**Innovative Generator Could Spark Energy Savings**

*ScienceDaily (Aug. 24, 2006)* — An innovative residential generator that can produce both heat and electricity could spark a revolution in energy efficiency, said Eric Guyer (S.M. 1974, Sc.D. 1977), the CEO of Climate Energy, during an MIT Energy Club talk recently. Guyer described Climate Energy's micro-combined heat and power unit (micro-CHP) to the standing-room-only crowd gathered in the Tang Center as "hopefully, the next big thing in energy." Guyer's talk was part of the Energy Club's lecture and discussion series, sponsored by the Graduate Student Council. These biweekly events occur year-round and feature lecturers or student-led discussions on important energy topics.

The idea for combined heat and power (CHP) is nothing new, Guyer said. "Thomas Edison's first power plant was combined," he explained. Still, the idea of generating both heat and energy in a way that is not only affordable but also quiet enough for use in a private home is a more recent development.

"On an industrial scale, CHP is used all the time," Guyer said. A natural gas-powered micro-CHP unit has the potential to save the consumer money by using the same fuel they buy anyway to generate both heat and electricity with greater efficiency. The micro-CHP systems are driven by heat-demand, delivering electricity as the byproduct. "This is all about providing thermal comfort to homeowners," Guyer said.

The unit is composed of two parts, one that acts as the generator and another that acts as a traditional air-handler or furnace, blowing hot air into the home. Currently being used in close to 30,000 homes in Japan and 20 beta test spots around Massachusetts and New York, the micro-CHPs have been very well received. Although the initial cost is more than double that of a traditional furnace, the micro-CHPs can save users up to $700 a year in electric bills, Guyer said. They even come with a backup power supply if the electricity goes out for any reason. The machines also have the advantage of being far superior at conservation, Guyer said. "Two-thirds of the power in a central station is thrown away," he explained. The micro-CHP utilizes more than 85 percent. "Micro-CHP in the home is one of the biggest things someone could do to reduce their carbon footprint."

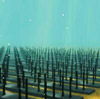
Outside the Tang Center, a truck from Guyer's company, Climate Energy, was running free demonstrations of its micro-CHP unit, which will be available this fall. "So far people seem very happy," Guyer said.

"Many were surprised to see how quiet the generator was and how much heat it produced that could be used for space heating," said graduate student Derek Supple of the MIT Energy Club. "The talk was just as we intended: relevant to a broad group of disciplines and exciting due to the innovative nature of this residential-scale technology."

Massachusetts Institute Of Technology (2006, August 24). Innovative Generator Could Spark Energy Savings. ScienceDaily. Retrieved August 15, 2011, from <http://www.sciencedaily.com>­

### [Renewable Energy From Slow Water Currents](http://www.alternative-energy-news.info/renewable-energy-from-slow-water-currents/)

**January 8th, 2009**

[[](http://www.alternative-energy-news.info/renewable-energy-from-slow-water-currents/)](http://www.alternative-energy-news.info/renewable-energy-from-slow-water-currents/)We can use slow moving ocean and river waves for a new, reliable and affordable alternative energy source. A [**University of Michigan**](http://www.umich.edu/) engineer has developed a device that acts like a fish that turns the potentially destructive vibrations in water into clean, renewable energy. This machine is named as [**VIVACE ( Vortex Induced Vibrations for Aquatic Clean Energy)**](http://www.vortexhydroenergy.com/). It is the first known device that could draw energy from most [**water currents**](http://www.alternative-energy-news.info/technology/hydro/) around the world, according to a statement from the University of Michigan. “There won’t be one solution for the world’s energy needs,” VIVACE developer Michael Bernitsas, a professor at the U-M department of naval architecture and marine engineering, said in the statement. “But if we could harness 0.1 percent of the energy in the ocean, we could support the energy needs of 15 billion people.”

VIVACE can work in flowing water moving slower than 2 knots, or about 2 miles per hour. Here it should be noted that most water currents are slower than 3 knots, while turbines and water mills need an average of 5 or 6 knots to operate efficiently. VIVACE doesn’t need waves, tides, turbines or dams. It’s an unequaled hydrokinetic energy system that relies on “vortex induced vibrations.” Think like a fish not like a bird, say researchers of the University of Michigan. Because in water, nature has invented a different strategy for natural swimmers. If we observe the movement of a tiny sperm or a giant whale, we will see that they generate vortices (or little whirlpools) that they push off of to propel themselves forward. Michael Bernitsas of the University of Michigan, realized that these same vortices could be used to drive a generator. He and his colleagues have invented VIVACE whose cylinders oscillate up and down in moving waters. “This device works naturally in the marine environment,” says Bernitsas.

Bernitsas’ team has developed a working prototype in their lab. The spring-supported cylinder moves up and down in a tank of moving water. As water bangs into the cylinder, this action induces turbulence which transforms into a vortex. The vortex eventually rolls off the back, giving the cylinder a little push as it goes. The next vortex that forms will spin in reverse and give a push in the opposite direction. These opposing forces cause the cylinder to vibrate up and down. The high density of water, makes the vibrations about 800 times more energetic than they would be in air at the same speed. Due to this, the VIVACE system can produce three to 10 times more energy from a given volume of moving water than tidal turbines.

Bernitsas and his team have tried to duplicate the roughness of fish scales on their cylinders because a rough cylinder surface could increase the power output by 40 to 70 percent compared to a smooth surface. Bernitsas is also impressed with fish tails. His team has begun to experiment with passive tails that could keep vortices from interfering with each other.

Currently Bernitsas’ group is working with the U.S. Navy to install two VIVACE systems in the next year: one in the Detroit River and another in an ocean environment somewhere.

Although the production of VIVACE systems in commercial plants is still a future dream, the cost of electricity from a mature VIVACE installation would be roughly 5.5 cents per kilowatt-hour, which is similar to the current price of wind generation. Roger Bedard, EPRI’s ocean energy leader is of the opinion that with the passage of time, slower tidal passages will become economical.

University of Michigan (2008, January 8). Renewable Energy From Slow Water Currents.  *Alternative Energy News*. Retrieved September 9, 2011, from <http://www.alternative-energy-news.info>

# Innovative Electricity Generator is Powered by Prayer

by Steve Levenstein

Buddhist **prayer wheels** can be found outside the gates of monasteries in a number of Asian nations, most famously in **Tibet**. If you think about it, countless people spinning countless prayer [wheels](http://inventorspot.com/articles/innovative_electricity_generator_powered_prayer_27251) for over 1,500 years would have generated an incredible amount of electrical energy had the prayer wheels been crafted to produce and capture it.

Designer [Taikkun Li](http://www.taikkun.com/" \t "_blank) thought about the possibilities and is moving to put those thoughts into action with his ***Prayer Wheel Energy Generator***.

*What's a "prayer wheel", anyway?*, you may ask. Typically inscribed with the mantra **Om Mani Padme Hum** in Sanskrit, it is said that [spinning the wheel](http://inventorspot.com/articles/innovative_electricity_generator_powered_prayer_27251) has the same meaning as reciting the mantra - though it's best to recite the mantra and focus one's mind before spinning the prayer wheel.

At some Tibetan monasteries, a single person can walk down a long row of cylindrical wheels, putting each wheel into motion as they proceed.

Not only locals but tourists spin prayer wheels along their travel and [tour](http://inventorspot.com/articles/innovative_electricity_generator_powered_prayer_27251) routes. Says Li, *"Now that positive energy can be harvested along Tibetan streets, turned into electricity, and used to provide evening lighting along those streets and inside the adjacent homes."*

As well, Taikkun Li's generators can be made cheaply from used [bicycle](http://inventorspot.com/articles/innovative_electricity_generator_powered_prayer_27251) and fan parts, plus the lighting Li envisions comes from long-lasting, energy efficient LEDs.

It all seems so obvious, and practical as well: Tibetan households are not chock full of energy-hungry appliances and a small boost of free power would make a huge difference in people's lives.

Levenstein, Steve. Innovative Electricity Generator is Powered by Prayer. Inventorspot Retrieved September 9, 2011, from <http://www.inventorspot.com>­

# THE MAGLEV: The Super-powered Magnetic Wind Turbine

by [Mahesh Basantani](http://inhabitat.com/author/mahesh/), 11/26/07

Renewable energy produced from the wind has garnered much attention and support in recent years but is often criticized for its low output and lack of reliability. But now a super power wind turbine has come along that may be just what the renewable energy industry needs. The [MagLev](http://magturbine.com/" \t "new) wind turbine, which was first unveiled at the [Wind Power Asia](http://www.windpowerasia.com/) exhibition in Beijing, is expected take wind power technology to the next level with magnetic levitation.



Magnetic levitation is an extremely efficient system for wind energy. Here’s how it works: the vertically oriented blades of the wind turbine are suspended in the air above the base of the machine, replacing the need for ball bearings. The turbine uses “full-permanent” magnets, not electromagnets — therefore, it does not require electricty to run. The full-permanent magnet system employs neodymium (“rare earth”) magnets and there is no energy loss through friction. This also helps reduce maintenance costs and increases the lifespan of the generator.

Maglev wind turbines have several advantages over conventional wind turbines. For instance, they’re able to use winds with starting speeds as low as 1.5 meters per second (m/s). Also, they could operate in winds exceeding 40 m/s. Currently, the largest conventional wind turbines in the world produce only five megawatts of power. However, one large maglev wind turbine could generate one gigawatt of clean power, enough to supply energy to 750,000 homes. It would also increase generation capacity by 20% over conventional wind turbines and decrease operational costs by 50%. If that isn’t enough, the maglev wind turbines will be operational for about 500 years!

Construction began on the world’s largest production site for maglev wind turbines in central China on November 5, 2007. Zhongke Hengyuan Energy Technology has invested 400 million yuan in building this facility, which will produce maglev wind turbines with capacities ranging from 400 to 5,000 Watts. In the US, Arizona-based MagLev Wind Turbine Technologies will be manufacturing these turbines. Headed by long-time renewable energy researcher Ed Mazur, the company claims that it will be able to deliver clean power for less than one cent per kilowatt hour with this new technology. It also points out that building a single giant maglev wind turbine would reduce construction and maintenance costs and require much less land than hundreds of conventional turbines. The estimated cost of building this colossal structure is $53 million.

Basantani, Mahesh (2007, November 26). The MAGLEV: The Super-powered Magnetic Wind Turbine. Inhabitat. Retrieved September 9, 2011, from <http://www.inhabitat.com>­