thereby enabling a complete assessment of energy consumption resulting from building operations. For this reason, source energy is the best way to evaluate energy performance. Use source energy to understand the complete energy impact of a property and to compare energy performance of properties across a portfolio.

## Vegetative Swale

Constructed open-channel drainageways used to convey stormwater runoff. Vegetated swales are often used as an alternative to, or an enhancement of, traditional storm sewer pipes.

## Volatile Organic Compounds (VOCs)

Hydrocarbon compounds that exist in the ambient air and are by-products of energy used to heat and cool buildings. Volatile organic compounds contribute to the formation of smog and/or are toxic. Examples of VOCs are gasoline, alcohol, and solvents used in paints.

## Weather Normalized

Weather normalized measures can be used to compare energy use year to year. The weather in a given year may be much hotter or colder than your building's normal climate; weather normalized energy accounts for this difference. They are calculated by applying your past

energy use patterns to average conditions (also referred to as climate normals). Note that the adjustment is for weather only, but not climate. That is, the metric evaluates your building over time, but does not account for differences between your building and other locations that have different average (normal) climates. Weather normalized energy is not available for new building