

Measures of Power



If you're thinking about investing in utilities and renewable energy projects through companies like Brookfield Renewable Partners ([see Brookfield article](#)), Southern Company, or Duke Energy, you must understand units of power to know what you're backing. Having a firm grasp of what power is, down to the watt, will allow you to understand the value of your potential investments.

Watt (W)

Watts are the base of power measurement, making them essential knowledge for investors. In the 18th century, a Scottish inventor and mechanical engineer named James Watt took steps to improve the steam engine. To do this, he needed to measure and compare units of power to make sure his systems were more efficient. Watt devised a new way to measure power and named it "horsepower." Later, in the 19th century, the International System of Units (SI) created an official unit of power and named it the "watt" after his contributions.

A watt measures the rate at which energy is produced or used. It equals one joule of energy per second, which tells you how much energy something generates over time. Some items that use watts to measure power include:

- Light bulbs
- Computers
- Microwaves
- Phones
- Fans

Many people think about watts when it comes to light bulbs, which typically consume between two and 100 watts of electricity. Plugging a 60-watt light bulb into a socket that provides more wattage can result in overheating, socket damage, a burnt-out light bulb, or even a fire. Using a socket that doesn't provide enough wattage can result in dimmer lighting, but it won't damage the bulb or socket.

Kilowatt (kW)

The next-largest unit of power is the kilowatt. One kilowatt is equal to a thousand watts. People commonly use kilowatts to measure electrical systems and household appliances. You'll find air conditioners, washing machines, refrigerators, and electric vehicles using power measured in kilowatts or kilowatt-hours.

Kilowatt-Hour (kWh)

Kilowatt-hours measure electricity used over time. Using a one-kW heater for an hour would consume one kWh of energy. Utility companies use kilowatt-hours to track your energy usage, so when you receive your electricity bill, they'll charge you based on kilowatt-hours. U.S. homes, on average, consume [10,500 kilowatt-hours per year](#), which amounts to about 30 kilowatt-hours per day.

Kilowatt-hours are also important metrics for analyzing the profitability of energy companies. Supplying energy at a lower cost per kilowatt-hour means higher profit margins. Investors can use kilowatt-hours to gauge long-term growth opportunities as consumption patterns emerge.

Megawatt (MW)

A megawatt is equal to a thousand kilowatts, or a million watts. Megawatts measure energy consumption on a large scale, including entire cities. Based on the national average, one megawatt would power 95,238 homes per year.

Large machines and operations often measure their energy consumption in megawatts, including:

- Electric locomotives (usually [five or six MWs](#))
- Submarines (up to [50 MWs](#))
- Warships ([72 MWs of propulsion power](#))
- AI data centers (between [100 and 1,000 MWs](#))

When researching utility and energy companies to invest in, you'll mostly measure power in megawatts and gigawatts.

Gigawatt (GW)

One gigawatt is equal to a billion watts, or a thousand megawatts. One gigawatt alone is enough to supply a city with a million residents. Generating one gigawatt of power would take about 3 million solar panels producing 300 watts each, or 2.5 million panels producing 400 watts each.

Other ways to produce large quantities of energy include dams and nuclear power plants. Plant Vogtle, in Burke County, Georgia, one of the largest nuclear power plants in the U.S., produces [4.5 gigawatts](#) per hour.

Large electric companies like Duke Energy and Southern Company have an operating capacity measured in gigawatts. Operating capacity is the maximum amount of electrical power a power plant or utility can generate and sell, making it essential knowledge for investors.

As of 2024, [Duke Energy](#) boasted an operating capacity of 54.8 GWs, providing energy to 8.4 million customers in six states. While still massive, [Southern Company](#) delivered a slightly lower operating capacity of 43 GWs in 2023, but it served 9 million customers in three states. When you monitor a company's operating capacity, you can determine how well it can grow its earnings and whether it's operating at its full potential.

Terawatt (TW)

A terawatt is one of the largest units of power, equal to a trillion watts or a thousand gigawatts. This large unit of measurement simplifies power usage in terms of energy policy, global energy consumption, and renewable energy initiatives. In 2023, the U.S. generated [4.18 terawatts](#) in total. Investors can use terawatts to gauge the progression of energy on a national or global level, allowing them to identify opportunities in emerging markets and areas where energy demand is increasing.

Conclusion

Knowing the difference between power measurements is essential for investors who are interested in the industry. The rise of data centers and AI infrastructure is increasing the

global energy demand. The [U.S. Energy Information Administration](#) (EIA) is projecting a steady rise in global energy consumption through 2050, continuously making utilities and renewable energy companies more attractive to investors.

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