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ALTe Truck Conversions Operate on Battery Power All the Time

Story and Photos
by Bill Springer

When Kyle Maki isn't hunting, fishing or racing, he is at ALTe Powertrain Technologies in Auburn Hills, where he is senior mechanical engineering technician.

In that position at ALTe, Maki is responsible for preparing and completing all testing of the prototype vehicles and components.

ALTe's business model is to electrify the fleet industry by providing retrofit options for existing fleet vehicles, according to Maki.

"Our converted vehicles give up no payload or towing capacity, while improving fuel economy," Maki said. In fact, the electrified Ford F-150 towed a 10,000-pound asphalt eater at highway speed.

According to Maki, ALTe is the first company to take a Ford F-150-converted ALTe prototype on a road trip, covering 2,200 miles in five days of driving all over Michigan.

A significant part of the road trip was spent with U.S. National Forest personnel in their real-world scenario.

ALTe first removes the factory engine and replaces it, in the case of the prototype conversion, with a Ford 2-liter 4-cylinder engine. The production conversion will use the 2.5-liter Ford engine.

The Ford engine is mounted transversely, and is not connected directly to the drivetrain, but instead drives the generator.

Pratap Naick, controls and simulation engineer for ALTe, pointed out that there are two benefits to the ALTe system.

"First, because the engine can be run at its peak efficiency rate all the time, the overall efficiency of the system improves to 30 to 35 percent.

"Second, it's a plug-in hybrid, so you can plug the vehicle into the wall charger at night, and use that energy to drive the vehicle. That reduces the depending on traditional diesel or gasoline fuels," Naick said.

When the gasoline engine is running, it does so at three different levels, or established RPMs to drive the generator, which charges the battery.

The battery pack powers the AC three-phase permanent magnet electric motor through a DC-to-AC power inverter.

The battery pack is also charged by regenerative braking, fed backwards through the electric motor acting as a generator. The power that is recaptured is fed back through a rectifier to charge the battery, as well.

The electric motor runs at 250 to 700 volts, with 345 volts DC coming into the inverter. The battery pack is rated at 300 to 405 volts DC.

"In short, every mile is electric, with the DC battery driving the wheels," Maki said.

All of ALTe's customers will be fleet customers. The company was funded by John Thomas, Jeff DeFrank and Nam Thai Tang, all from Tesla Motors, and now at ALTe headquarters, located on Purks Rd. in Auburn Hills.

Maki stressed that they have not received any public funding, and that ALTe is not yet publicly traded.

An interesting anecdote to this story is that ALTe presently removes the torque converters from the stock automatic transmissions used on the prototypes, because the transmission isn't directly coupled to the gasoline engine.

Maki said that the production transmissions will allow regenerative braking in all gears. He would not elaborate, except to say that "traditional production transmissions don't lock in all gears."

All this being said, Maki, Naick and others at ALTe summed their system up as one that "allows fleet operators to meet a substantial portion of their daily operation with electric miles from the plug-in lithium ion battery.

"The balance of their daily duty cycle is achieved through running a 4-cylinder gasoline generator operating at its most efficient points to extend the vehicle range up to 300 miles.

"The series hybrid architecture leverages a powerful permanent magnet electric motor and high operating system voltage, enabling it to be applicable for a broad range of vehicles, from light- through medium-duty trucks and vans."

Maki is a third-generation race-car driver, and his family has been involved in stock car racing for nearly 40 years. Maki races Legends Car No. 18 at Whittemore, Owosso and other Michigan tracks in the Bishops Performance Series. He is a graduate of Lawrence Technical University, and a Michigander who loves what he does.

Kyle Maki, ALTe senior mechanical engineering technician.

Pratap Naick, ALTe controls and simulations engineer.

Delphi Down Due to Europe

Delphi Automotive reported third quarter 2012 revenues of $3.7 billion, a decrease of 6.8% from the prior year period, the result of further reductions in European production and a significant weakening of the Euro and Brazilian Real.

Adjusted for the impacts of currency exchange, commodity movements and divestitures, revenue was flat in the third quarter.

The Company reported third quarter net income of $269 million and diluted earnings per share of $0.84, compared to $266 million and $0.79 per diluted share in the prior year period.

"Delphi's third quarter earnings growth demonstrates the benefits of our lean and flexible cost structure in the face of a difficult macroeconomic environment.

This was particularly true in Europe, where vehicle production levels have weakened further," said Rodney O'Neal, chief executive officer and president.

Delphi generated net cash flow from operating activities of $414 million in the third quarter, compared to $410 million in the prior year period.

Cash flow before financing totaled $254 million compared to $274 million in the prior year period.

City Awarded 5-Star Status

Since 2007, when University of Michigan-Dearborn's iLabs eCities project began tracking key data markers for economic development, the City of Auburn Hills has ranked among the state's "hottest" hotbeds of entrepreneurial growth.

Auburn Hills was recognized as a five-star community, along with other business-friendly communities, such as Ann Arbor, Troy, and Southfield. The survey looked at 114 communities in 40 of Michigan's counties, where more than a third of the state's residents live.

The rating is based on a 32-item index of entrepreneurial activity, looking at six factors – clustering, incentives, growth, policies, community and education. Since 2007, 165 municipalities across Michigan have participated in the annual study, and each year, Auburn Hills is recognized for what Auburn Hills City Manager Pete Auger calls "a positive business environment."

"Auburn Hills continues to be a magnet city for entrepreneurs and businesses that want a progressive, responsive, entrepreneur-friendly government partner," said Auger.

Though Auburn Hills is home to just over 20,000 residents, it also boasts five colleges and universities, a growing downtown, and 40 international corporations from 32 countries, including Chrysler-Fiat.

BorgWarner's New Turbos Debuted At Recent SEMA Show in Las Vegas

Borg-Warner introduced its next-generation EFR-7163 (Engineered For Racing) turbocharger and its current EFR and AirWeeks Series turbochargers at the 2012 Specialty Equipment Manufacturers Association (SEMA) Show in Las Vegas.

The show, held Oct. 30-Nov. 2, was widely attended by OEMs and their suppliers.

Borg-Warner's new compact EFR-7163 features an innovative lightweight aluminum bearing housing and mixed-flow turbine. This design is meant to combine the responsiveness and compact packing of a B1 turbocharger with greater flow capacity to achieve 550 horsepower.

"Borg-Warner's latest EFR turbocharging advancements are built on our highly successful season as the exclusive turbocharger supplier for the IZOD IndyCar Series," said Pete Kohler, president and general manager, BorgWarner Turbo Systems.

"Our innovative technology optimizes responsiveness and maximizes power output, combining the best qualities of B1 and B2 turbochargers in a small, powerful package."

Designed for powerful performance in a compact package, BorgWarner's new EFR-7163 turbocharger achieves up to 550 horsepower while using a small B1 frame size that fits easily into a tight engine bay. Track-proven in the IZOD IndyCar Series, said Kohler, an aluminum bearing housing reduces the turbocharger's overall weight by approximately two pounds.

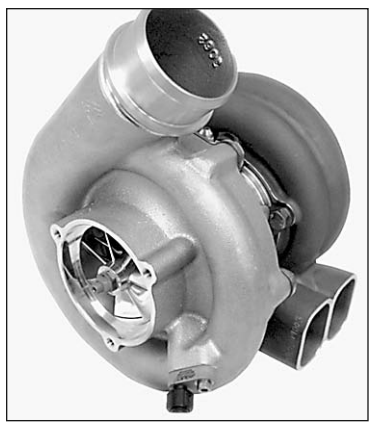
For fast response, the 63 mm mixed-flow turbine features lightweight Gamma-Ti material and innovative geometry, say Borg-Warner officials, to increase turbine flow capability while providing lower inertia than a conventional radial-flow turbine wheel.

To provide the best balance of quick response at low engine speeds with high flow capacity at top engine speeds, BorgWarner officials say their engineers optimized the 71 mm (OD) compressor wheel to manage as much flow capacity as a larger conventional wheel.

For flexibility, the turbine housing, say BorgWarner officials, accommodates either a v-band or T25 inlet connection option for engines using an open manifold or a T4 twin scroll housing for engines using a divided manifold.

SEMA visitors also had the chance to view BorgWarner's new EFR-7163 turbochargers in a 2013 Ford F-150 FX4 SuperCrew pickup powered by an EcoBoost 3.5-liter engine and a 2009 Jeep.

In addition, BorgWarner will showcase its current EFR turbocharger line, which, officials say, features race-proven Gamma-Ti turbine wheel technology with a range of units supporting 225 to 1,000 horsepower per turbocharger, as well as its AirWerks turbocharger line, which includes the competition-ready S and K series supporting a range of 120 to 1,700 horsepower per turbocharger.



EFR Turbocharger

BorgWarner's "Engineered for Racing" EFR turbochargers have achieved powerful performance and durability over the 212,000 miles of practice, test, qualifying and race events in the 2012 IZOD IndyCar Series.

GM Performance Engineer Stielow To Address SAE Mid-Mich. Session

The Mid-Michigan section of the Society of Automotive Engineers (SAE) will hold its November dinner and program meeting on Monday, Nov. 12, at 6 p.m. in the Holiday Inn – Gateway Center in Flint.

The featured speaker is Mark Stielow, the author of the book, "Pro Touring," a book about muscle cars.

Stielow began his career as an engineer at GM, and was involved in the development of the Chevrolet Caprice police car. He moved from there to GM Motorsports Technology, and eventually was recruited by Summit Racing to be their chief engineer for product development.

He is currently engineering group manager for GM high performance vehicle operations.

Tickets are $25 for SAE members, $20 for retirees and $18 for students. Non-member tickets are $30, and the event is open to the public.

For more info, call Bernard Santavy at 810-635-7948 or email SAEMidMichSec@cs-.com.

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