4 Technical Advances

Patents pending are in place on all of this

The system concept developed in 2005 -2007 required better efficiency on several levels to be economical to operate. Large turbines are more efficient than internal combustion engines, but small turbines lose efficiency. We needed a way to make smaller turbines efficient. Next, turbines are expensive to build. We needed a less expensive way to build small turbines. Even with a more efficient turbine, overall efficiency was still not as high as we needed. Currently available solar equipment converts about 10% of the energy in sunlight into electric power. If we are going to fully power homes and businesses with the sun, that takes a lot of solar panels. We need something closer to 40% if solar is ever going to become practical as a primary power source. Solutions have been developed for all of this.

1. The 1st advance is the way we make our turbine. We have developed a way to cut the blades out on a CNC machine instead of individually fabricating each blade and then attaching them to a hub. Our method is a great deal less expensive. When you look at the pictures of our turbine blade assembly being built, you are seeing the lowest cost turbine EVER made.

2. 2nd is the way we make small turbines practical. Small turbines have tip losses and case friction losses that make them impractical. We have developed a method of placing a ring around the blades effectively eliminating the tip losses completely and greatly reducing case friction losses. This technology is called “Ring Blade.”

3. The 3rd advance is called “Optimized Re-injection. Our turbine is “semi-condensing. This means that the exhaust is both liquid and vapor. The ratio is optimized. We have developed a special pump that allows us to inject this mixture directly back into the boiler. This is where the term “Optimized Re-injection comes from. Approximately 1/3rd of the energy in a typical power plant is vented to the atmosphere in the condenser and lost. Optimized Re-injection allows SunDancer to operate without a condenser at all, and none of this energy is lost.

4. 4th is designing the system to operate at low pressure and temperature. The turbine for the “low” pressure / temperature section of a coal fired power plant typically operates in the 700 psi / 700^{o}F range, with stack exhaust leaving the boiler at about 800^{o}F. Our turbine is designed to operate in the 300 psi / 300^{o}F range with stack exhaust leaving our boiler at about 340^{o}F. The stack exhaust temperature means that less energy goes out the stack.

These four technical advances combine to allow the development of a moderately priced solar system with an improved energy conversion rate.