The difference between source and site energy

After you've benchmarked your building, you'll see several performance metrics, including source and site EUI (or energy use intensity). What's the difference? And which is used for the 1 – 100 ENERGY STAR score?

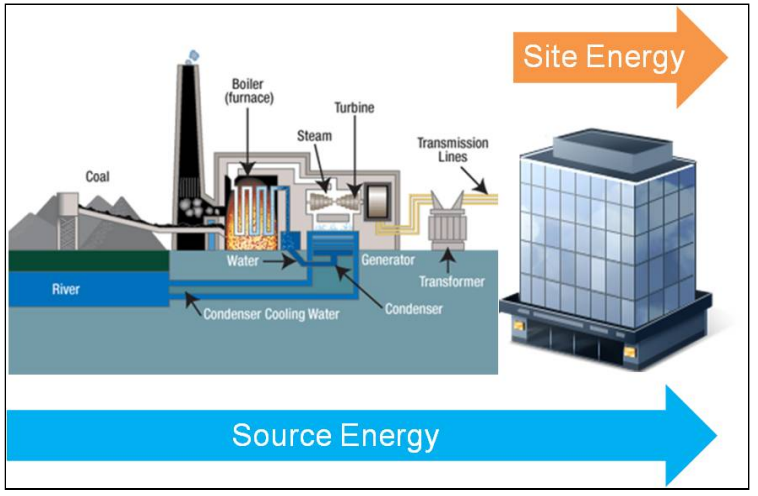
Commercial buildings use all types of energy, from electricity to natural gas to steam. To compare this diverse set of commercial buildings equitably, the 1 – 100 ENERGY STAR score must express the consumption of each type of energy in a single common unit.

EPA recommends using source energy

EPA has determined that ***source energy*** is the most equitable unit of evaluation. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses. By taking ***all*** energy use into account, the score provides a complete assessment of energy efficiency in a building.

Source energy accounts for total energy use

You're probably already familiar with ***site energy***, which is the amount of heat and electricity consumed by a building as reflected in your utility bills. Looking at site energy can help you understand how the energy use for an individual building has changed over time.

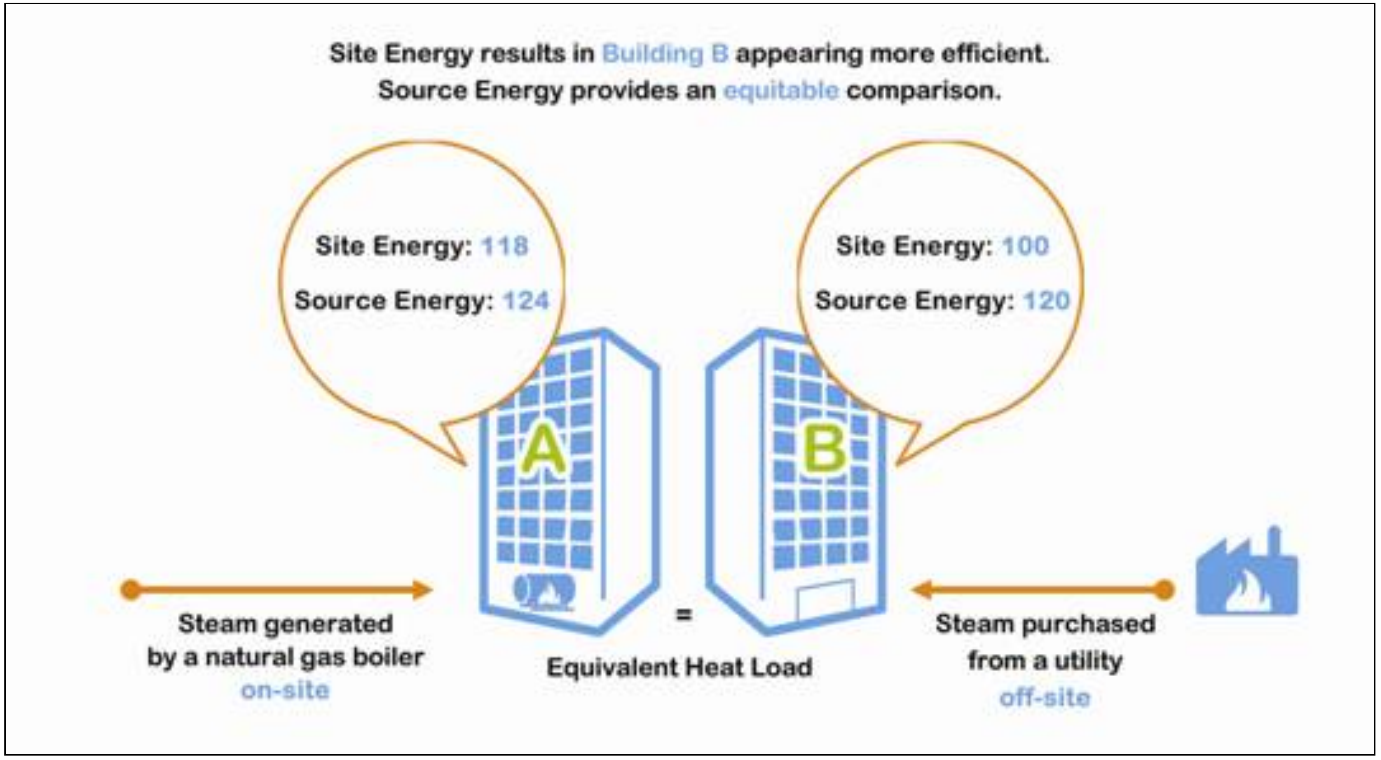


Site energy may be delivered to a building in one of two forms: primary or secondary energy. ***Primary energy*** is the raw fuel that is burned to create heat and electricity, such as natural gas or fuel oil used in onsite generation. ***Secondary energy*** is the energy product (heat or electricity) created from a raw fuel, such as electricity purchased from the grid or heat received from a district steam system. A unit of primary and a unit of secondary energy consumed at the site are not directly comparable because one represents a raw fuel while the other represents a converted fuel.

Therefore, to assess the relative efficiencies of buildings with varying proportions of primary and secondary energy consumption, it is necessary to convert these two types of energy into equivalent units of raw fuel consumed to generate that one unit of energy consumed on-site. To achieve this equivalency, EPA uses

source energy.

When primary energy is consumed on site, the conversion to source energy must account for losses that are incurred in the storage, transport, and delivery of fuel to the building. When secondary energy is consumed on site, the conversion must account for losses incurred in the production, transmission, and delivery to the site. The factors used to restate primary and secondary energy in terms of the total equivalent source energy units are called the ***source-site ratios***.



EPA uses national conversion factors to calculate source energy

The efficiency of secondary energy (e.g., electricity, steam) production depends on the types of primary fuels that are being consumed and the specific equipment that is used. These characteristics are unique to specific power plants and differ across regions of the country. For example, some states have a higher percentage of hydroelectric power, while others consume greater quantities of coal.

Because ENERGY STAR is a national program for protecting the environment through energy efficiency, EPA has determined that it is most equitable to employ source-site ratios at the national level. As such, there is only one source-site ratio for each of the primary and secondary fuels in Portfolio Manager, including electricity. The use of national source-site ratios ensures that no specific building

will be credited (or penalized) for the relative efficiency of its utility provider.

Technical methodology in Portfolio Manager

For more detailed information on source energy, read the methodology for computing source energy in Portfolio Manager Technical Reference: Source Energy. This complete technical document provides detail on the distinction between site and source energy and the value of performing source energy comparisons. In addition, the document provides details on the policies for incorporating renewable energy, the philosophy behind the use of national factors, and the specific calculations used to derive each conversion factor.