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Bright lights and big ideas

By Richard Gould



Erik McMillan's mission is simple: Change the world one bulb at a time.

The race is on to build a leaner, greener light and local inventor McMillan says he's done it. His company, Enigma Concepts, has already beaten the decades-old overheating Harley problem and now it's planning to change the way we look at light.

McMillan's hope lies in LEDs.

"It's the most efficient lighting system in the world and it burns cold," McMillan said. "Our competition's bragging about one-to-one replacement. We're already at one-to-two replacements."

Enigma's new fixtures are designed to replace existing lights used in commercial buildings and offices.

Jeff Crawley is a Tyson chicken farmer who needs to find a viable alternative to his current lighting systems in advance of the federal government's 2012 ban on 100-watt incandescent light bulbs.

He decided to try something new and partnered with Enigma Lighting to test the company's 17-watt lights in his brood house.

McMillan contacted the University of Arkansas and discovered that chickens prefer to eat under a cool bright white light, so he tuned his lamps to 4000 Kelvin to produce the right spectrum.

For the first test, Crawley mounted the lights on one end of the brood house filled with thousands of newly-hatched chicks up to seven days old. About three days into the trial, Crawley had to turn the lights off, because the birds were trampling each other to get underneath the lights to feed.

The lights were moved to the middle of the brood house to ease overcrowding.

"I've got three rows of lights in the middle of the house and the birds like them – they gather around them," he said. "They eat more. They're more active and they're putting on more weight. You can tell the difference on the center feed line."

Crawley said he expects the lights to pay for themselves within about a year through increased yield, energy savings and incentives.

"I've had them for nearly a year and I haven't had any problems out of any of them," he said. "I plan on switching the whole house over to the new lights,"

Enigma Lighting's Architectural 3-D Multi-Lens Troffer Replacements are designed to replace existing fluorescent strip lights.

"There's no mercury in these — they're totally green," said Enigma Lighting COO Roy Jaynes of the cool-burning, energy-sipping lights.

Each of the fixture's patented globes focus and direct the light from six micro light-emitting diodes virtually eliminating the kind of shadows produced by most commercial lighting fixtures.

They burn at about 98 degrees Fahrenheit, but one replacement unit can produce more light than two bays of fluorescents.

Underwriters Laboratories is in the final stages of certifying the new lighting systems. Unit sales will begin when UL signs off on the lights, Jaynes said.

Early estimates have the Enigma units selling for less than \$1,000 each, said Jaynes. At this stage, Enigma plans to contract with companies to replace multiple lights in a building to reap the full benefits of the new lights.

"The energy savings, when coupled with the green energy tax credits, incentives from the government and rebates from power companies will render these lights cost-neutral within about two years of their installation," Jaynes said.

McMillan theorizes that his units will be able to burn for 70,000 to 100,000 hours (eight to 11 years if they're left on for 24 hours per day) before they need to be replaced.

Enigma Lighting is focused on more than lighting brood houses and replacing traditional fluorescent tubes.

Most bulbs in street lights are mercury vapor and they burn at about 500 degrees.

Enigma's LED-based streetlight replacement modules emit more light but far less heat for a fraction of the cost.

"This one light is putting out the same amount of light as a 600-watt fixture, but it's only burning 90 watts," McMillan said as he demonstrated a light designed for use in bays and warehouses. "We can replace a 460-watt mercury vapor light

with one that burns as little as 90 to 95 watts.”

It might be a while before Enigma lights hit the shelves hardware in stores like Home Depot and Lowes.

“Primarily business, industrial and government is what we’re going after,” McMillan said. “We may go after the residential market, but right now there’s a lot of competition in that market and we’d like to make our reputation in commercial.”

SIDEBARS:

Beating the overheating bike dilemma

Before Erik McMillan decided to revolutionize lighting, he built custom motorcycles — choppers.

A long-time fan of Harleys and custom bikes, McMillan was acutely aware that they have a major weakness: The motorcycles are air-cooled, but lack a radiator system. They overheat if left to idle.

Within 30 minutes, the stationary bike’s engine oil temperature spikes. Ordinarily the problem may just be a minor annoyance, but for a rider stuck in construction traffic or in a sea of bikes in a rally in Daytona Beach, Fla. or Sturgis, South Dakota, the quirk puts the bike at serious risk.

McMillan’s solution is a gleaming chrome cylinder about the size of a large can of STP or two coffee cups stacked on top of each other. The system also utilizes an upper cooling unit built into and concealed by the motorcycle’s horn to remove stagnated heat from between the cylinder heads.

It’s called a Continuous Air-Flow Oil Cooling System, or C.A.O.C.S. for short, and the motorcycling world has taken notice.

“We just won V-Twin (magazine’s) value product of the year, and this is the first product we’ve had out,” said President of Enigma Cycles Kevin Penrose.

The air-cooled C.A.O.C.S. comes in two configurations. The cylindrical C.A.O.C.S. I is designed for use on Harley’s touring bikes and softtails. It’s mounted under the front of the engine below the regulator and behind the front wheel. It costs \$650. Designers are working to develop a new model for Harley Dynos.

“The problem is when traffic is stopped, because a bike can’t cool itself off. Once a bike drops below 35 mph, its cooling system no longer works,” Penrose said. “The C.A.O.C.S. is designed for hot idle conditions.”

The C.A.O.C.S. II is side-mounted behind the foot pegs on custom-made chopper-style bikes. The subdued unit costs \$1,800. The 3D version sells for \$2,300.

“There are a lot of good cooling systems out there, but they’re more of a radiator system while ours works whether or not the bike is moving,” Penrose said. “And ours is made in America.”

The milling and fabrication is done in Kings Mountain. The triple chroming is done in Tennessee and the wiring and other components are produced in Newton where the units are assembled.

Seventeen motorcycle dealers have signed on to sell Enigma’s products.

“The C.A.O.C.S. is for anybody who rides their bike and gets into heavy traffic like at a rally, but doesn’t want to pull over and turn their bike off,” said Chris O’Connor of Blue Ridge Harley-Davidson / Buell of Hickory.

And that’s not all: Products for the future

Erik McMillan is flush with ideas and new directions for his company.

He's working on building a full-scale prototype of an invention that works even though some say it violates the laws of physics, McMillan said.

He has created a thermal energy transfer system, which converts heat energy to electricity and can be powered by temperatures as low as 98 degrees.

"It reaches full efficiency at about 120 degrees and runs until it cools down," McMillan said.

U.S. Congressman Patrick McHenry paid McMillan a visit last August for a private demonstration of the first prototype.

McMillan ran hot water from the tap into the device. After five minutes, the spotlights mounted inside lit up and stayed lit for about 10 minutes until the heat dissipated.

"Once you have it set up, you don't have to fill it up again with anything — it works just like a battery," McMillan said.

He's also working on inventions for Enigma's future medical division.

McMillan and 3M are working together to develop synthesized blood and liquid air.

The synthesized blood will be clear and would be usable by anyone of any blood type.

The liquid air would be used as a pneumonia treatment.

"It would virtually eliminate dying from pneumonia," McMillan said.

McMillan sees an application where liquid air would be pumped into the lungs, which would absorb the oxygen and the depleted air would be pumped out.

And that's not all ...

"Soon we'll be putting together some ideas for electric cars," McMillan said.

Behind the curtain: Who is Eric McMillan?

Erik McMillan made a career of building custom motorcycles, trucks and cars.

Everything changed for him in June 1992.

He was sitting on a custom motorcycle at a red light on U.S. 70, SE, at 10 th Avenue Dr. SE, when he was hit from behind by a truck driving about 60 miles per hour.

The impact split his helmet in half and McMillan spent the next two years in physical rehab working to come back from brain and spinal injuries.

His wife of 18 years, Kisa, taught him to speak again.

McMillan had always been interested in engineering. In high school he devised a new turbo system and a simplified transmission.

After the accident, he was still interested in mathematics and mechanics, but now the ideas seem to come quicker.

"I bet I could keep three or four companies busy for years," he said.

McMillan is a family man and father to 16-year-old Tyler and 13-year-old Brandon.

Developing his company has consumed most of his time for the past few years but he's trying to give himself permission to relax.

“I can't do the things I used to do — like fishing — I feel like I'm wasting time if I'm not doing something,” he said. “I just like to tinker and build things.”

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