DWEA Briefing Paper: Distributed Wind Myths

Summary

It is important to understand the facts surrounding distributed wind technologies and installations and to recognize myths and irrational claims.

Distributed Wind Myths

A quickly growing industry with substantial innovation, the distributed wind industry often sees new products appear, at times offered by companies with limited experience in wind energy or manufacturing. While innovation is good and improvements are welcome, those who have been involved in the industry for some time all too often see emerging companies engage in overly aggressive sales hype, which can be harmful to both the industry and our customers. DWEA believes it is important for customers to be aware of common claims and when and why they may not be scientifically credible.

Wind turbines can operate with little or no wind

A mistake often made by new manufacturers is to underestimate the wind speed necessary to produce electricity. Wind energy is kinetic energy and increases exponentially with wind speed. While this means that great power production can be achieved in areas with good to excellent wind regimes, it also means that there is very little energy available at lower wind speeds. For example, 4 mph wind passing a 6'-diameter rotor contains less than 10 watts of power, hardly enough to spin the rotor, let alone produce power. There is simply little energy in light winds. Companies claiming significant energy production at very low wind speeds hurt the entire industry and cause confusion and distrust among interested customers.

Wind turbines can defy physical efficiency limits

Nearly 100 years ago, German physicist Albert Betz proved that the maximum efficiency of a theoretically perfect wind turbine is 59.3%, a fact well known to wind engineers. Attempting to extract more energy simply forces the wind *around* the rotor instead of through it. Now, a century later, there are still those who claim to exceed what has come to be known as the "Betz limit" or "Betz's Law." In fact, there are companies in the market that claim to produce more energy than the wind actually contains! Customers should be aware that such manufacturers exist and perform their own due diligence about feasibility as they consider their different options.

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Turbulent wind is good

Wind turbines operate best in the path of laminar (smooth) wind. Turbulence decreases their performance. However, customers will occasionally run into manufacturers who will market their turbines as 'turbulence-proof' or perhaps even inherently benefitting from turbulence. Two things are clear. First, wind turbines with airfoils require laminar winds to operate efficiently. Turbulence is chaotic airflow, and as such, turbulent wind contains less extractable energy than laminar wind. And second, turbulence imposes greater structural loads on wind turbines than laminar flow, thereby increasing maintenance as a result of wear and tear. Turbulence reduces a wind turbine's life expectancy.

Short towers, tall towers – No difference!

Wind speed increases and turbulence decreases the further you get away from the ground. Closer to ground level, trees, buildings, and other obstacles disturb the wind. All wind turbine customers should be aware of this and realize the golden rule–the taller the turbine tower is, the more energy output you can expect! There is no such thing as a wind turbine that works best at low heights.

Wind turbines are noisy

There are no magical turbines, or any other moving objects for that matter, that operate with zero sound levels. Yet compared to other sounds we are familiar with in our everyday environment, most small wind turbines are comparatively quiet and operate unnoticed. A widely available certification and testing standard exists that includes sound documentation, and most manufacturers willingly disclose and describe their turbines' sound power (decibel) levels.

Wind turbines destroy wildlife

Customers are often understandably concerned with how their wind turbine will affect birds and bats. As a result, emerging manufacturers sometimes claim to design turbines that prevent any impact on flying wildlife. While human existence is arguably detrimental to wildlife in many ways, the numbers make it clear that distributed wind turbines have very little impact on wildlife. In-depth independent studies evaluating distributed wind turbines reach positive conclusions about their safety for wildlife, including turbines installed near wildlife refuges and conservation districts. In fact, the National Audubon Society clearly states its support for the development of wind energy.