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Electric Vehicle Truck Weights

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The National Waste & Recycling Association (NWRA) is supportive of innovations taking place in the field of electric vehicles (EV); however, it also recognizes that the technologies for heavy-duty EVs like those utilized by the waste and recycling industry are not yet perfected, especially with regard to capacity issues. Furthermore, rear-load and roll-off collection EVs are not yet available on a significant enough scale to meet the logistical needs of the industry.

Collection Vehicle Weights

The average waste and recycling collection vehicle weighs approximately 33,000 pounds when empty.[1] That number will vary based on the age of the vehicle and whether the truck is a roll-off or a front, side or rear loader. Depending on the type of vehicle, these trucks can carry between 20,000 and 30,000 pounds of waste.[2]

According to CNBC, a battery for a heavy-duty electric truck may weigh up to 16,000 pounds.[3] This may add between 4,000[4] and 5,300 pounds[5] to the overall weight of a collection vehicle over the weight of a traditional diesel-powered vehicle. For example, the gross vehicle weight of a City of New York Department of Sanitation EV collection truck is 72,000 pounds when its four lithium nickel manganese cobalt oxide batteries that power the vehicle are accounted for.[6]

Due to the heavier truck weights caused by EV batteries, load sizes must be decreased to compensate for existing vehicle weight limits on roads and bridges. This has led some states to reevaluate the maximum gross weight of vehicles for those powered by alternative fuels.

EV Weight Limit Legislation

Legislation was introduced in the Commonwealth of Pennsylvania in 2021 to raise the weight of EV-powered vehicles to align with the increased weight limit for natural gas vehicles. This bill, which was signed into law (P.L. 2067) on November 3, 2022, allows for such vehicles to exceed gross vehicle weight limits by up to a maximum of 2,000 pounds.[7]

The Institute of Transportation Studies at the University of California, Davis released a study in November 2020 specifically looking at the issue of the impact of heavier trucks powered by natural gas, electricity and fuel cells on roads and bridges. It found the following:

California's truck fleet composition is shifting to include more natural gas vehicles (NGVs), electric vehicles (EVs), and fuel cell vehicles (FCVs), and it will shift more quickly to meet state greenhouse gas (GHG) emission goals. These alternative fuel trucks (AFTs) may introduce heavier axle loads, which may increase pavement damage and GHG emissions from work to maintain pavements. This project aimed to provide conceptual-level estimates of the effects of vehicle fleet changes on road and bridge infrastructure.

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Three AFT implementation scenarios were analyzed using typical Calif. state and local pavement structures, and a federal study's results were used to assess the effects on bridges. This study found that more NGV, EV, and FC trucks are expected among short-haul and medium-duty vehicles than among long-haul vehicles, for which range issues arise with EVs and FCs. But the estimates predicted that by 2050, alternative fuels would power 25–70% of long-haul and 40–95% of short-haul and medium-duty trucks.

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Results from the implementation scenarios suggest that introducing heavier AFTs will only result in minimal additional pavement damage, with its extent dependent on the pavement structure and AFT implementation scenario. Although allowing weight increases of up to 2,000 pounds is unlikely to cause major issues on more modern bridges, the effects of truck concentrations at those new limits on inadequate bridges needs more careful evaluation.[7]

The North Carolina Department of Environmental Quality (DEQ) has proposed an Advanced Clean Trucks (ACT) program. NWRA's Carolinas chapter has submitted the following comments to DEQ on the proposal:

NWRA members support the transition to more energy-efficient vehicles and have been leaders in this space for many decades. Member companies operate and continue to invest in natural gas vehicles, fueling stations, and other-clean energy technologies. These significant investments in clean-burning natural gas vehicles and other technologies have reduced greenhouse gas emissions.

Industry companies have been piloting and exploring different types of electric vehicles in North Carolina and other parts of the country. While NWRA members support the transition to more energy- efficient vehicles, the most significant concern with ACT and electric vehicles is battery cost, weight, and energy capacity. Trucks used in waste operations consume significant energy from collection to compaction. Member companies have concerns around electrified heavy-duty vehicles, including significant increased costs, infrastructure, range, weight limitations, increased maintenance costs and others.

An Ideal Option With Challenges

The waste and recycling industry is ideal for electrification as its vehicles run consistent weekly routes with low daily miles, limited speeds, repetitive accelerating/braking and can fully recharge overnight when not in use. The weight of the batteries and existing road and bridge weight limits are two of the current main obstacles.

Additionally, perfection of heavy-duty truck EV technology, especially when it comes to the capacity required by the waste and recycling industry, remains elusive for now. To the extent that any heavy-duty EVs are available, there are not enough of them on the market for purchase to fulfill the industry's requirements.

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As states and localities encourage or in some cases move toward mandating the use of EV waste and recycling collection trucks, they must also consider these factors if they hope to maintain current levels of service and efficiency.

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5. *"Effects of Increased Weights of Alternative Fuel Trucks on Pavement and Bridges," Institute of Transportation Studies, University of California Davis, Nov. 2020 https://escholarship.org/uc/item/4z94w3xr*
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7. *https://www.legis.state.pa.us/cfdocs/legis/li/uconsCheck.cfm?yr=2022&sessInd=0&act=145*
8. *Ibid 5.*