80 x 80). You'll want to keep your turbine out of that kind of wind's way (perhaps while still generating a bit of energy) so it can stay intact for the next reasonable wind.

By looking at a power curve, you can see what a turbine does (or supposedly does) in high winds. If the curve keeps increasing above about 30 to 35 mph, don't buy it! Few turbines can withstand the forces of storms if their rotor has to take the full brunt of storm winds. Long-time wind-turbine tester Mike Klemen of Harwood, North Dakota, says, "Any turbine that doesn't protect itself well dies here. I will never buy a turbine without seeing a power curve that proves that the turbine protects itself." Perhaps we should rename power curves "governing curves," so wind turbine shoppers understand the main value of the curve.

The other value in power curves is to electrical designers who create the other components needed in wind-electric systems. Knowing the cut-in point, peak voltage and current, and what's in between is necessary to specify appropriate components, and design robust controllers and inverters to match the generating characteristics of a wind turbine.

Energy is the Goal

The bottom line is that power curves are primarily an esoteric measure for wind geeks, with the unfortunate consequence of creating much confusion about wind generator performance. When we buy a car, most of us don't look at the horsepower of the engine or the cold cranking amps of the battery. We turn to more important overall measures like fuel economy. So we should leave power curves to the number nerds, and stop distracting ourselves from the prize—energy output. But what's an average wind system shopper to do?

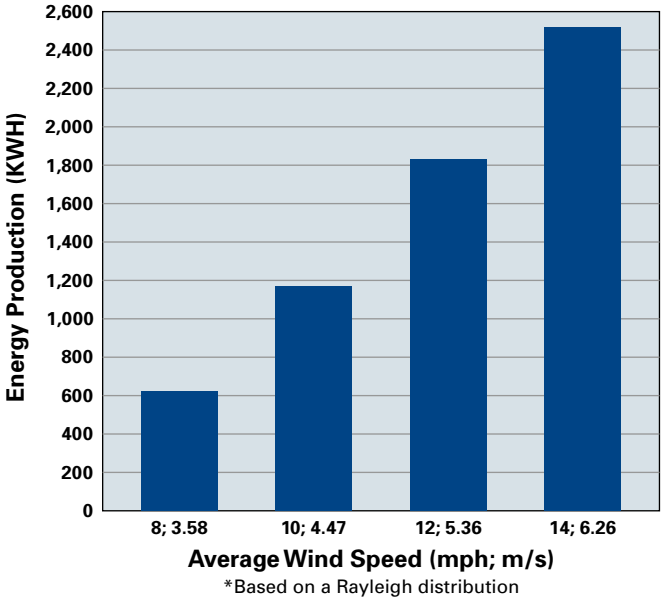
Veteran wind-energy expert Hugh Piggott says, "The power curve on its own doesn't tell you anything about energy, nor is there any simple way to determine that from a given power curve." We don't buy watts from the utility, and we don't put watts into our battery bank or into the grid. We buy, produce, and sell *watt-hours*—energy. So we should evaluate wind machines based on their energy performance, not peak power, or any other single point on the power curve.

Instead of using power curves, look on the manufacturers' Web sites or in their literature for *energy* curves or graphs (see the ARE 442 example). With an estimate or measurement of the average wind speed at your site, these curves can help you project the energy yield from a particular turbine. Then you can determine how that projection matches up with your energy needs, and get on with the job of designing and installing your wind-electric system.

Understanding power curves and energy curves can help you sort fact from hype, and real products from scams. See the "Perfect Turbine or Pipe Dream?" sidebar for how to do a reality check on the manufacturers' or promoters' claims. In addition, search the Internet for real-world users of the turbine you're considering, and compare the manufacturers' claims to reports of actual system performance.

Whether you are sizing a system or evaluating a product, you'll be working with an *estimated* average wind speed and an *estimated* energy production curve. That means that your numbers will be rough guesses at best. Get used to it—with small-scale wind systems, it is rarely practical or affordable to do much better than this. So be conservative when you design, and with luck, you'll be pleasantly surprised at your turbine's actual energy performance.

Monthly Production Estimates for ARE 442



Access

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