"Windmill In A Box" Soon Available At Retail Stores

A new wind turbine from EarthTronics produces up to 2 kW of energy with only 20-in. blades. The super efficient, ready-to-go turbine is designed for easy installation and low maintenance. And it's priced to be affordable.

"Our idea was to produce an alternative energy source for the average person," says Reggie Adams, president, EarthTronics. "You can mount it anywhere from a rooftop to a pole and generate 20 percent or more of your home energy needs for an up-front cost of about $2,000."

Grand Valley State University's Michigan Alternative and Renewable Energy Center (MAREC) developed the concept. MAREC selected EarthTronics to produce and market the mini turbine. Although still in the prototype stage and undergoing final testing this fall, Adams plans to have the Model 720 on retail shelves by the end of March 2009. He is confident buyers will appreciate the free wheeling and low cost/low maintenance design.

The turbine is not only gearless; it also doesn't need a separate generator. It is the generator. When the six 20-in. blades revolve, they act as rotors with the rim serving as the armature. This means electricity is being produced at tip speed, not hub speed as in traditional windmills.

The free wheeling blades start to revolve at 2 mph and start generating electricity at 3. The faster the turbine goes, the more electricity it generates, reaching maximum output at 15 mph. However, since the blade free wheels on the center shaft and bearing, it doesn't have to be shut down at high speeds. The small turbine is amazingly productive for its size.

"We are at about 700 watts in a 10 mph wind and at over 2 kW at 15 mph, exceeding

The rim of this new wind turbine acts as an armature so no separate generator is needed.

what an average home can use," saysAdams. "We have a system designed with a smart controller that will support battery systems and direct the energy to the home. In states that allow it, the homeowner can sell excess to the grid."

Adams says the Model 720 will be followed by a larger unit with 72-in. blades that's in the drafting stage. Plans are for still larger models in the future.

"Our target is to get the first one out there, prove the concept and then build on its success," says Adams. "As the blades get longer, efficiency multiplies since we're gaining the advantage of tip speed."

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First-Of-Its-Kind "Wingmill"

Gene Kelley thinks he has a better idea for harvesting wind energy. Instead of a spinning blade, his WindWing is a horizontal blade that pivots up and down on a lever that drives a generator. The WindWing is parallel to the ground until a breeze blows by. Then it goes to work, says aerospace engineer and inventor Kelley, CEO of W2 Energy Development Corp.

"It works like your hand when you hold it out a car window as you drive," says Kelley. "Tilt it one way and the wind pushes it up. Tilt it the other, and the wind pushes it down."

Kelley claims his system is more efficient than a propeller wind turbine. He also projects his wing system will cost as much as 80 percent less. Adjusting the angle of the WindWing will allow it to operate at lower wind speeds to start, and it will not have to shut down at high wind speeds. Kelly notes the WindWing motion at its highest speed of 16 cycles per minute will also be less hazardous to birds than spinning propellers.

This increased efficiency is due in part to the wind flowing across the entire wing surface, combined with mechanical advantage, he explains. He also notes that his design avoids the vibration problem that occurs with today's huge propellers, where tip speed is 200 mph compared to hub speed of only 16 mph.

The WindWing mechanical advantage is based on the Archimedes Class I lever principle. Kelley describes a wing system on a lever 10 ft. from the fulcrum or mount with a balancing weight one foot past the fulcrum. The distance from the fulcrum determines how much force is needed to move the lever up or down.

Instead of a spinning blade, the WindWing consists of horizontal blades that pivot up and down on levers that drive a generator.

That force is translated into reciprocal action of the lever moving up and down (similar to a pump jack) to drive the generator to produce electricity. A sensor will automatically change the direction of the leading edge of the wing as it reaches the top or the bottom of the stroke. A vane on the far end of the lever will keep the wings pointed directly into the wind at all times. Kelley envisions clusters of WindWings.

So far Kelley has a working model put together from scrap sheet metal, car window lift mechanisms, barbell weights and a few machined parts. A working "preproduction" model is being produced.

He's also working on a WaterWing version of the concept that will work in river and ocean currents.

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Windspire Produces Low-Cost Energy

Forget about giant propellers spinning in the breeze. Windspire from Mariah Power is a 1.2 kW, 30-ft. tall, 4-ft. dia. unit that spins in position. Designed to be a "personal" wind system, the unit comes complete with a built-in wireless modem that transmits power production information to a computer.

"We wanted a low cost product that the average person could afford," says Mike Hess, CEO, Mariah Power. "It comes with everything you need to plug it into the house or grid. No separate pole or inverter is needed."

The straight-bladed Darrieus design was introduced in June this year. The company says a Windspire can produce up to 2,000 kW of electricity a year in 12 mph (average) winds. The design is a self starter and produces electricity even at low speeds, but will operate at up to 100 mph. Installation takes only a few hours. It sells for $4,995.

Hess reports receiving more than 2,500 orders in the first two months, creating a near immediate backlog. He credits the economical cost of a Windspire and a 10-year payback on the machine for the response. They're building a new factory to increase production, he adds.

Installation consists of pouring a 6-ft. deep, 2-ft. diameter concrete base with anchor rods for the mounting bracket. The unit on its mono pole is assembled on the ground and winched into place. No guy wires or tower is needed. The company estimates installation costs of around $1,000.

Others have introduced and tried to promote vertical axis wind generators in the past. Cost and efficiency have been a problem. Mariah Power claims its low speed Giromill design rotor and high efficiency generator designed for those low speeds sets their machine apart. Rotor tip speed (rotor edge) is only two to three times the speed of the wind for nearly silent (45 dB estimated at 5 ft. from the base) operation. The total integrated system of rotor, generator and inverter optimizes efficiency. The company reports their brushless generator achieved more than 98 percent efficiency during testing sponsored by the National Renewable Energy Laboratory.

Initially used in small and high-speed motors in cameras and disc drives, brushless generators are now being adapted to larger applications such as the Windspire.

Hess says the Windspire is only the first unit the company plans to introduce. "The

Windspire is a 30-ft. tall, 4-ft. dia. unit that spins in position. It comes with everything you need to plug it into the house or grid.

Windspire was the smallest we could make and get certification," he says. "In December we will be introducing one that is 96 in. wide with the same generator and inverter. It'll produce twice the power and at speeds as low as 8 mph. By May or June of 2009 we'll have a 3 kW version powerful enough to provide almost 100 percent of a home's needs."

Future plans include an off-grid, remote power application as well as a 240-volt, AC version. The Windspire comes with a five-year warranty.

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Rear Bucket Handles Smaller Jobs

Jim Potts doesn't like tying up a loader when he just needs to move a little dirt or smooth out a surface. That's why he built what he calls the "Scoop". The rear-mounted bucket/blade features a deep mouth to catch and hold dirt as it's skimmed off.

"I had a farm with some cows, and there was always a muddy spot that needed some dirt hauled in or worked over," recalls Potts. "I didn't have an easy way to do it."

Others saw it and liked it. Now he builds it in three different sizes. The 6-ft. long by 13-in. deep Scoop holds a third of a yard. The 8-ft. long by 15-in. deep Scoop holds about 2/3 of a yard, and the 8-ft. long by 18-in. deep Scoop holds 9/10 of a yard.

"The width of the Scoop should span the rear tires of the tractor, so when the operator backs up, the tires are running on even ground," explains Potts.

The units come with a bolt-on hitch that lets the unit adapt quickly to any size tractor, or it can be outfitted with a quick hitch for even faster access. The main cylinder is 3 in. in diameter with a 10-in. stroke. Although

Rear-mounted bucket/blade has a deep mouth to catch and hold dirt as it's skimmed off.

prices start at $2,100, that is subject to change due to rising steel prices. Potts emphasizes The Scoop is made from U.S.A. steel, largely 1/4-in. with a 5/8-in. tempered cutting edge.

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