Why do AC Solar Systems Outperform DC System

DC solar systems are made up of a connected series of modules. With DC solar, if one panel isn't working, it affects every other panel in the chain. To put it simply, your DC solar system is only as good as its weakest link. With AC solar, each module operates independently. This makes the whole system more resilient to variations in the output of individual modules. Solar panels - by their very nature - are exposed to a range of environmental elements. And each module can be affected differently due to its location, age, the time of day and more. Here are some of the most common causes of variations in module output.

SHADING

Modules are often exposed to shading from clouds, trees, chimneys and other obstacles, and the amount of shading for each module can change throughout the day.

SOILING

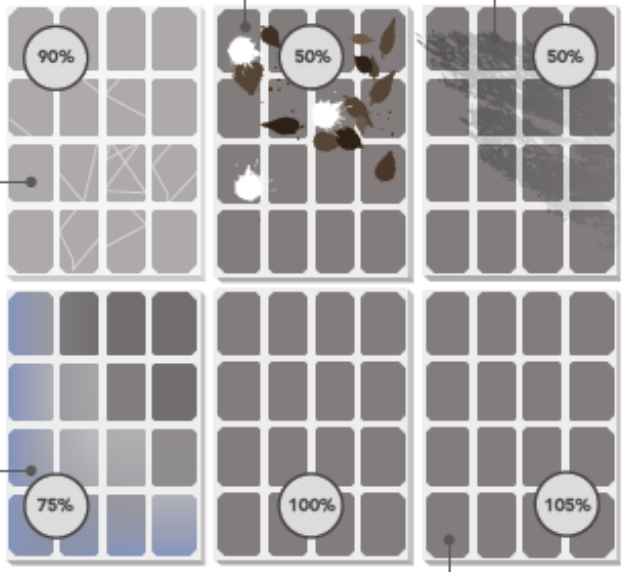
Soiling from dirt, leaves, bird droppings and dust build-up limits the amount of sunlight a module is exposed to. As with shading, modules are almost never affected equally, meaning the power generated by each module in an array can vary quite a lot.

AGEING

All solar panels lose effectiveness over time, but each individual module degrades at a different rate. This is even true for modules of the same make. For example, say a particular brand guarantees a drop of no more than 20% in power output over 20 years. By the end of this time, some modules might be performing at just 80% of their original capacity whilst others could still be performing at 95%.

TEMPERATURE VARIATION

The amount of energy generated by each module is affected by its temperature. Most modules become less effective as their temperature increases, which is significantly influenced by its location within the array. Modules on the outside of the array are exposed to more airflow, so they're often cooler than modules that are in the middle.



MANUFACTURING VARIATIONS

Solar modules are typically rated accordingly to their DC power output, with a measurement tolerance of a few percent (eg. +/-3% or +5%). This means that for a 250W module with a +5% tolerance, each module's output could still vary from 250-262.5W.

How these factors affect performance

With DC solar, if one panel has a reduced output for any reason, the entire system suffers. With AC solar, however, the overall output is the total of the energy generated by each individual module, which is always higher.

Because they're more resilient to these environmental impacts, AC solar systems typically produce a minimum of 5-10% more energy than DC systems when installed in un-shaded, north facing locations. Under some conditions AC systems can produce up to 25% more energy. Combined with its improved safety and reliability, AC solar really does stack up when it comes to choosing the right solar system.

In this example…

DC Solar Total Output

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