

Energy Use in K-12 Schools

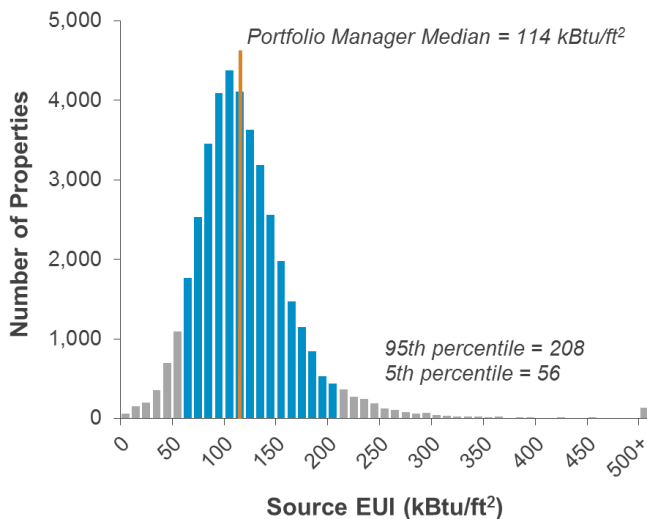
K-12 Schools Using Portfolio Manager

- 55,019 Properties
- 5.8 Billion ft²
- 67** Average ENERGY STAR Score

The U.S. Environmental Protection Agency's (EPA) ENERGY STAR Portfolio Manager is changing the way organizations track and manage energy. Because of this widespread market adoption, EPA has prepared the DataTrends series to examine benchmarking and trends in energy and water consumption in Portfolio Manager. To learn more, visit www.energystar.gov/DataTrends.

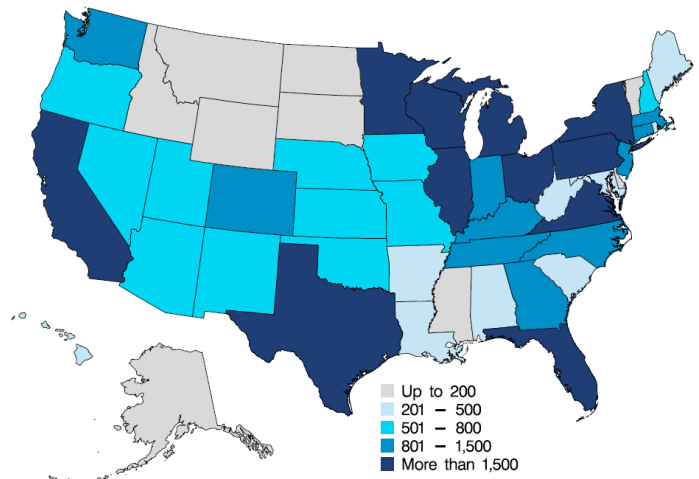
What is a typical operating profile?

Energy use intensity (EUI) ranges from less than 50 to more than 500 kBtu/ft² across all schools, with those at the 95th percentile using 4 times the energy of those at the 5th percentile. The distribution has a negative skew, which means the most energy intensive properties are further away from the median than the most efficient. Properties may use more or less energy for many reasons, including variable equipment efficiency and energy management practices, as well as variations in climate and property activities.



The median school in Portfolio Manager is approximately 75,000 square feet and has just over 2 computers per thousand square feet. But the typical building use patterns observed in Portfolio Manager vary just as much as energy. As you can see, there are K-12 Schools of all shapes and sizes benchmarking in Portfolio Manager.

Benchmarking by State Number of K-12 Schools



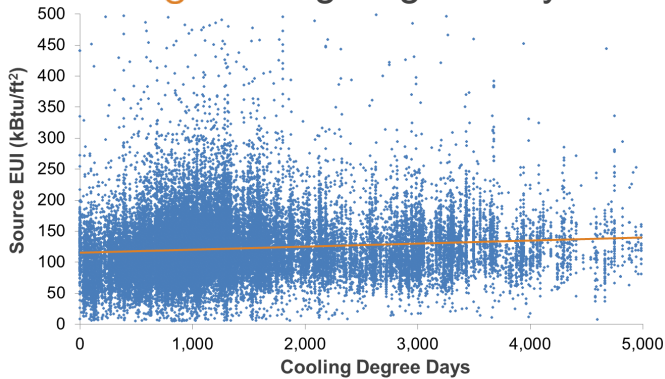
Property Characteristic	5th percentile	Median	95th percentile
Square Feet	23,211	74,519	284,599
Computers per 1,000 ft ²	0.7	2.1	5.2
Walk-in Refrigeration Units per 1,000 ft ²	0.00	0.01	0.04
Cooking Facilities?		79% say yes	
High School?		19% say yes	
Heating Degree Days	1,021	4,710	7,650
Cooling Degree Days	227	1,108	3,432

What is Source Energy? Source energy is the amount of raw fuel required to operate your property. In addition to what you use on site, source energy includes losses from generation, transmission, and distribution of energy. Source energy enables the most complete and equitable energy assessment. Learn more at: www.energystar.gov/SourceEnergy.

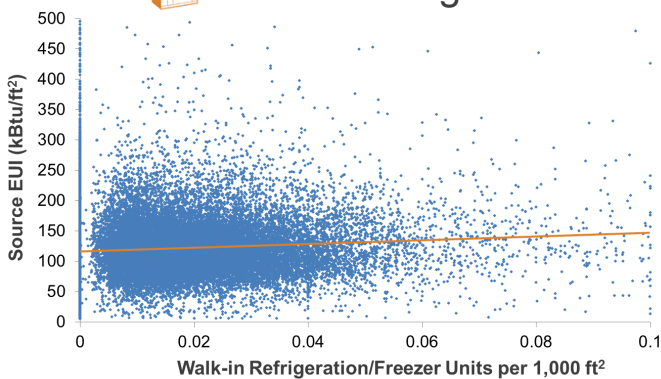
What characteristics affect energy use in schools?

Typical activity and climate are often correlated with energy consumption. For example, schools that experience more cooling degree days (CDD), have more walk-in refrigerators (a measure of cafeteria activity), or more computers per square foot use more energy, on average. The orange trend lines in the graphs below show the impact of each characteristic on energy use. The steeper the line, the bigger the impact. While these trends hold true on average, the blue dots demonstrate that for any given value of CDD, walk-in refrigerators, and computers, a broad range in energy use is observed. Similar trends can be seen for other indicators of property activity. For example, energy use is higher for high schools than elementary schools.

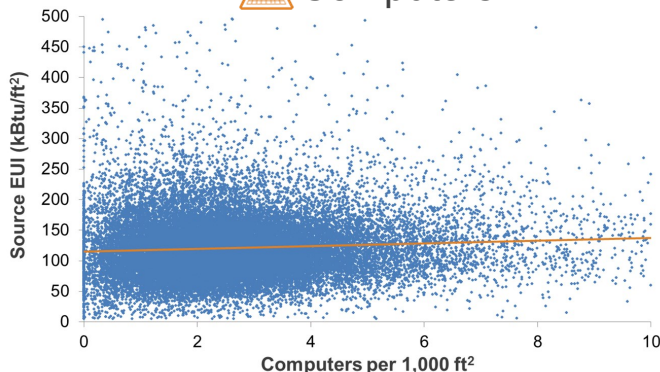
Cooling Degree Days



Walk-in Refrigerators



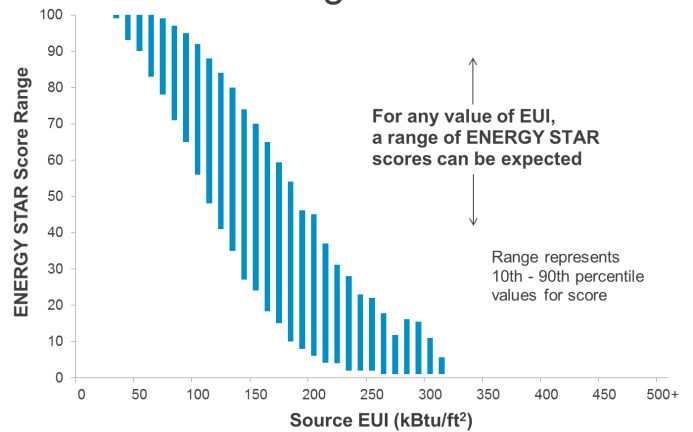
Computers



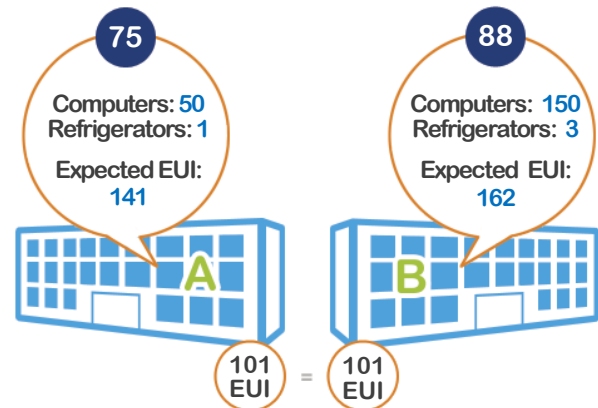
How does EPA's ENERGY STAR score vary with energy use?

EPA's ENERGY STAR score normalizes for the effects of operation. While buildings with lower EUI generally earn higher scores on the 1-100 scale, an individual building's result depends on its activities. For any given EUI, a range of scores is possible.

Score Range for Schools



Let's look at two K-12 School properties, School A and School B. They have the same EUI of 101 kBtu per square foot, and are identical except that School B has more computers and walk-in refrigeration units per square foot. Because School B has more intensive activities, it is expected to have a higher EUI than School A, based on ENERGY STAR scoring models. Since School B is *expected* to use more energy, but *actually* uses the same energy, it earns a higher score.



Note: Total number and floor area of properties benchmarked reflects cumulative data through 2013. Analysis of energy use and operational characteristics includes 40,655 properties benchmarked in the most recent 5 years. The data is self reported and has been filtered to exclude outliers, incomplete records, and test facilities. Portfolio Manager is not a randomly selected sample and is not the basis of the ENERGY STAR score. To learn more, visit: www.energystar.gov/DataTrends.