THE COST PER KILOWATT TRAP

Some energy providers will quote the cost per kilowatt of their turbines or panels to you. While this sometimes can be convenient for comparison, it can conceal poor quality and low performance.

HERE IS WHY:
The cost per kilowatt refers to the cost for a certain capacity of the equipment. Let's say a solar panel has a capacity of 1 kilowatt. That means that at full solar intensity it produces 1 kilowatt.

The problem is that all systems are designed so that full capacity is rarely reached. That size of solar panel may produce 1 kilowatt at noon on July 1 in the northern hemisphere, but most of the time it produces much less, and of course zero at night.

This means that the cost per kilowatt of capacity (sometimes called the "rated power") is usually inaccurate in telling you the benefits of your energy choice.

Solar panels decay in performance each year and are usually discarded after 20 years. That means that they give you the initial cost per kilowatt, whereas it would be fairer to give the cost per kilowatt based on their loss in capacity in the middle of their lifespan at 10 years.

The metric you want to use for determining return on investment is cost per kilowatt hour. When you look at kilowatt hours, you look at how much electricity that turbine or panel produces. For calculations of return on investment, you can most easily use the value of the electricity produced per year.

EXAMPLE:
The wind in a certain area averages 6 meters per second.

At that speed the turbine produces 1 kilowatt each hour. With 8760 hours in a year, that turbine produces 8760 kilowatt hours each year.

If the value of the electricity is 10 cents per kilowatt hour, then the yearly value of the electricity is $876.

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If the price of the turbine is $8760, then the return on investment each year is 10%. If the price of the turbine is $17,520, then the return on investment each year is 5%.

This allows us to compare energy systems much better than using cost per kilowatt, which tells you the purchase price, but not what you get from it.

(Note that with wind, as opposed to solar, taking the average usually results in underestimating the return on investment because gusty, non-uniform wind is usually much better than consistent wind.)

BUT WAIT! THAT STILL ISN'T THE FULL STORY!
It doesn't consider the lifetime of the turbine or panel. A turbine that costs $17,520 and lasts 20 years has the same return on investment as a turbine that costs $8760 and lasts 10 years. It actually is better because you don't have to take the old turbine away and install a new one. If you buy a low-quality turbine, and you have to buy 2 to match the longevity of buying 1 quality turbine, that 10% return on investment falls to 5% or less. (It is almost always less because inflation causes the price of the second turbine you buy to cost more.)

THAT STILL ISN'T THE FULL STORY!
Maintenance is a cost that needs to be included. It reduces the value of the energy produced each year. If the maintenance cost is relatively high, as it could be for horizontal axis turbines, or if the labor and loss from dusting off solar panels to make them perform as well as they should, the return on investment drops.

So if our turbine costing $8760 that produces $876 worth of electricity per year has a yearly maintenance cost of $100, then its return on investment drops to $776/$8760, which is 8.8%.

Metrics such as Levelized Cost of Energy (LCOE) take this and other factors into consideration. There are also benefits of subsidies, depreciation, etc.

BUT WAIT! FOR FLOWER TURBINES, THERE IS MORE TO THE STORY.
These turbines are built to last 20-40 years with almost no maintenance except for some models replacing the grease every 2-3 years. So that needs to be factored into the return on investment.

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AND THERE IS EVEN MORE TO THE FLOWER TURBINES STORY!
Flower Turbines have a cluster effect such that, when correctly combined with each other, a group of 4 will produce twice the power of 4 physically separate turbines. Therefore, if a single turbine from Brand X and a single turbine of the same size from Flower Turbines both have a return of 10%, it isn't a fair comparison to Flower Turbines, because putting 4 together means each Flower Turbine has a return of 20%.

When you are purchasing a turbine and looking for return on investment, you need to take these facts into account. In addition, Flower Turbines offers many other benefits that are harder to quantify. For example, the lower starting speed means there is some energy available for use when other turbines are producing nothing. The durability at high speeds also means less replacement cost.

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