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A White Paper on Fleet Electrification by Electrada

Now is the time to electrify for fleets operating daily routes under 200 miles

Outbound Freight is Ready to Electrify – Now

Fleet operators and owners may not realize it, but their fleets are more prepared for electrification than they think. Most company-owned trucking carriers run outbound freight routes well-suited for the current range of medium-duty (MD) Electric Vehicles (EVs) on the market. Although electrifying fleets can be complex, those operating with a hub and spoke model (also known as return-to-depot) and handling daily routes of 100-200 miles with Class 3-6 MD vehicles are prime candidates for this transition.

The 2023 National Private Truck Council (NPTC) Benchmarking Survey Report, a highly regarded resource on private fleet practices in the U.S., reveals that fleet electrification is on the minds of many fleet operators and is increasingly attainable. This comprehensive report, “widely regarded as the foremost authoritative resource of private fleet practices in the United States,” features data from 110 companies and holds significant statistical relevance for the private fleet industry.

The California ACF and ACT regulations will require up to 200,000 ZEVs to be on the road by 2030, requiring an estimated \$12.6 billion in charging infrastructure to be deployed, primarily at depots.

Additional data from the North American Council on Freight Efficiency (NACFE) supports the near-term feasibility of fleet electrification as well. NACFE “considers short and medium regional heavy-duty vehicles electrifiable today with their range of 200 miles.” The 2021 Run on Less Campaign, examining 13 fleets and their vehicle OEM partners, concluded that 100% of MD box trucks are particularly well-suited for immediate electrification given their short distance route cycles and return-to-depot operations.

Moreover, regulatory developments like the California Air Resources Board's (CARB) Advanced Clean Fleet (ACF) rule are accelerating the shift. Starting in 2025, at least 10% of fleet vehicles must transition to EVs, with increasing requirements leading up to complete electrification by 2042. The 10% threshold applies to vehicles in the Milestone Group 1, which includes box trucks, vans and package delivery vehicles — the types of EV models available now.

Though there are many arguments for heavy-duty (HD) vehicle electrification now (Classes 7-8, <26,001 lbs. US GCWR), the optimal candidates are MD vehicles (Classes 3-6, 10,001-26,000 lbs. US GVWR). California alone has over 253,000 vehicles in Classes 2b-6, suggesting that around 40,000 are ripe for immediate electrification. Across the U.S., about 20 million vehicles, including 3 million in California, fit this (ready to electrify now) profile, being part of return-to-depot fleets with daily routes under 200 miles.

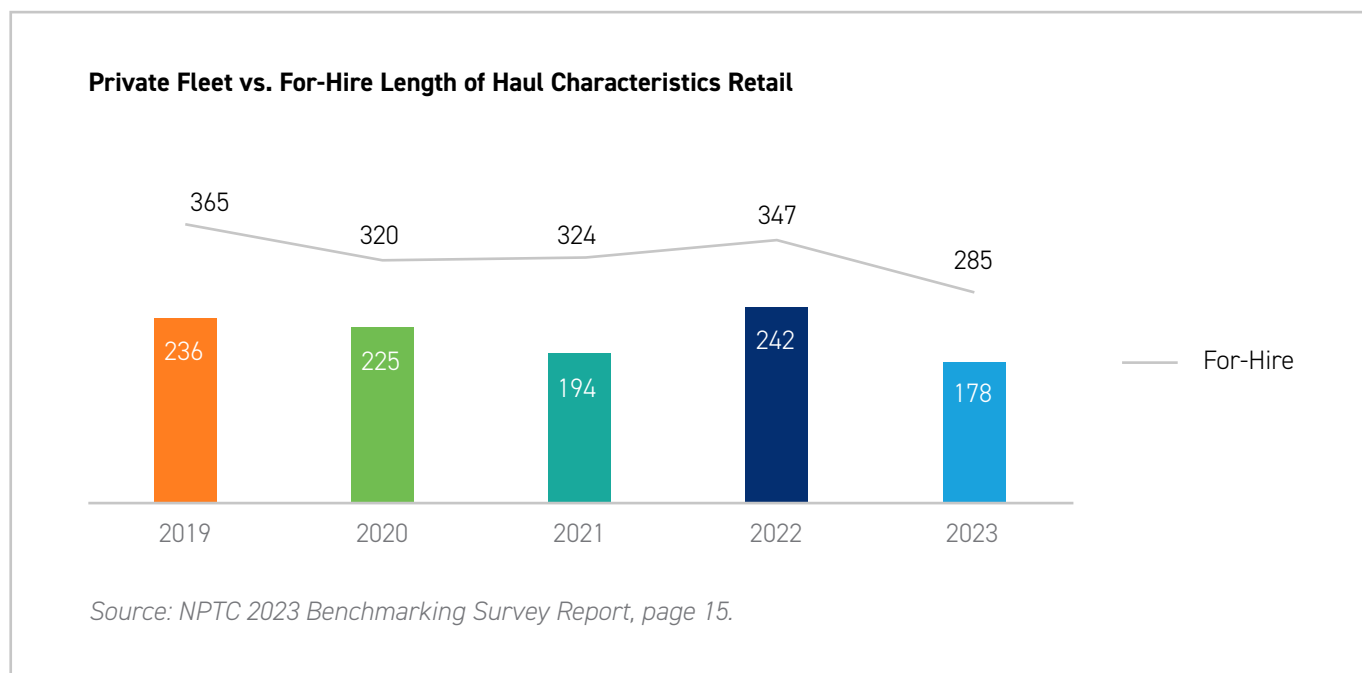
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Key Considerations for Fleet Electrification

EV adoption challenges like charging infrastructure and vehicle cost are surmountable by aligning route types with the EV models currently available.

EV range is influenced by factors such as battery capacity, payload, ambient temperature, and driving behavior. A critical aspect of electrification is the development of charging infrastructure, particularly its speed (measured in kW).

For electrification, private fleets should first assess their average route length. The 2023 NPTC report highlights that 64% of private fleet outbound freight, mainly deliveries that go directly to the retail customer, has an average route length of 178 miles, which is gradually decreasing.



The majority of outbound freight routes are attributed to retail, with average route lengths of 178 miles, making them well positioned for operations by currently available MD EVs. However, routes serving distribution centers and interplant operations are also well-suited for EVs. The average length of haul for distribution centers is 205 miles, while interplant outbound freight movements average route lengths were 279 miles in 2023, with a downward trend in outbound route lengths.

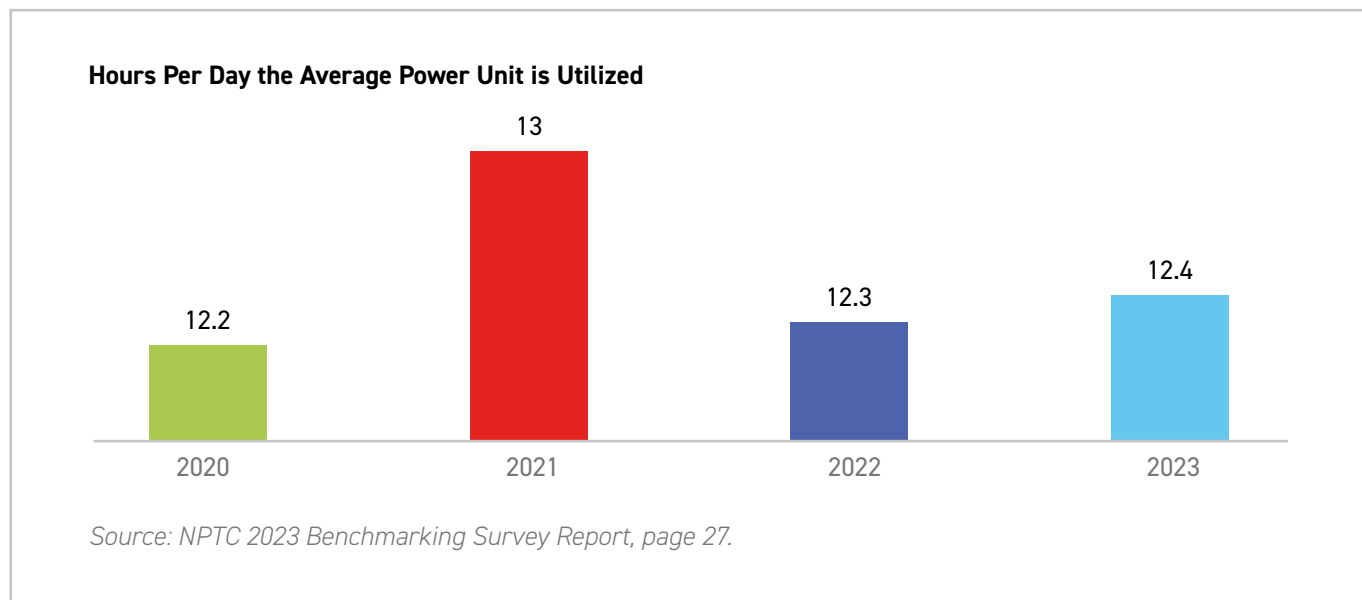
The downward trajectory of outbound route length is consistent (notwithstanding a 2022 anomaly). This is due to several factors coalescing, all of which are beneficial for driving fleet electrification:

- The majority of private fleets (86%) operate out of several locations, with an average of 44 locations compared to the 38 locations last year (2023), and 43 the previous year. The importance of this metric is that private fleets are moving closer to their customers. That gives fleets more depots at which to charge EVs, further mitigating range concerns.
- As fleets continue to reduce route lengths, it pushes even more of their routes into the “electrifiable” zone and is part of a consistent trend that sees private fleets moving their long routes to for-hire fleets.
- 70% of drivers return their vehicles to depots nightly, allowing ample time for charging.
- Overnight charging reduces the required capacity and costs of charging stations and electricity.

The 2023 NPTC report also stated that route predictability is also high in MD fleets, facilitating the electrification process. While MD vehicles are currently ideal for electrification, many heavy-duty (HD) vehicles in private fleets are also becoming suitable. HD vehicles average 304 miles per route, though some operate below this average, making them potential candidates for electrification, especially for distribution center or inter-plant routes.

Conversely, MD private fleets average around 34,700 miles per year. Considering drivers per asset, vehicle operational hours, and total driver labor hours, the annual average route for MD vehicles is approximately 123 miles, further supporting their potential suitability for electrification.

Daily vehicle operation is another critical factor. A typical vehicle is operational (i.e., away from the fleet depot) for 12.4 hours daily, with about 8 hours on the road. This scheduling leaves nearly 12 hours daily for charging, bolstering the case for electrification.

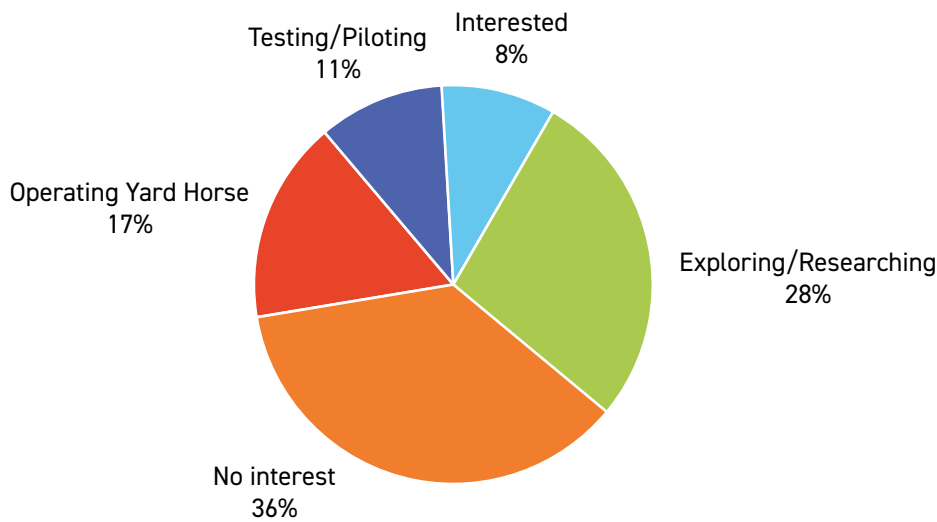


Vehicle utilization is not solely about driving. About 62.4% of the HD vehicle driver’s weekly operational hours are spent driving. The rest includes loading, delivery, and non-productive activities, providing additional charging opportunities.

Vehicle turnover is another significant metric for electrification consideration. The average lifecycle of an MD vehicle is 8.8 years or around 351,400 miles, presenting opportunities to replace aging internal combustion engine vehicles with EVs.

Lastly, sustainability efforts, driven by supply-chain, shareholder, and regulatory factors, remain a priority for most private fleets. According to the 2023 NPTC report, 72% are investing in green initiatives, including exploring EVs, with 64% of fleets at least interested in or already using EVs.

Gauging Interest in Electric Vehicles



Source: NPTC 2023 Benchmarking Survey Report, page 27.

Conclusion

As *Transport Topics* reported in May 2023, "Electric truck sales are poised to expand in the coming years, particularly in the MD range, due to upcoming emissions regulations and financial incentives, along with technology advancements." Routes within a 100–200-mile round trip, coupled with a 12-hour operation and dwell time, using MD (class 3-6) vehicles, are excellent electrification candidates. These fleets can optimize central operations and charging, where the economics and operational savings often favor electrification.

The benefits of fleet electrification extend well beyond ensuring clean air in the communities they operate. Some of the operational challenges that fleets experience can be solved by electrification and include mitigating rising costs attributed to engine and emissions that have historically led the rest of the breakdown causes. With no mechanical moving parts and no oil changes, this

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challenge is eliminated with EVs. Additionally, more reliable vehicles mean more uptime, which translates into on-time deliveries for customers.

Fleet operators would do well to understand the portions of their fleets that are currently most suitable for electrification in light of the fast-approaching government mandates. While early incentives are still available, many incentives and funding programs become depleted, so waiting until 100% of the fleet is ready to electrify based on available technology will not confer any of the financial or other early adopter benefits.

Working with a trusted partner can ensure a smooth fleet electrification journey. With a sea of new charging technology options (hardware and software) and the complexities of executing the end-to-end spectrum ranging from design and build to operation and support of fleet-tailored EV charging infrastructure, fleet owners and operators should look to risk-mitigated outbound electrification models such as Charging-as-a-Service (CaaS) to significantly minimize risk and dramatically maximize performance.

The most innovative, effective, and low-risk way to transition your fleet to electric fuel, Electrada's 360 Charging-as-a-Service reduces fleet fuel cost per mile from day one — guaranteed — with a seamless fleet electrification solution that is fully capitalized, integrated, scalable, and reliable. [Get in touch](#) to learn more.

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