Electric Motors to Power Axles In Meritor-UQM Truck Project

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Meritor Inc. and UQM Technologies Inc. announced an agreement to develop an integrated electric axle that would replace or downsize internal combustion engines on some electric commercial vehicles.

The agreement is intended to combine UQM’s hardware, motor and inverter technology in the same housing with Meritor’s axle components to create an e-axle, UQM said.

“The biggest difference between an electric axle and a traditional axle is that the e-axle provides propulsion and retardation of the vehicle. … The engine is being migrated into the axle,” John Bennett, general manager of global product strategy for Meritor, told Transport Topics.

“I think where Meritor saw the promise with the move toward electrification on the commercial side is, if you are able to design the proper gear ratio and, for instance, on the larger vehicles actually put in a two-speed rear axle so, in essence, it is serving as the transmission and ultimately build the electric motor into the axle — you are going to have a far more cost-effective and efficient system,” Joe Mitchell, CEO of UQM, in Longmont, Colorado, told TT.

Meritor and UQM see smaller medium-duty vehicles as well-suited for full electric power, initially. “Their range is well-defined, so one of the e-axles we will be developing will be targeted for that segment,” Bennett said.

At the same time, an e-axle can be configured with a diesel engine and a transmission to supplement the engine, he said. That allows the engine to be smaller and, when more power is needed to climb a hill or accelerate, the motor in the e-axle serves as a boost or an assist. That is an approach better suited for the Class 8 regional linehaul applications.

“We are focusing on both. We see applications in the market for both. There is not a one-size-fits-all technology when it comes to electrification,” of medium- and heavy-duty truck and bus applications, Bennett said.
At the same time, the price for batteries that power electric vehicles is falling, and that is the biggest reason the electric commercial vehicle segment is expected to expand, the companies said.

“If you go back 10 years ago, batteries were over $1,000 per kilowatt-hour [the energy needed to power a 100-watt lightbulb for 10 hours]. It has come down to about $250 per kilowatt-hour, and some companies are projecting getting down to $200, even $160 in the next five years,” Bennett said. “So that has completely changed the business case for these vehicles and is one of the big reasons why we see them starting to take off now in the next five to 10 years.”

UQM's Mitchell agreed.

“That is really what’s truly driving this from being a concept level one or two prototype to becoming mainstream,” Mitchell said. The companies will show the e-axle at the North American Commercial Vehicle Show, scheduled for Sept. 25-28 in Atlanta, he added.

Meritor has bolted electric motors to axles before but has never integrated the rotor, stator and all of the copper wrapped around its gearing to share the same housing, Bennett said.

“People have done this on the automotive side, but for commercial vehicles, it hasn’t been done to date,” said Mitchell, who added that he sees in Meritor a good partner for the commercial side.

“We are very pleased they see the market growth and potential and to choose us,” he said. “We feel we have a premium motor and inverter solution, and the power density and overall efficiency of our product can give them an advantage in this market.”

That advantage is being sought at the highest levels at Meritor, CEO Jay Craig said.

“Our intent is to be the market leader in electric drivetrain solutions, just as we have been with mechanical drivetrain since 1909,” Craig said Jan. 29 during a call to discuss 2017 first-quarter earnings.

UQM was founded in 1967. Its propulsion systems have powered commercial and passenger vehicles worldwide, it said.

Troy, Michigan-based Meritor is a supplier of axles, drivelines and braking and suspension systems, primarily for medium- and heavy-duty trucks, among other segments, it said.

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