

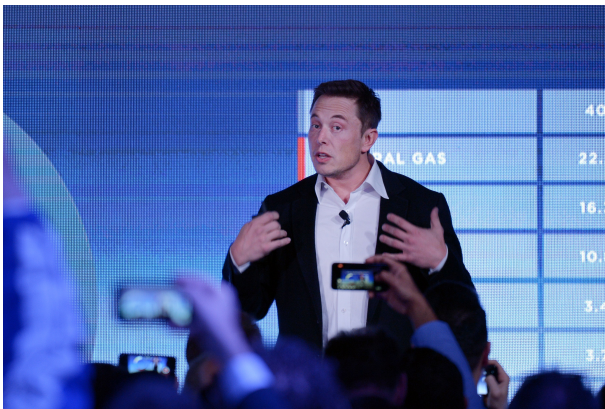
This copy is for your personal, non-commercial use only. To order presentation-ready copies for distribution to your colleagues, clients or customers visit <http://www.djreprints.com>.

<https://www.wsj.com/articles/tesla-plays-the-long-game-with-semi-truck-1510963133>

## AUTOS

# Tesla Plays the Long Game With Semi Truck

Commercial truck makers say weight and cost of long-haul electric vehicles makes them impractical



Tesla's Elon Musk says the Semi will be able to travel 500 miles on a single charge. PHOTO: CARLA GOTTGENS/BLOOMBERG NEWS

*By Bob Tita, Tim Higgins and Jennifer Smith*

Nov. 17, 2017 7:00 p.m. ET

Tesla Inc. Chief Executive Elon Musk is taking on the commercial truck market with an approach that defies conventional expectations: an all-electric vehicle capable of traveling for hundreds of miles on a single charge.

Commercial truck makers trying electrification initiatives have largely focused on smaller trucks for short-run duties, arguing the battery range, weight and cost of long-haul electric trucks makes them impractical. With the Semi, unveiled this week and due out in 2019, Mr. Musk is promising a vehicle that can travel 500 miles on a single charge—enough to cover most regional freight deliveries—and is cheaper to operate than diesel trucks.

Some potential customers said they are willing to give Tesla a try. Retailer Wal-Mart Stores Inc. said Friday it has preordered 15 Tesla trucks to test. J.B. Hunt Transport Services Inc. also placed a reservation for “multiple” Semis, but only to deploy in short-run service such as to and from West Coast ports and truck-to-train transfer yards.

Fleets that move cargo thousands of miles across the country may be less eager. The Semi is aerodynamic, but the likely weight of the battery and its 500-mile range may hurt its ability to compete against heavy-duty diesel trucks can run for 800 to 1,000 miles between refills.

“The limited 500-mile range of the Tesla truck hinders our ability to be an early adopter,” Greg Hirsch, a senior vice president at trucking company Daseke Inc., said in

an email. The company specializes in hauling oversized industrial equipment and materials, often over long distances. "There will need to be an over-the-road infrastructure put into place prior to us being able to take advantage of this technology."

While Tesla has weathered its share of production hiccups, the company maintains appeal by offering high-end performance cars in a sexy package. Mr. Musk further appealed to enthusiasts this week by unveiling the Semi alongside a small \$200,000 roadster that he says will be the quickest production car ever to hit roads.

Morgan Stanley auto analyst Ravi Shanker said the Semi "topped most of our expectations in terms of performance, cost savings, capability and time to market." Cowen analyst Jeffrey Osborne said "our mind wasn't blown."

Trucking companies are focused on ownership costs, reliability and the availability of service. Without costs for diesel fuel and maintenance expenses for an internal combustion engine, Mr. Musk said the Semi will cost \$1.26 a mile to operate, compared with \$1.51 for a diesel truck.

Incumbent truck and engine makers in the U.S. remain wary of the economics behind heavy-duty electric trucks. With the price of diesel averaging \$2.50 a gallon and new model trucks providing significantly better fuel economy than a decade ago, most predict that widespread adoption of large electric trucks is at least a decade away and will be driven by regulatory restrictions for truck engine emissions.

"We don't think they're viable in long-haul, heavy-duty trucks," Tom Linebarger, chief executive of engine maker Cummins Inc. told investors Thursday. "Given the range and given the weight sacrifice with lithium ion, it just doesn't look like battery electric vehicles are the right solution for long-haul trucks."

Cummins plans to spend about \$500 million over the next three years developing electric powertrains for buses, fork lifts, city delivery trucks and other vehicles that typically travel shorter distances and would require smaller batteries.

Cummins also is among several companies working on e-trucks. Daimler AG, which makes U.S. market leader Freightliner big rigs, showed off an electric prototype in October. U.S. Xpress, a large fleet, said earlier this year it had ordered hydrogen-electric semi-trucks from Nikola Motor Co., to be delivered in 2020.

Tesla was vague about how it achieves the cost difference. Tesla would charge truckers 7 cents per kilowatt-hour for electricity drawn from its solar-powered charging stations. That is about half the average kilowatt cost in the U.S.

Part of Mr. Musk's calculation for making his trucks at least 20% cheaper to operate than a diesel truck is through the creation of a fast-charging network dubbed Megachargers that he says will be built world-wide, allowing the commercial vehicles to regain 400 miles worth of charge in 30 minutes. They could be installed at origin and destination points allowing for recharging during loading and unloading.

Mr. Musk didn't release a price for the Semi and there are other issues to address. Lithium ion batteries are heavy and bulky, for instance, and extending the range of the battery likely adds weight, which subtracts from the amount of cargo that can be carried.

Venkat Viswanathan, an assistant professor of mechanical engineering at Carnegie Mellon University in Pittsburgh, estimates that a 500-mile battery for the Tesla truck would weigh 26,000 pounds.

“That is certainly much heavier than the diesel engine that is there now,” he said. “The battery weighs so much that you’d eat into the cargo weight.”

The Semi’s battery would likely account for about a third of the 80,000-pound weight limit in most states for a fully loaded semitrailer truck. Heavy-duty truck loads typically range from 34,000 to 44,000 pounds.

Mr. Viswanathan predicts the cost of the batteries alone for the Tesla truck would be about \$170,000 and figures the rest of the truck would run about \$100,000. Heavy-duty diesel trucks average about \$150,000 each. Tesla is counting on the lower ongoing cost of operating its truck to offset the initial high cost.

Mr. Musk is promising superior performance, saying a fully loaded Semi would travel from zero to 60 mph in 20 seconds and feature autonomous driving systems to improve safety.

Four separate motors driving the rear wheels of the truck are intended to eliminate jackknife accidents where trucks and their trailers swerve out of alignment during a panic stop or on icy roads.

Still, electric vehicles are still seen as niche and their inability to stick in the marketplace raises big questions for owners concerned about resale values. The market for natural-gas powered commercial trucks looked promising a few years ago, for instance, but shrank when the initial buyers of the trucks, which carried a higher price, had difficulty selling them when diesel fuel prices retreated. Peter Nativo, a vice president for Florida-based Oakley Transport Inc., said his company tries to recover at least 20% of the original cost of its trucks from the used market.

“At the end of its life if an electric truck doesn’t have market value, that could be a problem,” he said. “I don’t think we’d be the guinea pigs. We’ll watch the way the rest of the industry goes first on electric trucks.”

**Write to** Bob Tita at [robert.tita@wsj.com](mailto:robert.tita@wsj.com), Tim Higgins at [Tim.Higgins@WSJ.com](mailto:Tim.Higgins@WSJ.com) and Jennifer Smith at [jennifer.smith@wsj.com](mailto:jennifer.smith@wsj.com)

*Appeared in the November 18, 2017, print edition as ‘Tesla Plays the Long Game With Semi.’*

Copyright &copy;2017 Dow Jones & Company, Inc. All Rights Reserved

This copy is for your personal, non-commercial use only. To order presentation-ready copies for distribution to your colleagues, clients or customers visit <http://www.djreprints.com>.

