

Renewable Energy Terms

Watt-hour—unit of energy

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Once you know what a gallon is, you should have no trouble seeing that a “gallon per second” is a *rate* of liquid flow. The phrase itself helps us understand. With electricity, the terms tend to confuse us.

At first glance, the term “watt-hour” might sound like a rate. It has a time element, reminding us of “per hour.” And a watt, like a gallon, sounds like a quantity of “stuff.” But in fact, a watt is a rate, and a watt-hour is a quantity. We can compare a watt (technically a joule per second) to the rate water is filling your bucket (a certain number of gallons per second), and watt-hours to the number of gallons in your bucket.

This distinction between watt and watt-hour is crucial! They are not at all the same thing, though they are often mixed up. The terms themselves are confusing, and frequent misuse dulls the distinction for us.

What if you ask your spouse to bring home three gallons per second from the dairy section of the local grocery store? You will wish that you’d specified the time period you had in mind when you get more milk than you expected.

You’ll have a similar confusion if you ask your renewable energy (RE) dealer to design a system that will give you 14,000 watts. He or she will want to know if you need 14,000 watts continuously (an enormous system), or if you are really misusing the terms and mean 14,000 watt-hours per day (a merely huge system). You might also mean that you need 14,000 watts peak, to handle the brief surge when you start all your large power tools and your irrigation pump at once.

If you’re looking for the universal measure for an RE system—watt-hour is it. A watt-hour defines the amount of energy used when we leave a one watt load on for

one hour. Just multiply watts times hours and you’ll have watt-hours. Voltage is already factored in, so once you get to watt-hours, you’re using a measure that allows you to compare loads, generating sources, and batteries—regardless of system voltage. When you do your load analysis, convert everything to watt-hours and the process will be much easier.

Folks on the grid buy electrical energy by the kilowatt-hour, which is one thousand watt-hours. When people say that they paid for 50 kilowatts last month, it’s obvious that they don’t understand the terms. It’s like saying you’re going to buy three gallons per second at the dairy—it tells you only the rate, not the total amount.

A closely related terminology confusion is between “power” and “energy.” Electrical energy is measured in watt-hours. Electrical power is the rate of energy flow, and it’s measured in watts. In common speech, we use “power” and “energy” very loosely, and often not in their technically accurate sense. This doesn’t actually bother me too much, since most of our lives are not spent speaking technically. It also seems hopeless to expect the whole population to use these terms in their technical sense. Even the power—Oops! Do I mean energy?—companies can’t seem to keep them straight.

But when it comes to watts and watt-hours, we will only confuse others—and ourselves—by not using the terms correctly. A watt-hour is a measure of energy—it’s a quantity of “stuff.” A watt is the rate at which energy is generated or used.

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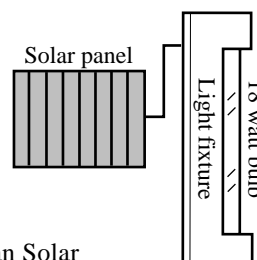
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