

WINDLETTER

THE MONTHLY NEWSLETTER OF THE AMERICAN WIND ENERGY
ASSOCIATION

Volume 26 Issue No. 9

SMALL TURBINE COLUMN:

Investment Considerations for Wind Systems

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Last month we examined the shortsighted view of evaluating a wind system in terms of “payback,” and the problems with this line of thought. A wind system is an investment, and should therefore be evaluated with the same yardsticks as other investments of similar value. Some of these considerations must include:

1. Your average annual wind speed. This is actually the variable with the biggest impact on the return of your wind system. The reason for this is the fact that the output of a wind turbine is a function of the cube of the wind speed. Small increases in wind speed result in huge increases in energy available to the wind turbine to convert to electricity. A 10% increase in wind speed results in a 33% increase in power available to the wind turbine’s rotor.

As a result, placing your wind turbine on the best spot on your property to access winds is critical to its success. A corollary to this is that a tall tower almost invariably turns out to be a good investment, as it raises the wind turbine above the turbulence created by ground clutter, the trees, and man-made structures. In addition, it is well understood that taller towers access stronger wind, as average annual wind speed increases with distance above grade.

2. The cost of the electricity offset by the wind system. This is the second biggest variable affecting the return on investment of your wind system. Obviously, the higher the cost of utility-purchased electricity, the more competitive a wind turbine will be in terms of offsetting utility purchases of electricity.

3. Whether your state or utility offers net metering, and to what extent. Net metering means that your utility credits you with the retail rate for the electricity generated and “stored” on the grid for later retrieval—simple enough. But, as always, the devil is in the details. The big question is what happens to net excess generation, that is, kilowatt hours that you generate that exceed a given month’s “normal usage.” If the utility pays the retail rate for all electricity generated, regardless of usage, you have an ideal situation. However, if the utility pays a wholesale rate for excess generation, the

economics will be considerably skewed. The worst situation is one where net excess generation is “bequeathed” to the utility with no compensation.

Your strategy for sizing your wind system will depend to a great extent on the way your utility treats net excess generation. If they pay you the retail rate for everything you generate over and above normal monthly usage, you should consider installing the largest wind turbine allowable. This is because of the fact that there is an economy of scale for small wind in that larger systems generate electricity at a lower cost than smaller systems. A large system will therefore have a better return on investment than will a small system.

On the other hand, if you get little (the wholesale rate) or nothing (all net excess generation “is given to” the utility) for your excess generation, you will want to install a system that will either cover your average monthly consumption, or never generate enough to turn your kilowatt-hour meter backwards.

4. Sales tax. A little-remembered item on your utility bill that increases the cost you pay for electricity is sales tax. If you pay 11 cents/kWh for your electricity, and another penny for sales tax, the real cost of your electricity is 12 cents/kWh. When you generate your own electricity, you avoid paying the sales tax as well as the cost for the energy consumed. When you “store” your excess electrical generation “on the grid” in the form of a credit for later retrieval, you also offset the sales tax. When figuring your wind system’s return on investment, don’t forget to include the sales tax.

5. Cost of equipment. While you can certainly shop around for the cheapest equipment and a bargain-basement installation, this approach is usually short sighted. Expect to pay for quality equipment, just as with any other purchase. Remember, you are in this for the long haul, 20 to 30 years. An inexpensive wind system that repeatedly breaks down, or worse yet fails after a few years, may have had an inexpensive upfront cost, but when you factor in this short life or the extensive repairs, the cost of electricity generated and your investment decision will look rather pathetic and short sighted.

6. Equipment reliability. A corollary to the above, inexpensive equipment needing annual repairs may be “inexpensive” up front, but over the life of the system will far exceed the cost of a quality system. Unless, of course, you do all of the maintenance and repairs yourself and put no value on your time. The question you need to answer: are you looking for a hobby or an investment?

Regardless, repairs do “cost money” in terms of down time plus the purchase price for the parts that need replacement, even if you do all the work yourself. These costs need to be considered. The norm for estimating operation and maintenance (O&M) costs, including repairs, is to add 1% of the retail cost of the entire installation, accrued annually. For example, let’s say you have a 10-kW wind turbine installed for \$55,000. One percent of this would be \$550, which is the amount you need to allocate annually for O&M and eventual repairs. This works as follows: your system will need to be inspected annually to make sure that everything is operating as it should and that nothing is loose, worn, cracked, broken, fatigued, or about to fail. Hiring a local installer to drive out, climb the

tower or tilt the tower down, and give you a report might run \$200. That leaves you with \$350, which you set aside for future repairs, assuming that no repairs are required this year. After, say, 10 years, you have “accrued” \$3500. Coincidentally, that’s about the time that your system might need to have the blades rebuilt or replaced, or the alternator bearings replaced. Your “accrued account” covers that cost.

7. Installation cost. This is one area where people often make very big mistakes, basically by shopping around for the lowest installation bid or, worse, bargaining the installation cost down. As consumers, we have no qualms about buying “stuff”— That is, durable goods or things we can put in a bag and drag home. But for some reason, we really resent paying a fellow human being for the time they spend working for us. Here is the problem with that attitude: You really need your installer, maybe not during the actual installation, but afterwards when you have questions, or need to have the system inspected or repaired. Up-front chiseling almost always results in an “orphan” system, one where the installer will never set foot on the property again because of the way they were bargained down for the installation. Remember, you’re in this for 20 to 30 years, not a week or so for the installation only.

8. Insurance. This is another annual cost that is often overlooked. Insurance costs will include both liability insurance required if your system is connected to the utility as well as coverage for damage and repair due to “acts of God”. There is incredible variability in what people are quoted and charged for insurance on their wind turbines. The system should simply be added to your existing homeowners, farm, or business policy as an appurtenant structure (which essentially means that it is a permanent structure on your property, but not your dwelling). Special policies or adders to your existing policy should alert you to the fact that you are being overcharged because your agent or company does not understand the minimal risk associated with a wind turbine. If this is the case, shop around for a company or agent that is more wind friendly. It could be worth hundreds of dollars in savings a year.

9. Where the money comes from. Taking money out of a savings account with a low interest yield may make the best sense in some cases. However, that money is no longer available for other uses. Borrowing money from a bank may make more sense, but it will also cost more. If you are borrowing money for the wind system, the interest paid and the length of time for the loan will affect the return on your investment.

While short-term loans are readily available, they have the highest interest rates. Since a wind turbine is a long-term capital improvement to your property, adding the cost to your mortgage is usually a better strategy. In addition, the interest payments on a mortgage are tax deductible, while the interest payments on a short-term loan are not.

10. Excess-generation revenue. If you have revenue from excess energy generation, this money can pay off any loans on the installation, increasing your return on investment. Don’t forget, however, that this revenue is technically income, and must be declared as such when you file your income taxes.

11. Tax advantages. If the wind system is purchased by a farm or small business, there may be additional tax advantages not available to homeowners. The capital expense can be depreciated over a number of years, depending on your situation. In addition, the O&M and repair costs are deductible.

12. Rising cost of utility-purchased electricity. As with any investment, including a savings account, certain assumptions must be made regarding the inflation rate and the rising cost of electricity due to escalating fuel costs and new power-plant construction. (Remember, wind power has no fuel cost.) All of these impact the present and future value of money and the value of your investment relative to other investment options, such as a savings account, the stock market or mutual funds, an addition to your house, or purchasing a new car.

Detailing all of these categories and costs in a spreadsheet to determine the return on investment for a wind system might seem like a burden, but it results in a far superior way of evaluating such an investment compared to calculating simple payback.

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Research for this article was funded in part through Wisconsin's Focus on Energy Program

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