

## Putting the electric motor on a diet

By Michael Kanellos

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### Electric motors have a problem, according to Steve Strasser. They work too hard.

The electric motors that power elevators, conveyor belts and other industrial equipment typically only operate in two modes--off or full power. Most of the time, the motor could operate at lower power levels, said Strasser, CEO of Las Vegas-based [Power Efficiency](#), which has developed power controllers that "resize" electric motors by curbing the power that goes into them.

"There are millions of motors around the world that are oversized," he said. "We lower the electricity going to the motor to match the load. As soon as the load comes on, we lower the floodgates."

The company's showcase product application right now is the escalator. The motors inside escalators are designed to transport 250 pounds on each stair. That rarely happens, so the motor is essentially churning too hard.

In trials at the Las Vegas hotels Caesar's Palace and the Bellagio, the company's Power Genius product cut power consumption by around 34 percent on heavy-duty outside escalators. In a year, each Power Genius could cut electricity bills by about \$1,500 per escalator, the company estimated. The box itself sells for about \$1,000 wholesale, but with installation, the final price to a customer comes to around \$2,000 to \$3,000.

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--Steve Strasser,  
CEO, Power  
Efficiency

Systems have also been installed in escalators at airports in Toronto, Seattle, Denver and Anchorage, Alaska, among other places.

Power Efficiency, founded in 1994, will try to broaden its reach in 2007. In the first quarter, it will launch a line of component-size versions of the Power Genius, which are meant to be installed into vending machines and other appliances by the manufacturer at the factory. (The Power Genius is an add-on device that weighs approximately 64 pounds.) It will also come out with a product similar to the Power Genius that can be bolted onto a wider variety of electric motors.

Power Efficiency has also conducted trials with mining companies in Northern Nevada. Roughly 30 percent of the electrical power in the region goes toward running stone crushers and other mining equipment.

"The U.S. Department of Energy issued a report in 1998 that said that 44 percent of all electric motors in the U.S. were fully loaded less than 40 percent of the time," Strasser said. "That is zillions of dollars" of wasted electricity.

Energy conservation--along with [alternative car fuels](#), electrical-generation technology (solar and wind) and [water technology](#)--has emerged as one of the main pillars of the clean-technology market. In some ways, it's also shaping up as one of the safer markets.

For one thing, it works. Electricity conservation technologies such as efficient refrigerators [have saved around \\$100 billion](#) over the past 30-plus years, according to the U.S. Department of Energy.

In addition, the results can be easily measured. [Comverge](#), which has developed a system that lets utilities curb users' power consumption during peak periods via a network, has said that customers in Florida have seen their utility bills decline by 15 percent to 25 percent. [Verdiem](#), meanwhile, has come up a remote system that puts idle PCs to sleep: So far, 300,000 machines are under its spell.

### How it works

While difficult to design, the technology is fairly easy to describe. The Power Genius box senses the workload of a motor by monitoring the changes in the phase lag, or wave pattern, of the current and voltage. When the device senses that the motor doesn't need all of the required energy, it throttles the current.

NASA designed a device like this in the 1970s, but subsequently abandoned it. Several large manufacturers, meanwhile, have come out with "soft start" motors that rev up to maximum power slowly. Power Genius does that too, but also continues to dynamically adjust the power consumption.

Power Efficiency has sold the systems for years, but demand has begun to kick up because of legislative mandates to curb electricity usage.

"The customers love it," said Tom Kautz, assistant vice president and national accounts director for Kone, a Finnish manufacturer of elevators and escalators. "They are looking for energy-efficient products. Most of them have already exhausted their lighting credits."

Dynamic power adjustment has other benefits, too. Because the electric motor most of the time will not run at full speed, wear and tear is lessened.

Despite these advantages and rising demand for the technology, Power Efficiency likely faces an uphill climb. A decline in utility prices could put customer interest on the back burner. Competition from large companies will invariably appear as well. Still, electricity prices are a hot topic these days.

"Until about a year ago, nobody really cared about utility savings," Strasser admitted.

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