



## Green Auto Market

The Business of Green Cars, Fuels & Technologies

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#### Electrified trucks gaining interest in medium- and heavy-duty truck segments

Interest is building in electric trucks serving the Class 3-8 commercial vehicle sector. The ability to compete with the payload and range capacity of gasoline and diesel engine trucks is being watched closely. As with light-duty electric vehicles, China is a key market and a source of investors needed to succeed.

**Daimler gains new investor:** Li Shufu, the chairman and main owner of Chinese carmaker Geely, [has amassed a stake of 9.69%](#) in Daimler AG, the German company said in a regulatory filing last week. The \$9 billion in Daimler shares makes Li the largest single shareholder in the manufacturer of Mercedes Benz cars, trucks, and vans. Sources told Reuters that Geely's main objective in the Daimler investment is sharing its EV technology to meet China's demand for new energy vehicles.

Commercial trucks are a big part of China's EV strategy. Zhejiang Geely, which owns Volvo, in December invested \$3.9 billion in Volvo AB, the world's second-largest truck maker after No. 1, Daimler Trucks. You'll also read about Geely's deal made this year with Via Motors.



Daimler has made comments about preparing to be the world's leader in electrified trucks in the medium-duty and heavy-duty truck segments. Last week, the company released details on its [eActros heavy-duty trucks](#) still in development. The company said that the eActros drive system comprises two electric motors located close to the rear-axle wheel hubs. The electric motors are liquids-cooled with a nominal voltage of 400 volts, and output of 125 kW each, that will have maximum torque of 485 Nm each. The gearing ratios

will be on par with the performance of a diesel truck, the company said. The truck can carry a payload of 11.5 tons, and will have a 125 mile range per charge. Energy will be stored in two lithium-ion batteries with an output of 240 kWh. Daimler is looking at 20 to 80 kW charge rates, which will be able to charge up the eActros in three to 11 hours.

Last fall, Daimler took pride in beating Tesla in bringing commercial electric trucks first to the U.S. market. Mercedes brought Mitsubishi Fuso's **eCanter electric trucks** to New York City at that time. UPS, the Bronx Botanical Garden, Habitat for Humanity, and Big Reuse began two-year leases on a small number of the medium-duty electric trucks that can go up to 80 miles on a charge. Daimler

had previously made a deal with 7-Eleven to send 25 of the trucks to Japan. The electric trucks can carry three to four and a half tons of cargo, which is a few tons less than the diesel equivalent.

**Via Motors and Zhejiang Geely** will be launching plug-in hybrids and all-electric commercial vehicles, starting with a medium-duty extended range electric truck. Via Motors now has an agreement with China-based Zhejiang Geely New Energy Vehicle Co. Ltd., a subsidiary of Zhejiang Geely Commercial Vehicle Group. The joint venture will tap into Via's proprietary vehicle software and systems control technology "to meet the demanding duty cycle and performance requirements of commercial vehicles," said Nathan Yu Ning of Zhejiang Geely Holding.

In recent years, Via Motors has faced the crisis that several EV makers have experienced: finding the necessary capital and market demand to successfully manufacture and market the costly trucks. Several other companies have faced near or actual bankruptcy, but were salvaged and revived by these new backers, with some of them based in China.

Via's chairman of the board, Bob Lutz, was pleased to see the deal take place. "Geely is the ideal strategic partner for Via Motors, as the fastest growing global vehicle company, with a demonstrated commitment to the electrification of their portfolio of award winning vehicles," Lutz said in a statement. "The alliance between Geely and Via Motors combines technology, access to their industry leading suppliers, and a mutual entrepreneurial spirit dedicated to accelerating the global adoption of extended range electric commercial vehicles."

**Workhorse Group Inc.** has been taking a lot of orders for its medium-duty electric trucks and vans. The Workhorse W-15 is the first plug-in range extended electric pickup built from the ground up by an OEM. Lithium ion battery cells from Panasonic provide an 80 mile all-electric range, while the onboard generator works to recharge while driving to get the job done. Ryder System Inc. has placed an order for 2,500 electric pickup trucks from the Loveland, Ohio, startup Workhorse. The company just entered into a contract with UPS to replace 50 of the company's delivery trucks with battery electric Workhorse trucks. Workhorse sold about 300 delivery vehicles overall to UPS already and has been testing package deliveries with drones for the company. The vans will have fast-charging capability.

In a recent conference call with Wall Street analysts on 2017 financial results, [Tesla CEO Elon Musk predicted](#) the company would be delivering 100,000 electric **Tesla Semi heavy-duty trucks** annually four years from now. Tesla already has its hands full explaining to shareholders how much the Tesla Model 3 electric car will cost to reach ambitious production targets, which are far behind the company's original estimate. Antti Lindstrom, a truck industry analyst with IHS Market, found Musk's statement preposterous, as the 100,000 production goal would equal about half the Class 8 truck sales in the U.S. during a good sales year.

Along with its Workhorse Group order, UPS has taken the largest order so far of the Tesla Semi trucks with down payments on 125 of the Semi tractors. More than 500 orders have been placed on the Semi from companies such as UPS, PepsiCo, Walmart, Sysco, and Anheuser-Busch. The company reported hundreds more Semi orders have been placed by other customers.

The company says the base price will be \$150,000 for the Semi, with a 300-mile battery range. A 500-mile range truck will start at \$180,000. Tesla is receiving \$20,000 reservations fees for each Semi pre-order. Production is planned to begin sometime next year. Musk said that the range will be more than satisfactory with nearly 80% of the freight in the U.S. being driven less than 250 miles.

**RNG competing with electric trucks, and renewable diesel playing a role in California:** Renewal natural gas has gained much support as a replacement for diesel in trucks serving the Ports of Los Angeles and Long Beach, the nation's largest harbor. The California Natural Gas Vehicle Coalition (CNGVC) is working with port administrators and fleets on bringing in more RNG trucks.

Currently, the ports have about 700 natural gas-powered trucks serving them, according to the Southern California Gas Co. All of these trucks operating in the region currently have access to RNG, also known as biomethane, through natural gas fueling stations. Southern California has been the hub of these natural gas fueling stations, which will help drayage and carrier truck companies convert over to the fuel. The benefits of using RNG in trucks equipped with natural gas-powered engines are becoming well known among fleet managers. In a 2011 study of RNG production methods (PDF), Argonne National Laboratory concluded that all RNG methods show significantly less GHG emissions and fossil fuel consumption than conventional fossil natural gas and gasoline.

The coalition last summer submitted the ACT Now Plan, which encompasses all zero- and near-zero emission technologies and fuels, including natural gas, propane, battery electric, hydrogen fuel cell electric, and others that meet a 0.02 g/bhp-hrNO<sub>x</sub> standard and can achieve a minimum 40% reduction of greenhouse gas (GHG) emissions using renewable fuels or energy.

For now, port commissioners are showing more interest in electrified transportation in hitting emissions targets. While that would more than meet these emission reduction targets, it will take several years for the heavy-duty electric trucks to become available at that scale. Renewable natural gas could serve as an ideal bridge fuel during that time, according to members of the coalition. Truck operators will need to invest in more expensive RNG-capable trucks coming to market that have the capacity to meet all of the emissions reduction targets.

**Electric buses** are becoming a major force in global vehicle electrification, with China playing a big part in its future. Nearly half of the municipal buses on roads worldwide will be electric by 2025, according to a report from Bloomberg New Energy Finance. That will mean last year's 386,000 units sold will go up to 1.2 million in the next seven years. Strong domestic support and aggressive city-level targets will mean China accounts for 99% of the world's battery-powered buses by 2025, the report said.

Hydrogen fuel cell buses will see an increasing trend as Chinese governments provide more support and subsidies. The Bloomberg report is taking a more optimistic view overall on electric bus growth with China supporting electric buses aggressively.

Two Chinese bus makers are dominating the domestic market – Yutong and BYD. BYD is the leading electric bus manufacturer, and Yutong is the largest overall bus manufacturer in the country. The EV manufacturer not long ago supplied 20 electric coaches to two Macao tourism enterprises in China. BYD continues to be active in other global markets, including supplying buses in the U.S. to transit districts. The Chinese company just announced it will supply 11 BYD ADL Enviro200EV single deckers operated by Go-Ahead London for the Transport for London. They'll be similar to other BYD electric buses already on London roads operated by Go-Ahead London.

Electric bus maker Proterra just introduced the DuoPower drivetrain for its Catalyst all-electric vehicles. The Catalyst bus will be five times more efficient than a standard diesel bus with a lot more horsepower and acceleration. It offers a 20% increase in efficiency over Proterra's standard ProDrive

system. For the Catalyst E2 max model, the DuoPower drivetrain enables a nominal range of 426 miles on a single charge, which the company says far exceeds the average distance of North American transit routes. Separately, the company announced that major bus and coach manufacturer Van Hool has selected Proterra to provide its highly efficient battery platform for Van Hool's first all-electric motor coach. Van Hool's CX Series electric vehicle will utilize the E2 battery technology.

### **Autonomous trucking and platooning**

While Google's Waymo company has taken center stage for bringing self-driving cars to roads, [autonomous trucking may make it to the mainstream first](#). Silicon Valley startups, technologists, and venture capitalists see great potential in the technology—even more than most traditional trucking companies are supporting.

Embark, a Silicon Valley start-up, is scheduled to release details next week on its self-driving technology for trucking. The automated system has tested in partnership with truck-leasing company Ryder and Electrolux, an appliance manufacturer. Trial runs are exploring the potential of transporting trailers to Electrolux's California warehouses with autonomous trucks.

CB Insight, which tracks venture capital, reports that companies will place about \$1 billion in commercial truck autonomous systems this year, 10 times the level of spending three years ago. The \$700 billion trucking industry continues to be an integral part of the U.S. economy, and that of other economic giants and developing countries around the world. With more manufacturing happening overseas in places like China, trucking is part of making sure everything from automobiles to packaged food products make it to warehouses and end users on time.

Trucking companies and giants who invest heavily in logistics — like Amazon and Walmart — see great potential in cutting costs and speeding up delivery times. That will come via cutting labor costs when truck drivers no longer become necessary, and by extending the hours that commercial trucks can be kept in operation.

Companies also believe that traffic accidents will be reduced when autonomous vehicles become widely adopted for passenger and cargo transport. Insurance premiums are expected to go down, along with collision repair costs. Autonomous driving is expected to be much safer than what's delivered by human drivers.



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