

New Electric Motor Costs Less, Weighs Less, Works Better

A new electric motor promises to outperform and overpower traditional electric motors. The Conductor Optimized Rotary Energy (CORE) motor eliminates wound wire and other complexities of traditional electric motors. The CORE motor consists of a printed circuit board with embedded wires sandwiched between two permanent magnet rotors. The new design may revolutionize electric motors and not just in the lawn maintenance products arena where it's being introduced.

"We have built everything from one hp motors up to a 36-ft. dia. wind generator with our design," says Matt Jore, chairman, Core Outdoor Power. "We foresee larger versions of our technology going into agricultural equipment. Long-term, we believe it will be adapted to automotive uses."

He explains that the flat CORE motor design is diameter sensitive. If you double the diameter, you get 8 times the power and torque. The 36-ft. dia., three-megawatt CORE wind generator only generates power in its outer 20 in. The remainder of the diameter is inexpensive struts running out to the stator/rotors ring.

"Most electric motors are complicated systems," explains Jore. "My son Lincoln had the idea of embedding conductors into a rigid circuit board. Any printed circuit board manufacturer in the world can print one out. All you have to do is laminate the stator, assemble it with rotors on a shaft, and pop a housing over it."

The CORE motor is not only easy to build, it is also extremely efficient. The CGT line trimmer, the first outdoor tool with a CORE motor, will be introduced in spring 2012 for \$249. What sets it apart from other electric trimmers is that it will run as long on a single charge as a gas-powered trimmer would run on a tank of gas. Just as important is that it will produce as much torque as that gas engine.

With the CORE motor mounted right on the trimmer head and no gearbox needed, the CGT trimmer weighs just 8-lbs., 11-lbs.

with its power cell. It runs up to 70 min. on a charge and recharges in 3 hours (less with an optional rapid charger). It offers two speed modes -- 7,000 rpm's for light trimming and 5,000 rpm's for high torque trimming. It has no vibration, little noise and starts instantly at full torque.

Later in 2012 the company will introduce GasLess hedge trimmers and handheld and backpack blowers. In 2013 a self-propelled lawn mower, the first wheeled product with a CORE motor, will be introduced. It will weigh 85 lbs., cut a 21-in. swath and run up to 60 min. on a single charge. Prices have not yet been set for these tools.

Introducing their own line of outdoor power tools is as much about proving the value of the CORE technology as it is developing a profit center. Jore notes that introducing a new technology is always difficult; however, emission standards are driving costs through the roof. An alternative motor and power source are needed.

"The motor is only 50 percent of the equation," says Jore. "The other part is the power source."

Jore notes that most existing lithium ion batteries are not capable of competing with gas motors for power or running time. Those few that can are very expensive. CORE is working on a new non-chemical based power source it hopes to introduce in 2012. The company is working with Molycorp, the only producer of rare earth oxide outside of China. Currently the new energy cell can power a cell phone for two days. The goal is to size it up.

"If we are successful, it will be a superior power source at 1/10 the cost of current lithium ion batteries," says Jore. "We will then be able to expand the use of our technology from hand held equipment and push mowers to the rest of these categories."

He acknowledges that the motor's flat profile limits its use in small diameter spaces where lots of power is needed, such as in-line pumps. That said, he thinks there are plenty of opportunities for its use, such as in vehicles.



Conductor Optimized Rotary Energy (CORE) motor eliminates wound wire and other complexities of conventional electric motors. Exploded view of motor (above) shows printed circuit board with embedded wires sandwiched between two permanent magnet rotors. The first outdoor tool with a CORE motor - a weed trimmer - will be introduced this spring.

He points out that electric wheel motors have trouble standing up to the beatings wheels and axles take.

"Really good gears are hard to beat for durability and expense," suggests Jore. "Why not use the existing proven axle, transmission and differential in a modern car? Put a flat CORE motor on top of the differential and just run the driveshaft between them."

Given the CORE ratio of power to diameter, the larger the car (axle length), the greater the diameter motor that could be installed. "If a machine designer can give us

an inch or two more diameter, it's always worth it for producing higher torque at a lower cost," he says.

Currently Core Outdoor Power purchases the circuit board stator and rotors, but makes all other components at its Montana location. Eventually Jore hopes to be providing entire power trains and power sources to OEMs.

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Where To Buy A Mobile Slaughterhouse

If you're looking to get into the mobile butchering business, there are several custom trailer manufacturers who can build you one, including TriVan Truck Body, Brothers Body and Equipment, Featherlite and others. Since building their first one in 2004, TriVan has built a number of other mobile processing plants for farmers.

"We've built units that range from 36 ft. to 53 ft. long," says Bob Lodder, TriVan Truck Body. "We've done poultry processing trailers and large animal units. Right now we are working on projects as diverse as fish processing and cheese making."

TriVan's first trailer was for a group of farmers in the San Juan Islands in Washington state (featured in Vol. 27, No. 5). TriVan is now completing one that's non-mobile. The 53-ft. by 10-ft. by 14-ft. high enclosure is a turnkey slaughter and processing facility for a farm in northern British Columbia.

"We've been getting more calls on mobile slaughter units as people discover they're more economical and can produce higher quality meat," says Lodder. "Meat quality suffers when you transport animals long distances."

Lodder says a basic 36-ft. slaughter facility can process 10 head of beef, 24 head of cattle or 40 head of sheep per day with two butchers on hand. The on-board cooler will hold about 6,000 lbs. of carcasses. A single butcher can operate the facility, but at lower capacity. Fully equipped with a generator and all equipment needed, the mobile slaughterhouse

will cost around \$175,000. While the unit is designed for slaughter, processing the carcass into cuts would need to be done at a second location. A processing facility can be included in a larger unit.

"The strength of our company is we are a custom builder," says Lodder. "We can add storage under the trailer, extended beams for hanging animals out the back, and chutes to remove the offal."

TriVan custom trailers can take from 14 to 20 weeks from order to delivery, depending on specifications. Finished slaughter facilities meet all USDA inspection and licensing requirements.

Lodder suggests having basic needs in mind when talking to a manufacturer such as TriVan. "The big questions are capacity and type of animal," he says. "What kind of maneuverability do you need to get the trailer to the farms? What is your goal in terms of animals per day? The type of animal determines the meat rail system, height of the trailer and more."

Brothers Body and Equipment has built on-farm poultry processing trailers for New England producers. The company has designs for large animal facilities as well.

"We establish what kind of equipment you want, the volume you want to do and the equipment needed for the process you want to use," says company representative Tim Horn. "Our large breed 53-ft. semi trailer runs from \$100,000 to \$150,000 depending on options."



Brothers poultry van.



TriVan trailer unit.



Brothers work station.



TriVan interior sink.

Another company that has built a mobile slaughter unit is Flat River Corp. General manager Jerry Eisenmenger says, "I think they have a lot of potential for the small producer who happens to live in an area where local locker plants are no longer available."

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