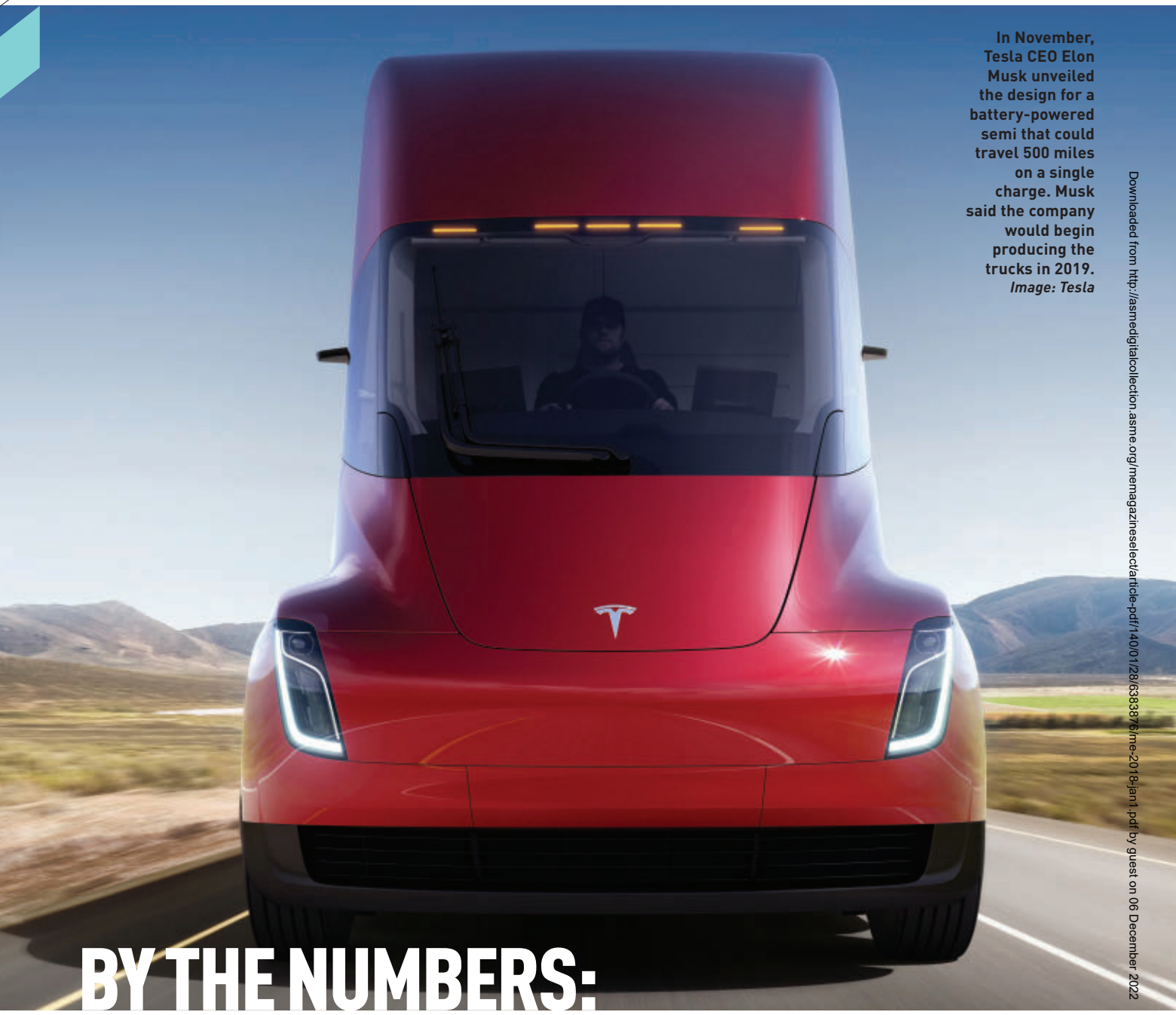

In November, Tesla CEO Elon Musk unveiled the design for a battery-powered semi that could travel 500 miles on a single charge. Musk said the company would begin producing the trucks in 2019. *Image: Tesla*

BY THE NUMBERS:

WILL TRUCKING GO ELECTRIC?

According to a new report, fleet owners may quickly adopt EVs for medium-haul routes.

The sounds and smells of the trucking industry are as much a part of American mythology as the jangle of the cowboy's spurs or the belch of coal smoke from a steam locomotive. For decades, diesel-powered semi-trailer tractors have pulled loads at high speed from coast to coast, providing not only the fodder for music and movies, but also the backbone of the just-in-time retail economy.

Trucking may remain economically important for decades to come, but according to a report late last year from McKinsey and Company, the diesel-powered tractor is in line for an overhaul. Much more quickly than most people might expect, the commercial vehicle sector will switch from internal combustion engines to battery-electric vehicles for many use cases.

The report says that, unlike consumers who often decide which passenger car or truck to buy based on emotion and faulty logic, fleet owners "place greater emphasis on economic calculations and reflect a greater sensitivity to regulation." When the total cost of ownership—encompassing not only the initial purchase price but also operating and maintenance costs—becomes lower for electric trucks than for diesels, fleets will switch over relatively quickly.

In some scenarios McKinsey looked at, that tipping point will come within ten years in local and regional cargo markets worldwide and before 2031 for even long-haul trucking.

But in some instances, the total cost of ownership makes electric trucks an economical choice today.

The report highlighted the regional light-duty delivery market in Europe, where fuel costs are higher than in the United States. "While most industry players focus on last-mile and urban-delivery solutions, the regional hub-and-spoke distribution approach is more advantageous," the report stated. "Vehicles in this use case could share passenger-car components and infrastructure to accelerate adoption." Light-duty regional electric delivery trucks would carry such items as groceries or flowers and be more stripped down and less capable than conventional diesel trucks. Even so, a battery range of about 70 miles would enable several deliveries per charge, and partial top-offs per day would keep the truck on the road.

Designing vehicles and business models around the capabilities of electric powertrains—capabilities that differ from those of diesel trucks—will enable battery-electric trucks to penetrate the market more quickly. It may be some time before we get a semi-trailer tractor capable of hauling containers coast to coast, but well before then, the McKinsey report declares, electric trucks will have become common enough to rewrite at least part of the mythology of the highway. **ME**

JEFFREY WINTERS

TYPICAL USE CASES COULD SPARK THE ELECTRIFICATION OF TRUCKS

APPLICATION SEGMENT	SEGMENT PERSPECTIVE	EXAMPLE USE CASES	DATE OF TOTAL COST PARITY
Regional light-duty truck hub-and-spoke delivery 	First truck segment to reach total-cost-of-ownership (TCO) parity, lowest entry barrier for battery electric vehicles	Regional grocery delivery for shops and restaurants	2017
Urban light-duty truck stop-and-go delivery 	Second truck segment to reach TCO parity due to low share of battery cost	Urban last-mile distribution with central hub and many stops	2017-2021
Regional medium-duty truck hub-and-spoke delivery 	Third segment to reach TCO parity due to balanced capital and operating expenditure	Grocery store chain with logistics center for several branches	2017-2023
Urban heavy-duty city bus 	In China and US, buses have a lower share of battery cost in total capital expenditure than do trucks	Typical city bus or school bus with dozens of stops	2020-2023
Long-haul heavy-duty truck point to point 	Parity for average users around 2030, due to large battery need, but up to 7 years earlier in beneficial use cases	International or continental freight logistics	2023-2031

Date of parity depends on region; Europe shown.
Source: McKinsey Center for Future Mobility.