Laine converted a gator to electric using 22 batteries and also installed an onboard charger.

Deere Gator Converted To Electric

After a field fire burned up his Deere Gator, Brian Laine could have junked the 25-year-old machine. Instead, he decided to turn it into something new.

"A few years earlier, I bought a crate of lithium-iron-phosphate batteries at reduced cost on Craigslist from someone's failed EV project," says Laine. "The old engine was 16 hp., so I figured a 10kW power plant would give me roughly equivalent horsepower (13 to 14 hp.). Given the electric motor's flat torque curve, I expected it would match or outperform the original."

After stripping out fire-damaged parts, Laine removed the Gator's original drive train with forward/reverse gearbox.

"I shopped some sites and found a supplier that could sell many of the parts needed: the DC motor, controller, gearbox, pedal, and even an instrument cluster," says Laine.

After getting the rough dimensions of the parts, he calculated room for about 22 batteries. He placed 16 behind the motor and three under each seat in place of the old fuel tank and radiator. The batteries he had purchased were 3.2 volts, producing about 72 volts in total.

Laine estimated the project would take a few weeks once the parts arrived. He ended up working on it on and off for about 6 months. There were some things he hadn't anticipated.

"Talking to the motor manufacturer, I was told I should have a BMS or battery management system to help protect the batteries and add safety to the design," says Laine.

The BMS connects to each cell and balances them as needed. It also monitors voltage to make sure the batteries don't get overcharged, overdischarged, or overheated and will power down if needed.

Laine's first challenge was how to couple the gearbox with its differential and CV-joint axles to the Gator's splined shafts on the forward drive axle. Limited space on the driver's side required modifications. He coupled half of the original splined adapter from the Gator to the shell of the new CV joint. However, when he spun the axle, it bound slightly. He ended up replacing it with a Lovejoy coupling to provide needed flexibility and some cushioning to the drive. This required cutting, drilling and tapping the Lovejoy shell to attach it to one side, then machining the splined Deere connector to size and cutting a keyway in it for the other half.

"On the passenger side, I had plenty of room for the axle and CV joint," says Laine. "I cut back the provided axle and machined a spacer to adapt it to the Gator's splined part. I turned a piece of scrap into a bushing and coupled them together with a 3/16-in. diameter roll pin holding it together."

The original gearbox had brakes built in. With no room for brakes on the forward drive axles, Laine installed mechanical disc brakes on the rear axles, with the option of installing dual brake pedals for independent braking.

"I made the discs from scrap steel and added go-cart brake calipers," says Laine. "I cut the Gator's splined hub adapters in half and machined them to accommodate the discs before welding them together. If the new roller chain ever needs adjusting, I may have to shave down the spacer blocks or disks, not ideal."

The motor controller converts battery DC power to AC needed by the motor to control speed and current. It also provides regenerative braking back to the batteries.

Laine installed an onboard charger that charges at a rate of about 12 amps, automatically stopping when fully charged.

A DC converter takes 72-volt battery power and provides 12-volt DC at 25 amps to run the bed lifting actuator, lights, and auxiliary output plug on the rear of the machine for use with a sprayer.

"I added solid-state fuses to each battery bank," says Laine. "The fuse manufacturer wanted something like $70 each for fuse mounts, but I drew them up on CAD and 3D printed them for cheap."

Laine also fabricated aluminum panels to hinge down with the seats to cover the batteries. He used old road signs purchased at a swap meet.

"I needed to connect all 22 cells in parallel, so I made copper busbars with a slot on one end so any bar can be used to connect batteries end-to-end or side-to-side," says Laine.

Along with the new electric drive, Laine refurbished and repainted the machine. The new eGator hums along at 30 mph. Based on use to date, he estimates about 3 hrs. run time. Upgrading to newer batteries would likely double that or more.

When finished, the total cost for conversion parts was about $2,000, thanks to the low-cost batteries. While not cheap, Laine compares it to buying a new Gator for $20,000.

As with several other projects, Laine has detailed the entire conversion process with many pictures on his website.

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Orio robot features a series of ground shovels, packer wheels, and rotating fingers and is driven by four 3000-watt 48-volt electrical engines powered by four rechargeable lithium-ion batteries.

Row Crop Robots Replace Tractors

Naio Technologies' Orio robot is designed for plowing, weeding, seeding, and tilling, primarily in row crops and vegetable beds. It's popular with growers of lettuce, carrots, parsnips, onions, cabbage, cauliflower, various herbs and more.

"We think of our robots not as tractors but as autonomous tool carriers," says Christian Melendez, Director of Sales, North America. "One of our priorities at Naio is ease of use, so we make our robots cover a wide range of tools."

The Orio uses a self-contained Real-Time Kinematic (RTK) based GPS system delivering accuracy and precision down to 1 to 2 in.

"Because it's self-contained, it requires no external towers. This allows even the smallest growers to take advantage of superior RTK technology," Melendez says.

The robot features a series of ground shovels, packer wheels, and rotating fingers and is driven by four 3000-watt 48-volt electrical engines powered by four rechargeable lithium-ion batteries. Ground speed of the robot varies from 1.5 mph to 3 mph depending on local regulations, but as laws evolve, Melendez expects the speed will be increased.

All of Naio's robots, including the Orio, are manufactured in France and are available for purchase in North America.

"Our market strategy involves a strong dealer network," he says. "Ideally, this is the best way forward as dealers have existing relationships with the end users. We've already sold over 400 robots."

Melendez says Naio's robots start with pricing in the upper $40,000's for the smallest units and range into the high $200,000's for their largest offerings.

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Chevy engine runs smoothly and puts out 400 to 450 hp. Beaver drives the modified tractor in parades and says it's always a big hit.

Farmall Repowered With Chevy Engine

When Charlie Beaver retired from a career in law enforcement, he acted on a long-considered idea to replace the original engine in his 1936 Farmall F20 tractor with a Chevy 454 motor.

"I was getting old, so thought I'd better get it done, or I wouldn't live long enough to enjoy it," laughs Beaver. "I already had the tractor and the 454 plus a big shop to work in, so I started the project about 2 years ago. It took me a full year to complete."

He began by restoring the body of the tractor, including sandblasting and repainting it gray to match the original pre-November 1936 color scheme.

The original gas-powered 221 cu. in., 4-cyl., 20-hp. overhead valve motor had frozen up.

"My whole concept was to keep it looking as original as possible," Beaver says. "But by replacing the engine, I had to fabricate everything involved. You can't just buy parts over the counter for this kind of project."

He left the fuel tank in the same location, and the transmission, drive train, radiator, and hood remained as manufactured. He modified the engine with an upgraded camshaft, aluminum intakes instead of heads, and headers that ran up each side of the hood.

Beaver says the trickiest part was positioning the motor so he could still use the original radiator. Designing and building the coupler was also a challenge.

"Because it's a Chevy engine, I ran GM bell housing, clutch and pressure plate, and had to hook it all to the original transmission. A buddy with a machine shop helped me fabricate all of that. Then I built the mounts, brackets and connections to line everything up."

The engine runs smoothly and puts out 400 to 450 hp. Beaver drives the modified tractor in parades and says it's always a big hit.

"It's a project I'm really proud of as everything about it is done right, not just cobbled together. I think I outdid myself on this one."

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