

## **Fact Sheet: St. Cloud VA Wind Turbine** *(April 2011)*

The St. Cloud VA Health Care System's wind turbine was funded through a \$2,293,500 American Recovery and Reinvestment Act grant and is part of a nation-wide VA energy conservation initiative that includes renewable energy generation technologies, metering systems, and energy conservation and water-saving measures.

The turbine significantly increases the St. Cloud VA's use of renewable energy resources. The turbine is anticipated to produce approximately 15% of the facility's annual electricity usage and provide a projected annual savings of approximately \$98,000 per year.

The turbine consists of three main components: the tower, rotor assembly, and the nacelle (structure and housing for gearing and generator). The 600-kilowatt wind turbine assembly is approximately 245 feet tall. The height to the center of the rotor hub is approximately 164 feet and the blades are each approximately 75 foot long. The rotor diameter is approximately 160 feet across. The tips of the blades pass overhead at a height of approximately 90 feet above the ground. The steel tower weighs approximately 58 tons, the nacelle (steel frame and fiberglass housing) and rotor weigh approximately 35 tons, and the total turbine weight is approximately 93 tons. Blades are made of fiberglass. The turbine operates in wind speeds of approximately 8 mph to 55 mph.

The St. Cloud VA operates the turbine "behind the meter," so that it supplies energy directly to the St. Cloud VA. The ability to interconnect to the electrical grid to allow net-metering is built-in, but at this time there are no plans to connect the turbine to the grid.

### **Frequently Asked Questions:**

Q: In general, how does a wind turbine supply electricity?

A: The wind turns the blades, which spin a shaft connected to a generator which makes electricity. The St. Cloud VA turbine is a two speed model and can operate at lower wind speeds. The turbine has a wind speed monitor on it. When it senses winds of 8 mph the blades will rotate to "catch" the wind. The turbine operates "upwind" in that the blades face into the wind. The blades self-adjust their angle according to the wind speed to optimize performance. The turbine generates electricity at 690 volts which flows to a step-up transformer at the base of the turbine that converts the electricity to 13,800 volts. This power is then directly fed into the St. Cloud VA's primary electrical loop.

Q: What safety features are associated with the turbine?

A: There is a wind speed at which the rotation is too fast for optimum operation. This is approximately 55 mph. In winds above 55 mph the turbine will not operate. The turbine features a fail-safe disk brake to prevent over speeding and to protect the generator. There are also safety devices installed in the turbine to disconnect it from the electrical loop in the event of a total loss of power from the energy supplier. This is to protect energy supplier workers from unexpected voltage from the turbine.