



New all-electric Ford Ranger can go 100 miles on a single charge for only a penny a mile. Sugarloaf Ford of Winona, Minn., is taking orders for both new and retrofitted Rangers.



With no engine there's a lot of room under the hood. Photo shows 100V, DC electric motor, which drives a 5-speed manual transmission using Mag-Trans technology.

By Jim Ruen, Contributing Editor

## All-Electric Ford Ranger Gets 100 Miles Per Charge

There's never been a vehicle like this all-electric Ford Ranger that will be unveiled to the national media this July in Winona, Minn. FARM SHOW got an early sneak peak at the electrified Ranger which can travel an amazing 100 miles on a single 4-hour charge, at a fuel cost of only a penny a mile. If you add an optional on-board, gas-powered generator, the cost goes up to 5¢ a mile but it eliminates the need to ever stop for a charge.

The breakthrough technology that makes the electric pickup so efficient is the Mag-Trans transmission developed by well-known inventor Bob Albertson, who holds more than 250 patents from a lifetime of inventing.

Sugarloaf Ford of Winona, one of Ford's top dealers in the U.S., will be taking orders for new and retrofitted Ford Rangers with a standard 5-speed transmission controlled by the Mag-Trans technology.

"This is very exciting for us and is a great thing for Ford and for the country," says Mike Puetz, owner, Sugarloaf Ford. "This is the first all-electric vehicle that is affordable to the average person. It is a brilliantly simple design."

FARM SHOW took a ride with Albertson recently as he put his first production model through its paces. It was impressive...and quiet! Looking under the hood was even more impressive, mostly because of what wasn't there.

The pickup is powered by a 100V, DC electric motor that draws 50 to 60 amps under load. There's also a battery case with 10 deep cell batteries and the patented Mag-Trans technology.

"You can buy the system and have it installed for \$13,000 in a new or used Ford Ranger," says Albertson. "There is a \$7,500 federal tax credit for electric vehicles, and if you are from Colorado or California, it's practically free because those states have an additional \$5,000 state tax credit."

If you're able to sell the parts you take out — i.e., the engine, starter, fuel pump, water pump radiator, carburetor and exhaust system — you might even make a profit on the deal.

The Mag-Trans unit mounts directly to the 5-speed transmission at the bell housing. It consists of a copper disk driven by the DC motor running at its optimum rpm's. There's an air gap between the copper disk and a steel disk attached to the truck's transmission that's fitted with 36 rare earth magnets, each providing about 80 lbs. of attraction.

When Albertson steps on the gas pedal, the magnetic disk moves toward the spinning copper disk and begins to spin in response. The closer the two disks come to each other, the faster the magnetic disk turns. Transfer of energy from the motor to the drive shaft

is just that simple. Because power is transferred through the Ranger's 5-speed, shifting follows a normal pattern of clutch and shift. An amp gauge helps the driver find the most efficient gear.

"When the disks pull apart, the magnetic disk slows the drive," explains Albertson. "It actually provides a type of regenerative braking that puts power back into the batteries."

Albertson, a Minnesota native, chose to work with the Ford Ranger for his first kit because of the Ford Ranger assembly plant in nearby St. Paul, Minn. He developed the kit for a manual transmission, as it was simpler to work with than an automatic transmission. Kits for other vehicles will be developed as demand develops.

The power steering pump is mounted to the front of the electric motor. Other vehicle systems that remain run on electricity. Albertson expects eventually to capture and use the heat produced by the Mag-Trans system.

Initially, the kit will only be available through Sugarloaf Ford in nearby Winona, Minn. "We will start taking orders right after the July introduction and make deliveries anyplace in the country," says Puetz. A \$2,500 deposit will be required with the order, with the balance due on delivery. You can have the kit installed in a brand new Ranger, or retrofit an existing truck.

Puetz says the base price on a new Ranger is around \$15,000 with current rebates. He expects to soon have pricing on a kit-ready new truck, without engine and the other unneeded components.

If 100-mile round trips aren't sufficient, an optional gas-powered, DC generator complete with its own exhaust system is also available. Fully installed, the add-on will cost \$2,500.

Even without the on-board generator, the batteries are already recharged on-the-go by the regenerative braking system, and by the cooling fan which is left in place. A small generator is attached to the back of it. As air passes through, the fan turns to generate electricity which is fed back to the batteries. Right now the fan generates about 10 amps at a 30-mph road speed. Albertson also has plans for a power-generating suspension system that he plans to introduce in 2011. It generates electricity from the up and down motion of a vehicle on the road.

Albertson is also in discussion with a major farm equipment company regarding a variation of the Mag-Trans for tractors.

You can see a video of Albertson and his all-electric Ranger at FARM SHOW's website, [www.farmshow.com](http://www.farmshow.com).

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Mag-Trans unit consists of a copper disk driven by the DC motor running at its optimum rpm's.

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Located behind the pickup cab, the battery case comes with 10 deep cell, lead acid batteries which recharge in just 4 hours.



Salvaged from an old electrical warehouse forklift, the forklift mast pins to the front-end loader on Shearer's Deere 3020 tractor.

## Forklift Mast Mounts On Deere Tractor

"It's a real back saver, and I spent less than \$200 to build it," says Dallas Shearer, Stapleton, Neb., about the forklift mast he mounted on the front-end loader on his Deere 3020 tractor.

Shearer went to the local scrap yard and bought an old electrical warehouse forklift for \$200. He removed the fork head from the mast and welded 4 metal brackets to it, allowing him to pin the forklift to his loader with the bucket removed. He used rectangular tubing to make an upper bracket that pins onto the loader's bucket cylinders, and sq. tubing to make a lower bracket that pins onto the loader arms, allowing the forklift to be tilted up or down.

"It really comes in handy," says Shearer. "The forks are rated at 3,000 lbs. and work great for lifting big round bales, as the forks slide under the flat side of the bale with ease. Commercial forklifts of comparable capacity sell for \$1,600 or more and are rated at only 2,000 lbs. Also, they don't have a guard to

protect the operator like my forklift does. My tractor loader has a high reach so someone standing on a platform can use it to change light bulbs in yard lights, do roofing work, etc.

"Another advantage is that the forklift is only 4 ft. wide, so I can use it to load and unload anything on a pallet from the bed of my pickup. It's narrow enough that I can get the forklift clear over the pickup's axle and balance the weight of whatever I load into the back of the pickup. Some commercial models are so wide you can't even get the forklift past the pickup's tailgate."

The forklift is well balanced, says Shearer. "I can set the forklift on top of a pallet, remove 4 pins from the mounting brackets, and back away with no problem," he says.

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