Frequently Asked Questions

New technology and the use of renewable energy resources are exciting, yet can lead to recurring questions within the community. Below is a listing of questions that have been frequently asked. We will continually add to this listing, so check back often. Still don't see the answer to your question? Please contact us and we will get in touch with you.

At what speed will the turbine actually produce power? The electronic controls require approximately 9 mph for a 10 minute average before it releases the parking brake. Then the turbine will "cut in" and begin to produce electricity.

Can the wind be too strong? Yes. At speeds greater than approximately 56 mph, breaks will be automatically applied to protect the equipment.

What is the operational strategy of the turbine? When the brake is released and the turbine starts up naturally, it starts spinning very slowly, and then as it speeds up, it begins to accelerate much faster. This is due to the aerodynamics of the blades - at low speeds they are just like the blades of a fan, but at high speeds they start to act like the wings of an airplane. Therefore, the point at which it is hardest to get the blades to start to turn is when they are stopped. Still, under normal circumstances, at approximately 10 mph, they will begin to turn. Once they begin to turn very slowly, then very quickly the turbine will spin up to speed and begin to make power.

Sometimes, when the machine is cold (and oil is more viscous), or when the blades are stuck in the upwind position, the turbine will not begin to spin - even though the anemometer indicates that there is enough wind to make power. In this case, a "bump" is needed. The bump is a short motor-start of the turbine (it lasts about 1 second) and it starts the blades spinning up to a speed about where the blades start to act like airplane wings. This usually causes the turbine to spin all the way up to full speed and start to make power. This turbine is a downwind turbine; in the case that the blades are stuck upwind, the forces from the motor-start are often enough to cause the blades to spin around to the proper downwind position. This sometimes takes 2 or 3 tries.

The motor-start or "bump" actually uses a small amount of electricity off the grid for a second or two and is reported as negative power generation.

Are the data dials in real time and in sync with each other? Yes.

Why does the power generation number on the real-time data dials appear to be negative for short periods of time? Any wind turbine generates lift and drag while the blades are spinning. When lift exceeds drag, energy is produced. If winds are low, drag will exceed life, and if the generator is still connected to the grid, the generator will become a motor and use energy to keep the blades spinning. Entegrity optimizes the control parameters for maximum energy production, which sometimes means keeping the generator connected to the grid for brief periods of negative production because the winds may change soon, and the turbine will already be in a position to make energy.

What is meant by "waiting for wind" on the real-time data dials? There are two braking systems on the turbine; one is a disc brake in the hub, which "parks" the blades when there is insufficient wind (usually less than 7 mph); the other one is a set of aerodynamic "tip brakes" for each blade to help slow them down if a high wind shut down is needed. Wind turbines are required to have two braking systems, one of which must be aerodynamic. All brakes are designed such that the unpowered (failsafe) state is for the brakes to be applied. Therefore it takes electricity to hold the parking brake open and the tip brakes in the running position. In the "waiting for wind" state, there is not enough wind to generate electricity, so the brakes are left locked and the turbine cannot spin.

What is meant by "free-wheeling" on the real-time data dials? See above question regarding the braking systems. During "free-wheeling" the parking brake is released and the tip brakes are held in their closed position (if the tip brakes are released while the turbine is spinning they will fly out and act as large aerodynamic brakes). "Free-wheeling" occurs as the winds are coming up to speed, and the turbine will go into "free-wheeling" before it spins up to speed and goes into "production". "Free-wheeling" also occurs when the winds subside and we lose production.

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What is meant by "production" on the real-time data dials? Once the turbine spins up to speed and the generator connects to the grid and begins to produce electricity, the turbine will be in "production" mode.

What is meant by "low production" on the real-time data dials? When the wind drops away and drag becomes greater than lift, the generator becomes a motor and uses energy to keep the blades spinning. We call this state "low production".

What is the offset of carbon dioxide and certain polluting particulates? Based on the fuel mix averages for Michigan:

Production	CO_2 (lbs)	SO_2 (lbs)	NO_x (lbs)	CH_4 (lbs)
60,000 kWh	80,853	385	125	1.78
80,000 kWh	107,804	514	166	2.37

What is the capacity factor for the 50kW turbine and how is it calculated? If the turbine were to run at 50kW all the time, it would produce 438,000 kWh per year; the capacity factor is the percentage of 438,000 that it actually produces.

50k x 24 hours x 365 = 438,000 kWh
60,000 / 438,000 = 14%
80,000 / 438,000 = 18%