MD BOX TRUCKS

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NACFE
NORTH AMERICAN COUNCIL FOR FREIGHT EFFICIENCY

Market Segment & Fleet Profile Fact Sheet

Operational Characteristics

Duty Cycle	Return to Base
Use Case	Pickup & Delivery
Average Range	Less than 100 miles
Routes	Variable
Fueling	Centralized
Miles per Gallon	10.0
Replacement Cycle	10.2
Average Age	8.4
Axle Configuration	4X2

Definition

A box truck is a two-piece vehicle where the cargo box sits on the chassis and is not accessible from the cab. Box trucks can have different box sizes, cab designs, and door types, and range from Class 3 to 8. The cab type is either a conventional (engine in front of steering wheel) or cabover (cab over engine), and the most common box sizes are 10', 12', 16', 22', and 24'. In the US, box trucks typically have rear roll-up doors, however hinged doors also are available. Box trucks also are known as straight trucks, cube trucks, cube vans, or box vans.

Market Summary

Globally, the box truck market is forecasted to grow at a CAGR of 4.5% from 2021 to 2028 based on increased demand from industrial, military, and commercial entities. Common uses for box trucks include residential and commercial movers, parcel delivery, furniture and appliance delivery, and wholesale food and snack delivery.

Gas or Diesel	Type	Electric
25,500	**GVW**	26,000
152" – 270"	**Wheelbase**	195" – 212"
200 - 300	**Horsepower**	207 - 335
520 - 660	**Torque** (lbs-ft)	1,400 – 1,800
Up to 15,000	**Est. Payload**	Up to 14,500
$80,000	**Avg. Purchase Price** (USD)	$200,000

Run on Less – Electric highlighted three Class 6 box trucks. The vehicles featured were the Lion6 operated by Day & Ross to deliver packages in Montreal, Canada; the Peterbilt Cummins 220EV, which Frito Lay is using to haul snacks from its Modesto facility; and the Roush CleanTech Ford F-650 that the Roush Fenway Racing Team runs to deliver race car parts to teams in the Concord, NC area.

While some of these trucks still are considered demonstration vehicles, fleets are seeing high uptime and are working with their respective OEMs to optimize size and weight to meet range requirements.

Managing weight and range in Class 6 to 8 electric trucks is essential for fleets due to the correlation to the amount of cargo that can be hauled. Understanding load constraints, whether a typical load cubes out (constrained by size) or grosses out (constrained by weight), is critical to this equation and plays a significant role in right-sizing battery packs.

Additionally, there are some outliers within this segment that have routes that extend beyond the average 150-mile range for electric box trucks. To this end, fleets are continuing to identify the most optimal routes to electrify first as they integrate electric box trucks into their daily operations.

The duty cycles and use cases for the Run on Less – Electric box trucks are very representative of the commercial vehicle portion of this market segment and the operational requirements align well to the current battery technology.

NACFE considers this segment to be 100% electrifiable.

Run On Less – Electric Findings & Metrics

Drivers had to adjust to quick acceleration with no lag time, as well as utilizing regenerative braking when moving into electric vehicles. With experience, drivers found they preferred using the regenerative braking more than traditional brakes.

Managing acceleration, optimizing regenerative braking, light-weighting where possible, and right-sizing the battery all impact the overall efficiency of the vehicle and are key areas of additional work as noted by the manufacturers.

Interoperability testing should occur prior to introducing new vehicles and/or chargers into a location.

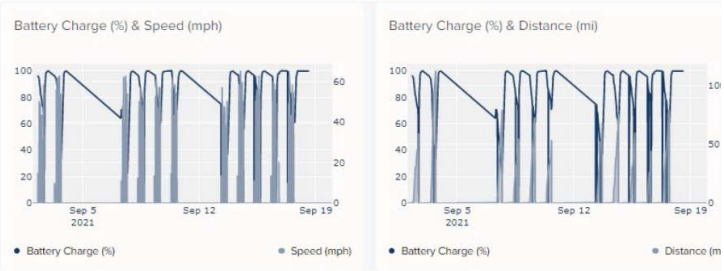
OEMs still are hesitant to quote a specific percent reduction for maintenance costs, but trends indicate it will be lower than current incumbent technology.

While there is potential to charge box trucks at public charging stations, Roush Fenway Racing found the size of their truck made it difficult to access public chargers. Designing public charging to accommodate small to medium-duty commercial electric vehicles (EVs) will be an important step in accelerating adoption of these vehicles.

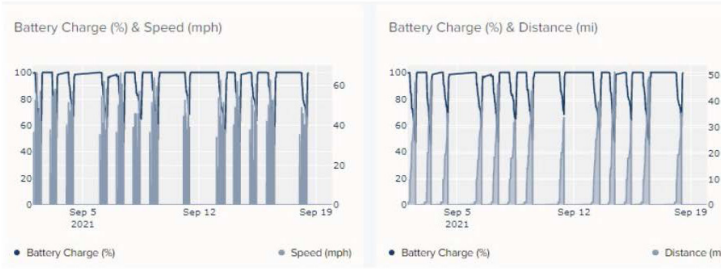
From a utility perspective, the biggest concern at the Frito Lay facility is surge protection. To mitigate risk, circuit breakers are used for all Frito Lay equipment.

Parking lot design is a crucial component for fleets when considering how to create safe and efficient access to charging stations. For example, some trucks have charging ports located on the rear of the vehicle, while others have charging ports located toward the front of the vehicle. Depending on the length of the charging cable, this could have some trucks backing up to charge and pulling forward to exit (safer option) versus pulling forward to charge and backing out to exit.

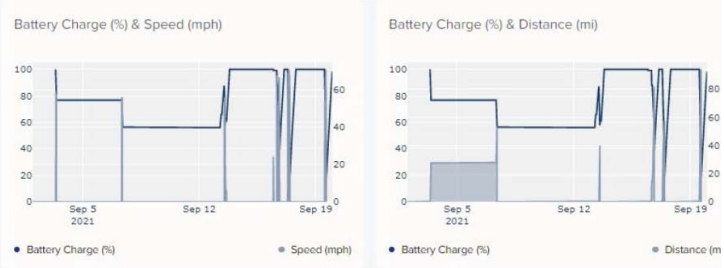
Lion6



Peterbilt Cummins 220EV



Roush CleanTech Ford F-650



To view the Lion6 metrics in more detail, click here.

To view the Peterbilt metrics in more detail, click here.

To view the ROUSH metrics in more detail, click here.

If 100% of the medium-duty box trucks in the US and Canada were electrified, it would require approximately 12,457 gWh of electricity for charging and result in the avoidance of 7,681,707 MT CO_2e* annually.

** Carbon dioxide equivalent, used in GHG reporting to bundle greenhouse gases into a single number.*

Day & Ross
Lion6

Frito Lay
Peterbilt Cummins 220EV

Roush Fenway Racing
Roush CleanTech/Ford F650

	Lion6	Peterbilt Cummins 220EV	Roush CleanTech/Ford F650
ROL-E Site	Montreal, Canada	Modesto, CA	Concord, NC
Fleet	Day & Ross	Frito Lay	Roush Fenway Racing
Service Territory	Local	Central CA	35-mile radius of campus
Facility Details	35,000 sq. ft terminal	500,000 sq. ft. warehouse	150,000 sq. ft. warehouse
Weather – Temp Range	50 – 80 degrees F	53 – 102 degrees F	55 – 88 degrees F
Duty Cycle Requirement	Less than 120 miles/day	65 – 80 miles/day	Less than 70 miles/day
Battery Capacity	252 kWh	155 kWh	138 kWh
Battery Range	150 – 175 miles	100 miles	100 miles
Battery Chemistry	NMC	LFP	NMC
Charging Rate	125 kW	62.5 kW	19.2 kW
Battery Charger	CCS1	CCS1	J1772
Total Miles	756	539	387
Estimated Moves	27	97	8
% of Speed <40 mph	62%	55.3%	25%
% of Speed >50+ mph	17%	9.84%	37%
Charging Opportunity	Overnight	Overnight	Overnight
Charger Location(s)	On yard	On yard	On yard
Charging Port on Tractor	Front of passenger-side door	Front of box on driver-side	Below driver-side door
Parking to Charge	Nose-in	Back-in	Nose-in
Days in Operation	11	13	6