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Ceres Analysis

New Corporate Electric Vehicle Alliance survey on commercial EVs establishes a clear demand signal and roadmap for manufacturers looking to compete in global vehicle market

Increasingly, major global and U.S. companies are committing to replacing the vehicles in their corporate fleets with zero-emission alternatives. Yet, as we rapidly approach critical climate deadlines, global auto and truck manufacturers must play a critical role in accelerating this transition. Manufacturers can ensure that they retain a place in the future auto and truck industry by both increasing model release timing transparency and prioritizing the design and production of zero-emission vehicles (ZEVs) that meet commercial fleets' most commonly selected configurations and minimum required specifications, including electric range, payload, and towing capacity. Policymakers also have an important role to play in supporting this transition, and should adopt technology-driving laws and regulations, such as the Advanced Clean Truck (ACT) rule, to speed the growth and maturity of the zero emission vehicle market.

These are the findings of a survey of 24 members of the Corporate Electric Vehicle Alliance, whose members include industry giants like Amazon, Best Buy, DHL, Hertz, Schindler Elevator, T-Mobile, and UNFI (United Natural Foods Inc.), and who collectively represent more than $1 trillion in annual revenue and own, lease, or operate over 1.3 million on-road fleet vehicles in the U.S. alone. Together, Alliance members represent significant available capital for vehicle procurement. Critically, this survey and analysis outlines 1) a roadmap for vehicle manufacturers to meet major companies' priority ZEV configurations, and 2) robust corporate demand for ZEVs that policymakers can reference when considering adoption of transportation decarbonization policies.

About the Corporate Electric Vehicle Alliance (the Alliance)

The Alliance, led by Ceres, is a collaborative group of major global and U.S. companies committed to accelerating the transition to ZEVs, and who work together to: 1) share best practices, 2) discuss current fleet electrification challenges, and 3) identify and advocate for innovative solutions to current market, technology, and policy hurdles. Alliance members leverage their aggregate corporate demand and market influence to expand and accelerate the following priorities:

- Production of new and increased volumes of EV models (class 1-8),
- ZEV market growth and economies of scale,
- Adoption of supportive policies and the removal of policy barriers, and
- Peer-to-peer learning with regard to industry best practices.

The Alliance's vision is a vehicle market where ZEV models are available to meet all commercial and vocational needs, are cost-competitive with internal combustion engine (ICE) vehicles, and are accessible to companies across their U.S. operations.

Some of the key takeaways from this analysis include:

- **Significant Commercial EV Demand**
  Within the next five years, Corporate Electric Vehicle Alliance members alone plan to acquire nearly 330,000 plug-in electric and/or hydrogen fuel cell electric vehicles, ranging in size from class 1 to class 8. This demand for clean vehicles is substantial, but it is important to emphasize that this number represents only a portion of the rising demand for ZEVs in the U.S. and indicates a seismic shift in the procurement criteria of large businesses. While the vehicle priorities found in this survey may not necessarily represent all corporate fleets across all industries, many commercial peers operate under similar use cases and see similar gaps in the U.S. ZEV market.

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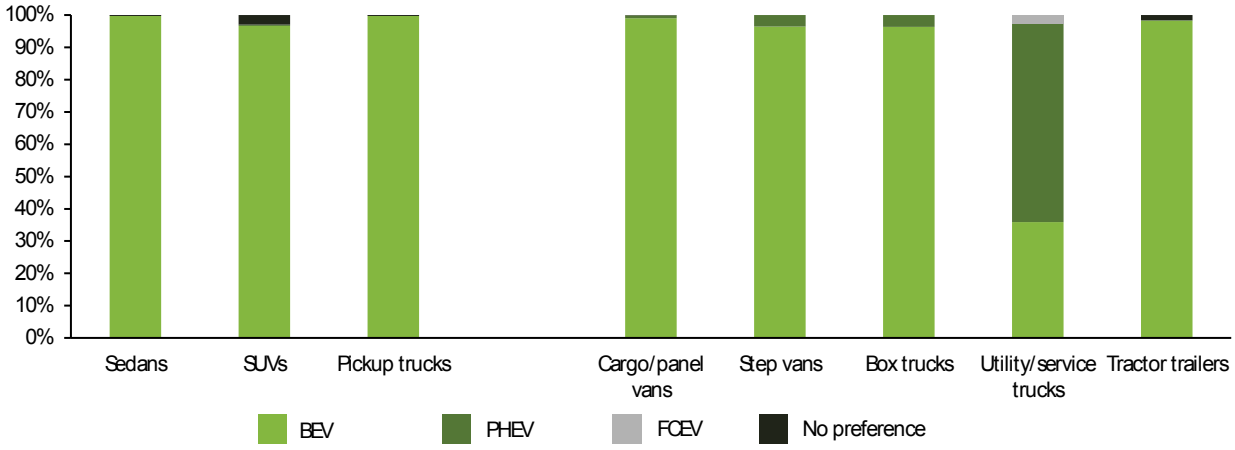
- **Willingness to Switch Brands**
  96% of survey respondents are willing to switch vehicle brands to procure a desired ZEV configuration. Vehicle manufacturers that can identify and build to the ZEV configurations summarized below have a significant opportunity to earn new customers and strengthen relationships with existing ones.

- **Preference for Battery Electric Vehicles**
  Across nearly all vehicle types, the vast majority of respondents indicate a preference for battery electric vehicles (BEVs) over plug-in hybrid electric vehicles (PHEV) or fuel cell electric vehicles (FCEV). Powertrain preference across all vehicle types:



- **Predominately Private Charging Strategy—But Public Charging Still Essential**
  The majority of respondents anticipate that most of their vehicle charging will take place at private locations: 26% at fleet depots, and 42% at employee homes. Public or on-road charging account for the remaining 32% of charging needs, on average. However, it should be noted that on-road charging is a critical element of a successful EV transition, in particular for regional and long-haul freight movement. Manufacturers and policymakers should support the deployment of this critical infrastructure, in particular for medium- and heavy-duty EVs, and actively work with the industry to improve interoperability.

Survey Background

In spring 2021, Alliance members completed a survey on short-term ZEV procurement plans and needs. 85% of Alliance members responded to the survey, and noted vehicle specifications that meet the **minimum** needs of the **majority** of their use cases. Together, respondents noted U.S. procurement plans of over 329,000 ZEVs in the next five years through direct purchase, leasing, or second party logistics providers. Survey questions were grouped by vehicle segment and Alliance members only responded to questions for vehicle segments they currently operate.

The majority of findings in this brief are presented on a procurement-weighted basis (exceptions are noted below). Answers to questions from respondents with higher planned procurement of a certain vehicle are weighted more heavily than answers from respondents with lower planned procurements. This results in key findings that reflect vehicle needs for the majority of short-term plans, but may minimize niche or smaller procurement plans.

All figures referenced in the Comprehensive Survey Analysis below are contained in the Alliance's ZEV Demand Aggregation Survey Results.

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Comprehensive Survey Analysis

Charging Needs

To successfully electrify commercial fleets, companies need both cost-competitive ZEV models with sufficient battery capacity and adequate charging infrastructure (private *and* public) to meet the demands of their diverse drive- and duty-cycles.

Outside of batteries that allow for faster charge times and increased energy storage, the availability of strategically placed, cost-effective, and interoperable public charging infrastructure is essential for trips that take drivers substantial distances from their fleet depots. Details on survey respondents' priority charging needs are outlined below.

Importantly, the survey found that:

- **Depot Charging**
  Respondents that plan to make larger orders for medium- and heavy-duty vehicles (MHDV) were more likely to identify private depots as a significant charging location.
- **Overnight Charging**
  All but one respondent also stated that at least half of their use cases would allow for overnight (8-10 hour) charging, with a third of respondents (representing around 6% of planned procurements) stating that overnight charging would be possible for 100% of their vehicles. 59% of total use cases would allow for overnight charging, including 78% of MHDV use cases.

Light-Duty Vehicle Needs

Light-duty vehicles (LDV) are responsible for almost 60% of U.S. transportation sector emissions, and as such, electrification of this sector is critical. The survey findings below outline the Corporate Electric Vehicle Alliance members' key priorities for zero emission LDVs.

Some 71% of respondents plan to procure nearly 269,000 zero-emission LDVs—sedans, sports utility vehicles (SUVs), and pickups—over the next five years. Sedans account for more than 75% of this planned procurement (shown in Figure 1 and Figure 2). Key takeaways include:

- **Battery Electric Vehicle Preference**
  Most respondents stated a preference for BEVs over PHEVs or FCEVs.[1] See Figure 3.
- **Range**
  The procurement weighted minimum ZEV range that would meet the majority of use cases for respondents is 275 miles.[2] The non-weighted range for sedans is lower than that of SUVs or pickup trucks. Procurement-weighted averages, and the spread of overall responses (not weighted), are shown in Figure 4.
- **Towing Capacity**
  While procurement weighted towing capacity needs for SUVs and pickups is similar at approximately 3,000 lb, the non-weighted range for pickup trucks is significantly wider, as shown in Figure 4. Finally, this figure shows the range of responses for gross weight rating for SUVs, with the procurement-weighted average falling just below 5,000 lb.

1. Within utility/service trucks, 60% of respondents preferred BEVs, but the 30% who preferred PHEVs make up over 60% of planned vehicle procurements.
2. Minimum electric range must hold true in real-world operating conditions, excluding extreme weather conditions/events

Detailed preferences by light-duty vehicle segment are listed below.

Sedans

Sedans reflect the largest category of short-term planned procurements in the survey, with respondents planning to procure over 208,000 ZEVs over the next five years.

20 different companies noted sedan procurement plans; however, 96% of this total demand comes from a single "primary" respondent (see Figure 5). Accordingly, this segment analysis also includes unweighted responses. The primary respondent identified a 250-300 mile range BEV with two-wheel drive (2WD) as the preferred configuration. While this vehicle type and drivetrain selection is largely echoed across other respondents, the range needs of each individual respondents were far more variable, with at least one respondent selecting each survey option from less than 150 miles to greater than 350 miles (Figure 6).

SUVs

19 Alliance members state that they plan to procure more than 35,000 zero-emission SUVs. Similar to sedans, procurement was concentrated in one "primary" respondent (84% of planned procurements), so we broke the findings down into both procurement-weighted and unweighted responses (Figure 7). The primary respondent identified a 250-300 mile range BEV with 2WD as the preferred configuration. However, across all responses, a larger number of respondents stated a preference for all-wheel drive (AWD) configurations. In addition, quite a few respondents highlighted both lower (200-250) or higher (more than 350 mile) ranges as preferred options.

Nearly half of all respondents flagged a need for significant cargo volume between the rear hatch to last row (i.e., 25 cubic feet or greater) and rear hatch to first row (i.e., 70 cubic feet or greater). Over 40% of respondents, not including the primary respondent, indicated towing capacity requirements.

Pickup Trucks

18 Alliance members stated that they plan to procure more than 24,000 zero emission pickup trucks over the next five years. Even across this large number of respondents (and fairly diversified procurement, see Figure 10), base specifications were consistent, with nearly all respondents preferring a BEV with AWD and a range between 250 and 350 miles (Figure 11).

While most planned procurement would be met by a standard six-foot bed, many of the other physical considerations reflected a wider array of configurations (Figure 12). Both towing capacity and gross combined weight rating (GCWR) show the same pattern, wherein the largest block of planned procurements indicate no minimum needs in either category, while the next most common response jumps to the higher end of the spectrum, with a towing capacity of 5,000–10,000 lb and GCWR of 10,000–20,0000 lb as the second most common procurement-weighted response.

Digging into the GCWR results in slightly more detail, Figure 13 shows GCWR requirements by cab type preference as well as towing capacity. Most planned procurements with no GCWR requirements also noted the need for a crew cab, perhaps indicating a use case that is more focused on additional crew capacity and less on hauling equipment. The higher GCWR requirements are also

generally associated with higher range requirements, though the majority of "no minimum" GCWR requirements **also** are paired with higher range requirements. This speaks to two possible different use cases: one with a high range, high weight capacity vehicle, and another in which vehicle power is more directly needed for range extension.

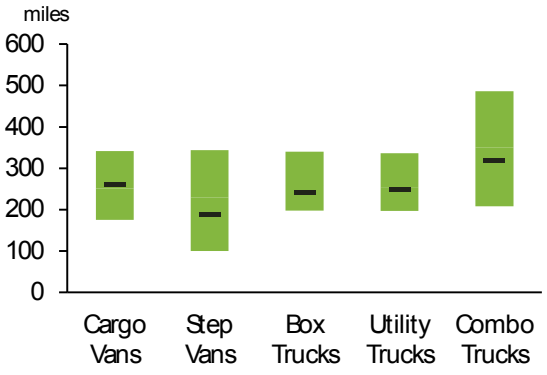
Medium- and Heavy-Duty Vehicle Needs

Rapid decarbonization of the MHDV vehicle sector is essential to meet both corporate sustainability goals and the demands of the global climate and public health crises. These vehicles include the tractor trailers, box trucks, and step vans used to meet growing freight and last-mile delivery demands. While heavy-duty vehicles (HDVs) represent only 10% of the vehicles on the road, they currently account for more than 28% of U.S. greenhouse emissions. On top of that, HDVs are responsible for 45% of the transportation sector's oxides of nitrogen (NO_x) emissions and over half of its particulate matter ($PM_{2.5}$) emissions. The survey findings below outline Alliance members' key priorities for zero-emission MHDVs.

In total, 19 Alliance members plan to procure zero-emission MHDVs, with cargo vans the most common planned procurement (19 members) and step vans the least (five members). Total five-year procurement plans include more than 60,000 zero emission MHDVs, mostly cargo vans. See Figure 14 and Figure 15. Key takeaways include:

- **Battery Electric Vehicle Preference**
  Most respondents stated a preference for BEVs over PHEVs or FCEVs, though respondents stated that the majority of utility/service truck procurements would be best served by PHEVs, namely for emergency response situations.[3] See Figure 16.
- **Range**
  The procurement-weighted response for most segments was around 250 miles, with step vans falling lower at 200 miles and tractor trailers rising to 350 miles.[4] While the spread of range requirements across most MHDV segments (cargo vans, box trucks, and utility trucks) are relatively consistent, cargo vans have a wider spread of range preferences. Step vans also show a wide spread although a lower procurement-weighted average. Tractor trailers have higher maximum and average range requirements but show a wide spread of range preferences as well (respondents were also presented with higher range options in the survey for this vehicle type). Procurement-weighted averages and non-weighted responses are shown in Figure 17.

Figure 13. Range Preferences for MHDV



*Bar ranges correspond with the middle half of *count* of survey responses and are independent of planned vehicle procurements; the procurement-weighted average dash estimates the average range/weight rating given reported planned procurements

- **Weight Rating**
  Figure 18 shows gross weight ratings across all MHDVs. Weight rating requirements generally increase with vehicle size, though the range also widens considerably at higher weight classes.

3. Within utility/service trucks, 60% of **respondents** preferred BEVs, but the 30% who preferred PHEVs make up over 60% of planned vehicle procurements.
4. Minimum electric range must hold true in real-world operating conditions, excluding extreme weather conditions/events.

Detailed preferences by medium- and heavy-duty vehicle segment are listed below.

Cargo Vans

20 respondents collectively indicated a need for nearly 42,000 zero-emission cargo vans (though one respondent accounted for 60% of planned procurements (Figure 19). Across these planned procurements, both base specifications and physical considerations are quite consistent (Figure 20 and Figure 21). The key exceptions are range and payload, which show a wider diversity of needs. In general, respondents needed mid-range (200-300 mile) 2WD BEVs with low weight requirements across a range of cargo volumes. In addition, looking at results broken out by cargo volume requirements, in general, higher cargo volume requirements were also paired with higher payload requirements, as well as, in some cases, higher towing capacity requirements (Figure 22 and Figure 23). This may highlight a need for a workhorse cargo van with both significant power and space.

Step Vans

Only five Alliance members stated short-term step van procurement plans, the smallest number of any MHDV vehicle type. However, total procurement needs are in line with other MHDV types, at slightly over 5,000 BEVs. In addition, nearly 90% of this procurement is from one respondent (Figure 24). Procurement-weighted results are thus very consistent, with a mid-range (150-199 miles), mid-gross vehicle weight rating BEV being the most common combination of specifications (Figure 25). Non-procurement weighted results, however, show more diversity in responses, with range requirements spanning less than 150 miles to more than 350 miles, and 60% of respondents noting a need for auxiliary power.

Box trucks

13 Alliance members collectively indicated a need for over 5,000 zero emission box trucks; demand is less concentrated in this category than it is for other MHDV types (Figure 26). In general, base specifications are consistent across planned procurements. A BEV configuration with a 200-250 mile range and a roller gate without refrigeration is the most common response, accounting for 4,500 planned vehicle procurements (Figure 27). There is more diversity in physical considerations (Figure 28). Interestingly, very little procurement-weighted need was noted in the mid-ranges for GCWR and box length, with higher and lower values much more strongly weighted in results. When looking at box length requirements in more detail, we see that the majority of planned procurement of traditional cab types are paired with no minimum necessary box length, while most of those respondents who have no preference on cab type do have a preference on cab length (Figure 29).

Utility/Service Trucks

11 Alliance members plan to procure around 2,000 zero-emission utility/service trucks in the next five years. These anticipated procurements are the least concentrated of all MHDV types (Figure 31). This, combined with the broad range of use cases for this vehicle type, likely contributes to the diversity in responses for both base specifications and physical considerations.

Specifications with the most agreement include an AWD drivetrain and an extended cab, as well as a 200-300 mile range. The large majority of respondents also require electric power take-off and an underbody compressor.

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Tractor Trailers

11 respondents plan to procure over 6,000 tractor trailers in the next five years. Within the range responses, very few use case needs would be met by a 300–400 mile range vehicle. Instead, most respondents require shorter (less than 300 mile) or longer (more than 400 mile or even 500 mile) ranges (Figure 34). Nearly all planned procurements would require a day/tandem-axle configuration.

Most respondents noted that their vehicles rarely or never meet weight capacity. However, nine out of 11 individual respondents noted that their weight capacity is met at least some of the time. Of these, generally, slightly higher frequencies were seen in correlation with higher range requirements—highlighting a potential need for powerful trucks that can haul full loads long distances (Figure 35).

Opportunities and Next Steps

Corporate Electric Vehicle Alliance members continue to look for opportunities to provide information and insight to auto and truck manufacturers, policymakers, and other stakeholders regarding their vehicle needs and procurement plans. In addition to critical one-on-one conversations, future aggregated information surveys can help gather this information. Opportunities for additional focus areas could include:

- A deep dive on use cases for commercial vehicles (weighted by prominence), which can inform specific configurations and requirements.
- Ability for Corporate Electric Vehicle Alliance members to highlight multiple configurations per vehicle to highlight specific procurement needs that, while possibly niche, could present opportunities to vehicle manufacturers to build commercial relationships.
- Additional analysis comparing current and announced vehicle offerings to identified needs, including a gap analysis by vehicle type and use case.

This analysis was prepared for Ceres by M.J. Bradley and Associates, an ERM Group company, with leads Grace Van Horn and Luke Hellgren, and co-authored by Ceres.

For questions or comments, please contact:

Sara Forni
Director of Clean Vehicles, and the Corporate EV Alliance
Ceres
forni@ceres.org

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Survey Background and Assumptions

In summer 2021, 24 Corporate Electric Vehicle Alliance (Alliance) members completed a survey on short-term zero emission vehicle (ZEV) procurement plans and needs. The survey communicates to key stakeholders, including vehicle manufacturers and policymakers, the Alliance's robust demand for diverse ZEV model offerings as well as the current gaps in the U.S. market. The survey results are based on the following, and capture Alliance members':

- U.S. vehicle procurement plans over the next five purchase years (2022-2026).
- Procurement estimates for all vehicles that respondents would likely purchase, lease directly or through a fleet management company, or contract through a 2nd party logistics provider (excludes 3PL supply chain management).
- Well-informed estimates for future vehicle procurement rather than concrete procurement plans.
- Vehicle specifications that meet the minimum needs of the majority of members' use cases.

A narrative analysis of the key findings from this survey may be found in the Ceres Analysis here, and the accompanying figures on Key Findings (Appendix A) and Aggregate Survey Results by Question (Appendix B) are included below.

Note: Figures on key findings are primarily presented on a procurement-weighted basis. Answers to questions from respondents with higher planned procurement of a certain vehicle are weighted more heavily than answers from respondents with lower planned procurements. This results in key findings that reflect vehicle needs for the majority of short-term plans, but may minimize niche or smaller procurement plans.

The below graphs were prepared for Ceres by M.J. Bradley and Associates, an ERM Group company, with leads Grace Van Horn and Luke Hellgren.

Appendix A: Key Findings Figures

Figure 1. Light Duty Vehicle (LDV) Number of Respondents by Vehicle Type

71% of respondents plan to procure LDVs in the coming five years.

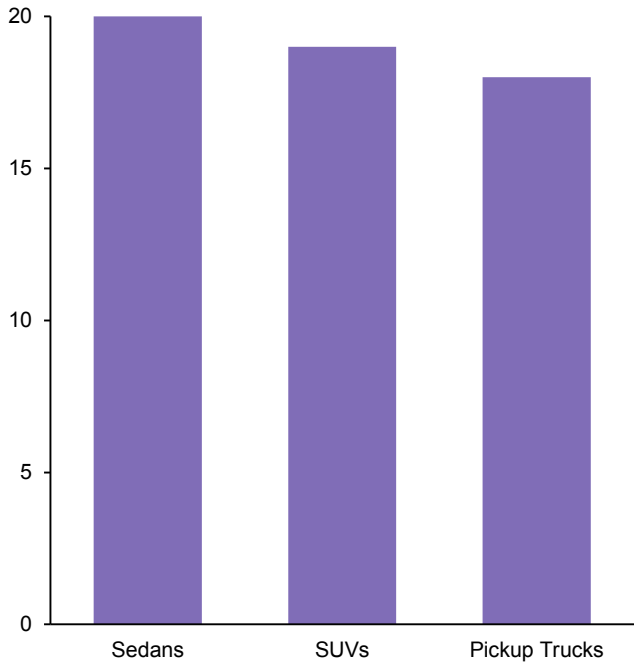


Figure 2. LDV Planned Procurements by Vehicle Type

Respondents plan to procure nearly 269,000 zero emission light-duty vehicles (LDVs)—sedans, sports utility vehicles (SUVs), and pickups—in the next five years. Sedans account for more than 75% of this planned procurement.

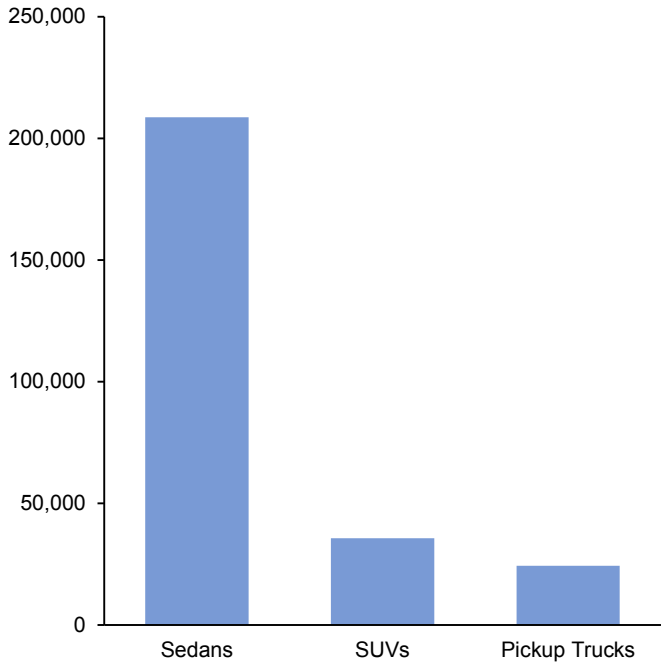
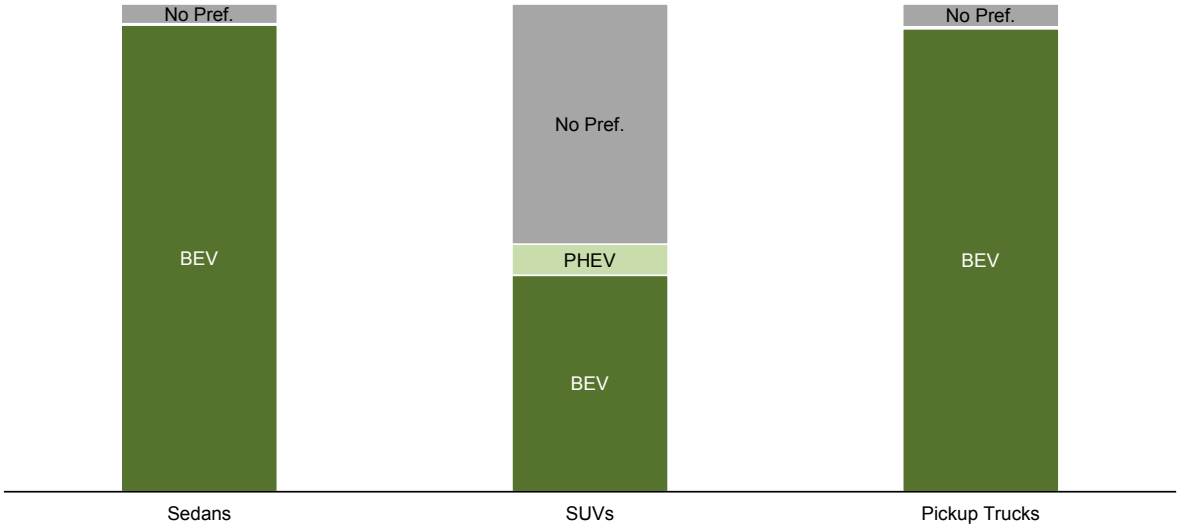


Figure 3. LDV ZEV Preferences by Vehicle Type

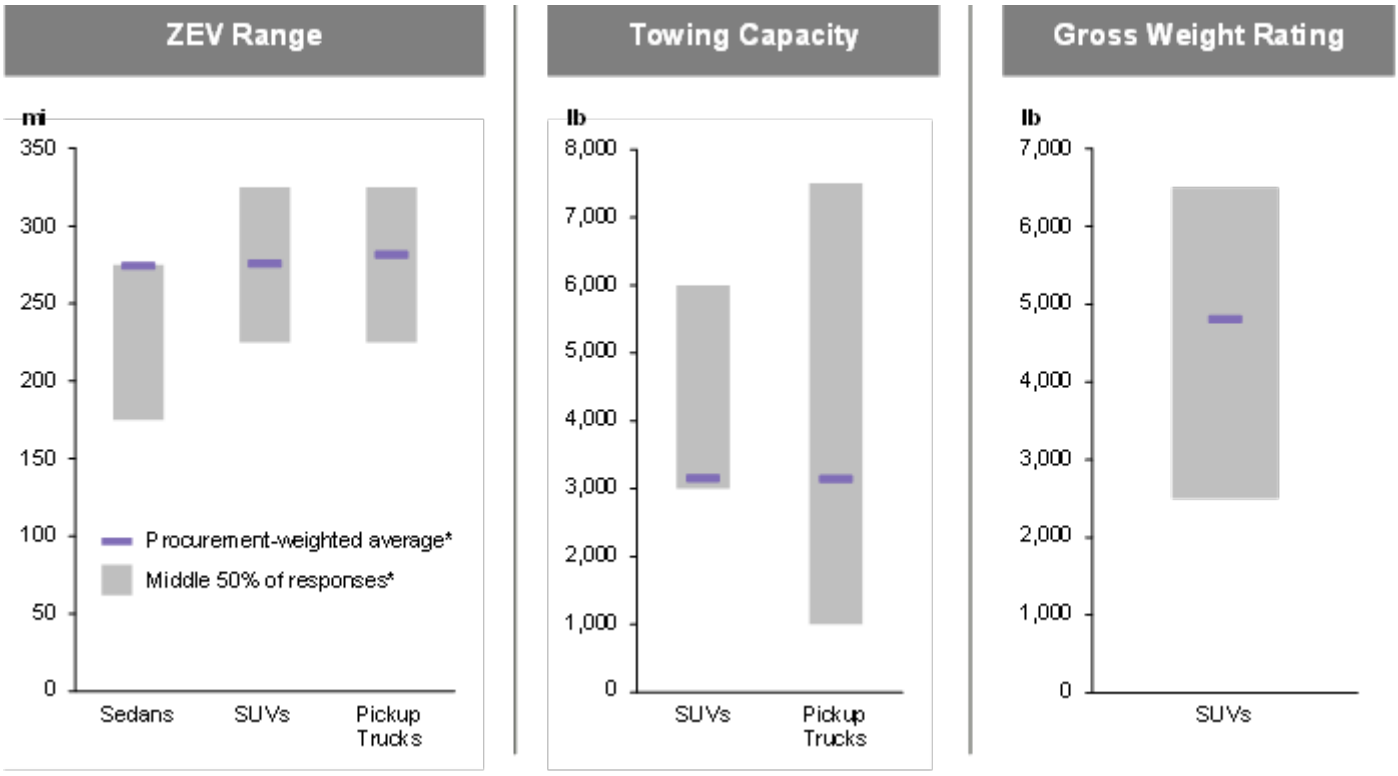
Most respondents stated a preference for battery electric vehicles (BEVs) over plug-in hybrid electric vehicles (PHEV) or fuel cell electric vehicles (FCEV).



Results are weighted by reported planned vehicle procurements

Figure 4. Distribution of Preferred LDV Characteristics

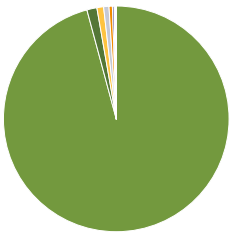
This figure displays both the procurement weighted and count of survey responses regarding LDV range, towing capacity, and gross weight weighting.



*Bar ranges correspond with the *count* of survey responses and are independent of planned vehicle procurements; the procurement-weighted average dash estimates the average range/weight rating given reported planned procurements

Figure 5. Sedans: Planned Procurements

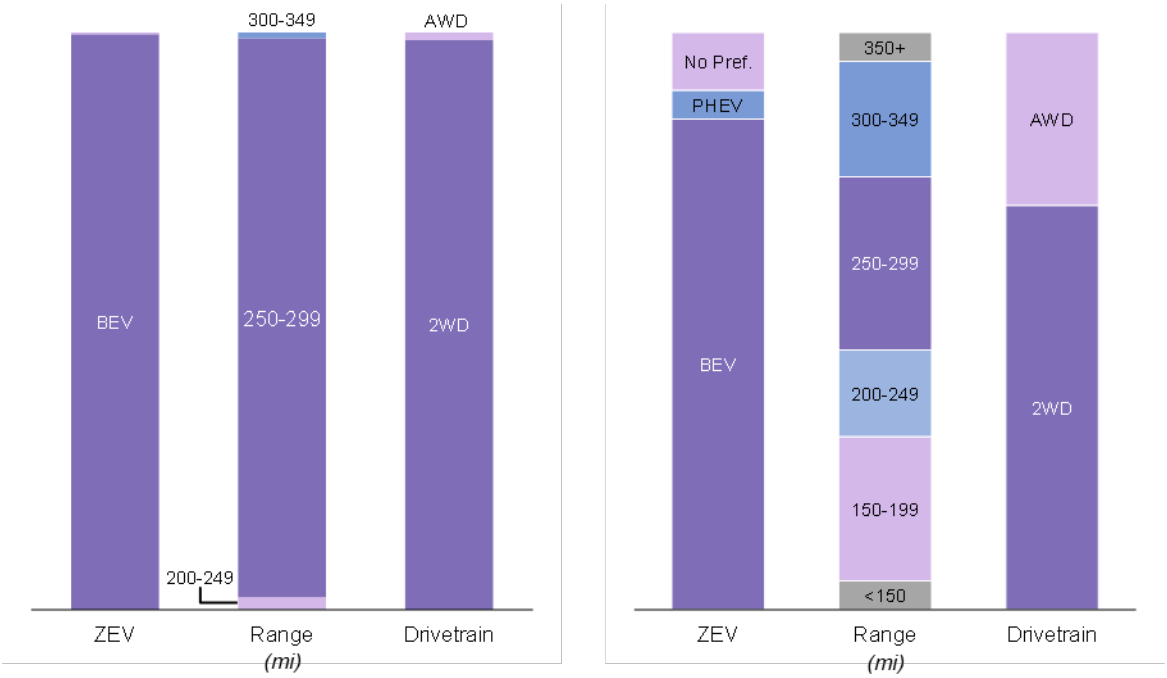
20 different companies noted sedan procurement plans but 96% of the total are attributable to a single "primary" respondent.



Each segment corresponds with respondent share of total vehicles

Figure 6. Sedans: Base Specifications (Procurement-Weighted and Non-Weighted)

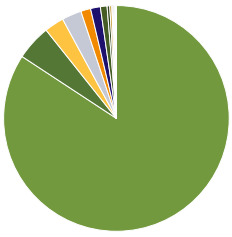
The primary respondent identified a 250-300 mile range BEV with two-wheel drive (2WD) as the preferred configuration. While this vehicle type and drivetrain selection is largely consistently echoed across other respondents, the range needs indicated per respondent were far more variable, with at least one respondent selecting each survey option from less than 150 miles to greater than 350 miles.



Results are weighted by reported planned vehicle procurements

Figure 7. SUVs: Planned Procurements

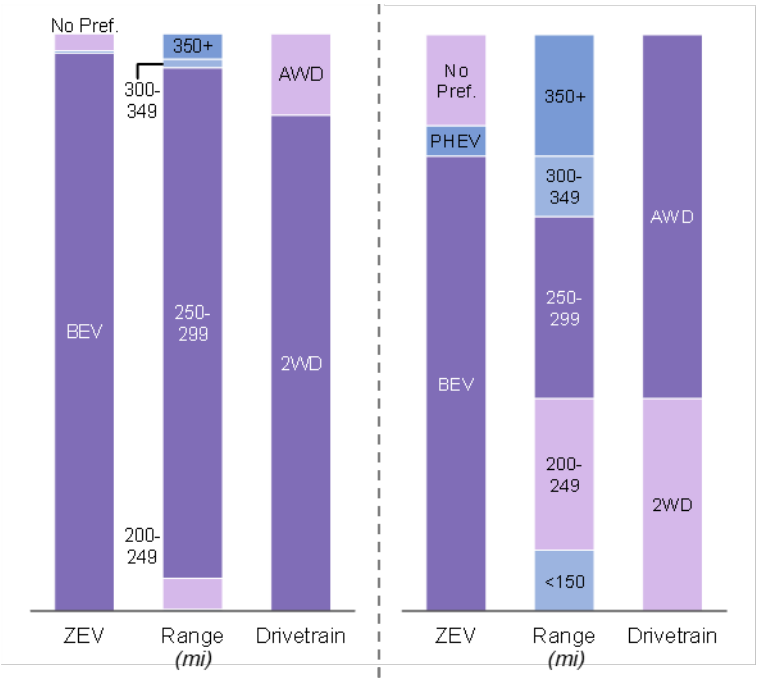
19 Alliance members state procurement plans of more than 35,000 zero emission SUVs. Similar to sedans, procurement was concentrated in one "primary" respondent (84% of planned procurements).



Each segment corresponds with respondent share of total vehicles

Figure 8. SUVs: Base Specifications (Procurement-Weighted and Non-Weighted)

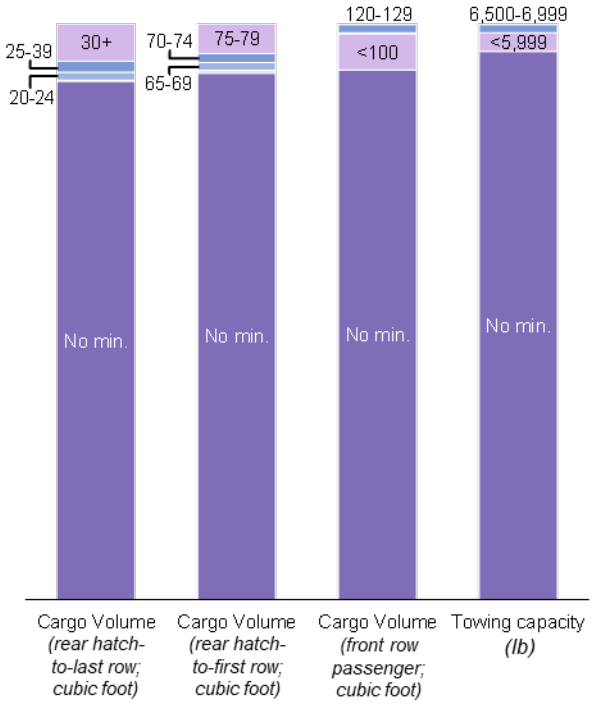
The primary respondent identified a 250-300 mile range BEV with 2WD as the preferred configuration. However, across all responses, a larger number of respondents stated a preference for all-wheel drive (AWD) configurations. In addition, quite a few respondents highlighted both lower (200-250) or higher (more than 350 mile) ranges as preferred options.



Left: results are weighted by reported planned vehicle procurements; Right: results are share of respondents

Figure 9. SUVs: Physical Considerations

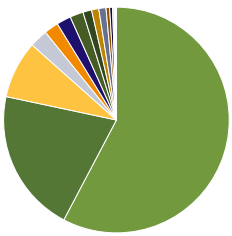
Nearly half of all respondents flagged a need for significant cargo volume between the rear hatch to last row (i.e., 25 cubic feet or greater) and rear hatch to first row (i.e., 70 cubic feet or greater). 58% of respondents, including the primary respondent, had no minimum towing capacity requirements.



Results are weighted by reported planned vehicle procurements

Figure 10. Pickup Trucks: Planned Procurements

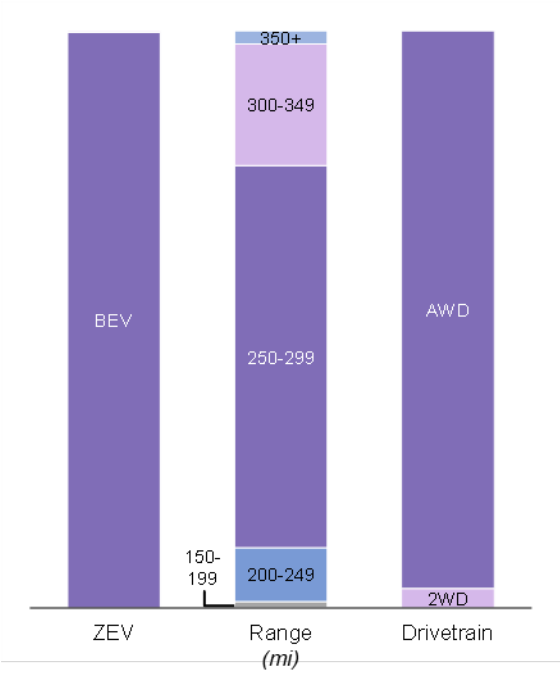
18 Alliance members stated plans to procure more than 24,000 zero emission pickup trucks in the next five years.



Each segment corresponds with respondent share of total vehicles

Figure 11. Pickup Trucks: Base Specifications

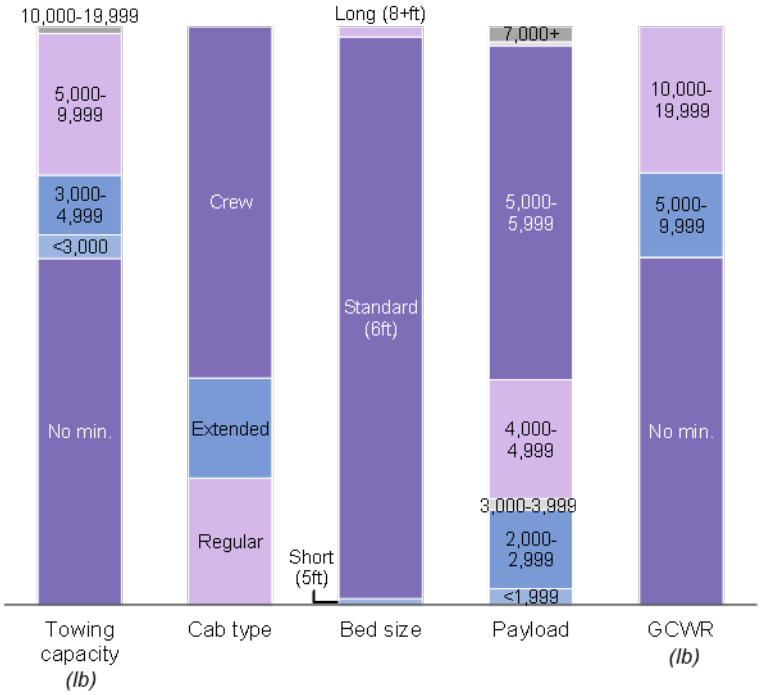
Base specifications were consistent, with nearly all respondents preferring a BEV with AWD and a range between 250 and 350 miles



Results are weighted by reported planned vehicle procurements

Figure 12. Pickup Trucks: Physical Considerations

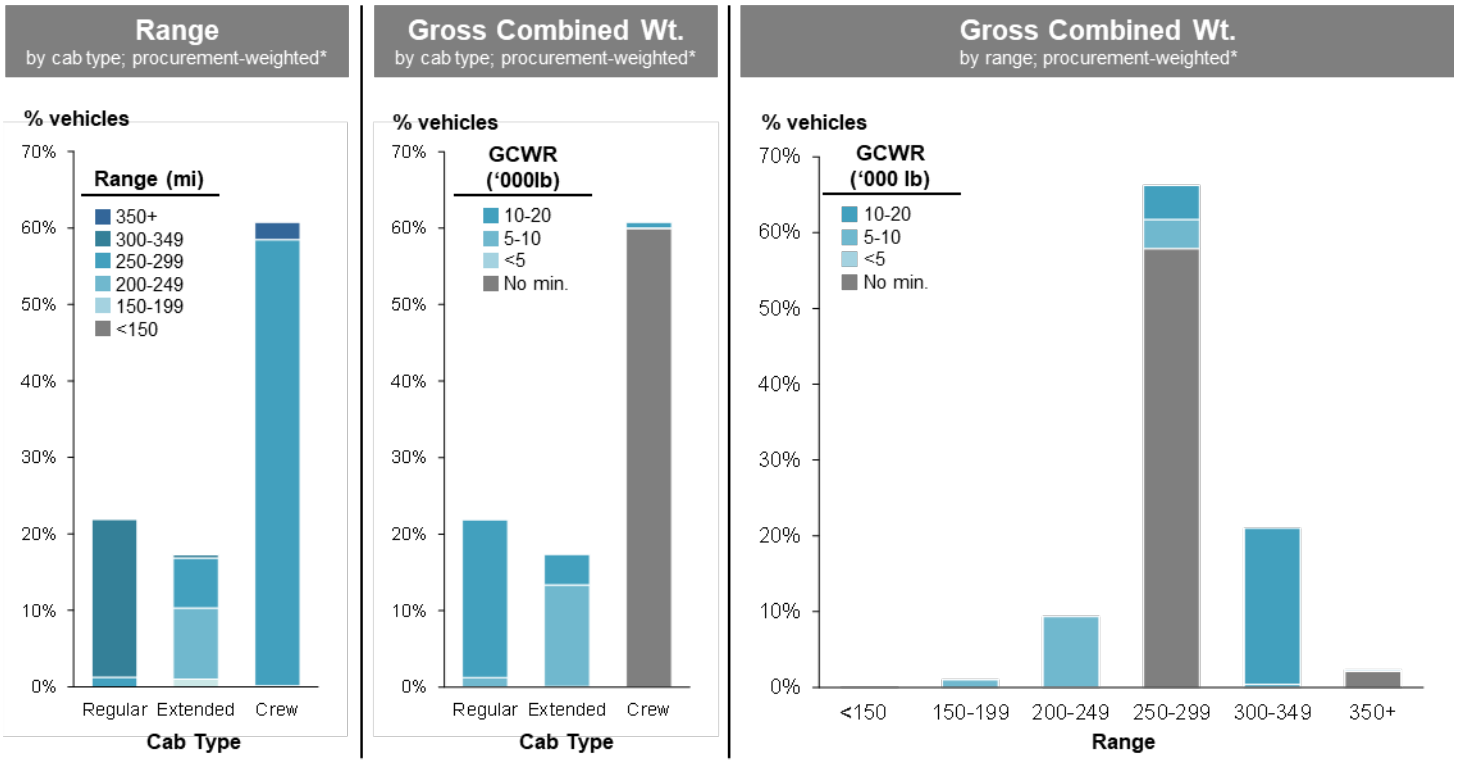
Most planned procurement would be met by a standard six-foot bed, but many of the other physical considerations reflected a wider array of configurations.



Results are weighted by reported planned vehicle procurements

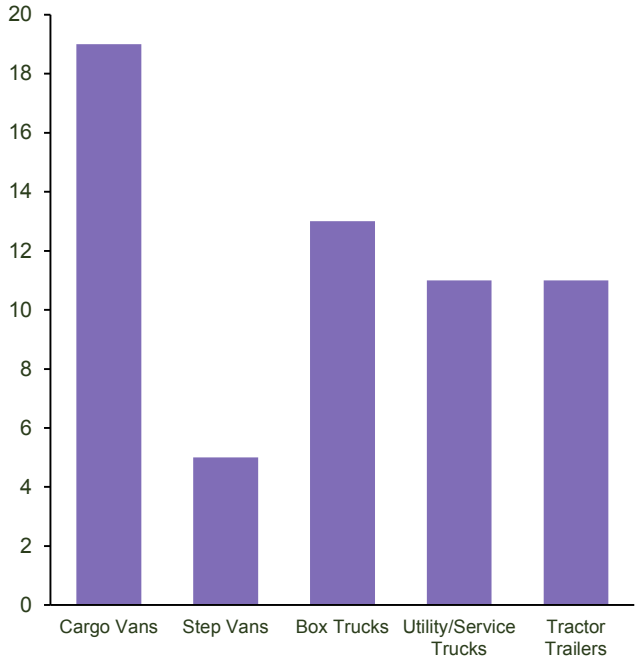
Figure 13. Pickup Trucks: Additional Analysis

This Figure shows GCWR requirements by cab type preference as well as towing capacity.



Results are weighted by reported planned vehicle procurements

Figure 14. Medium- / Heavy-Duty Vehicle (MHDV) Number of Respondents by Vehicle Type



In total, 19 Alliance members plan to procure zero emission MHDVs, with cargo vans the most common planned procurement (19 members) and step vans the least (5 members).

Figure 15. MHDV Planned Procurements by Vehicle Type

Total five-year procurement plans include more than 60,000 zero emission MHDVs, mostly cargo vans.

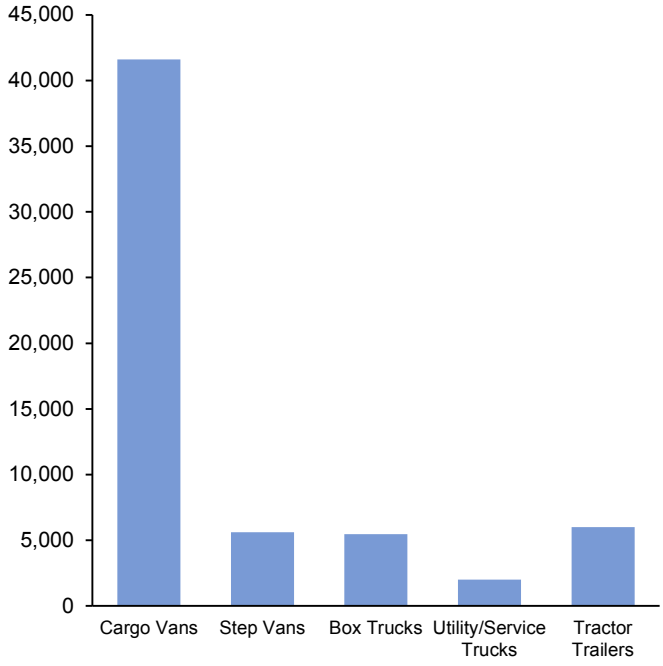
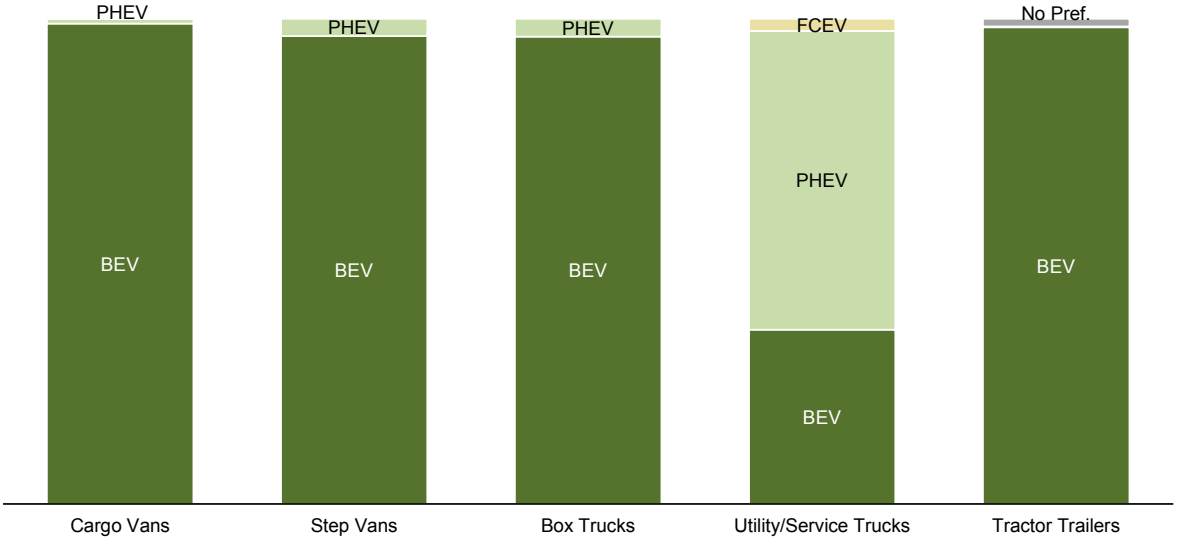


Figure 16. MHDV ZEV Preferences by Vehicle Type

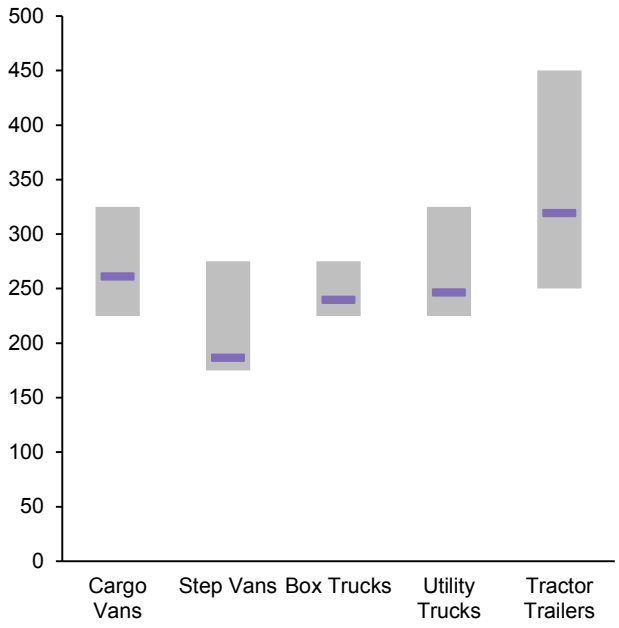
Most respondents stated a preference for BEVs over PHEVs or FCEVs, though respondents stated that the majority of utility/service truck procurements would be best served by PHEVs, namely for emergency response situations.



Results are weighted by reported planned vehicle procurements

Figure 17. MHDV ZEV Range (miles)

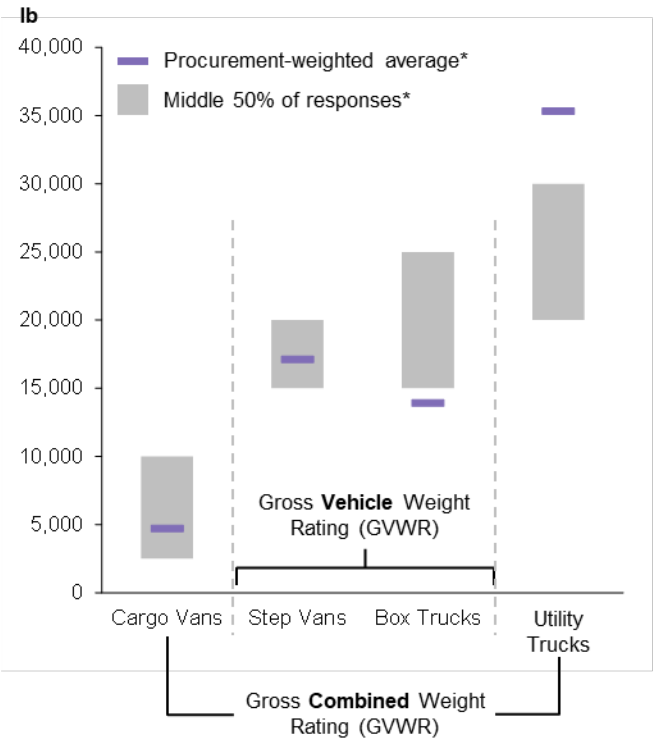
This figure displays both the procurement weighted and count of survey responses regarding MHDV range.



*Bar ranges correspond with the *count* of survey responses and are independent of planned vehicle procurements; the procurement-weighted average dash estimates the average range/weight rating given reported planned procurements

Figure 18. MHDV Gross Weight Rating (pounds)

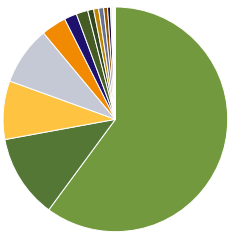
This figure displays both the procurement weighted and count of survey responses regarding MHDV gross weight weighting.



*Bar ranges correspond with the *count* of survey responses and are independent of planned vehicle procurements; the procurement-weighted average dash estimates the average range/weight rating given reported planned procurements

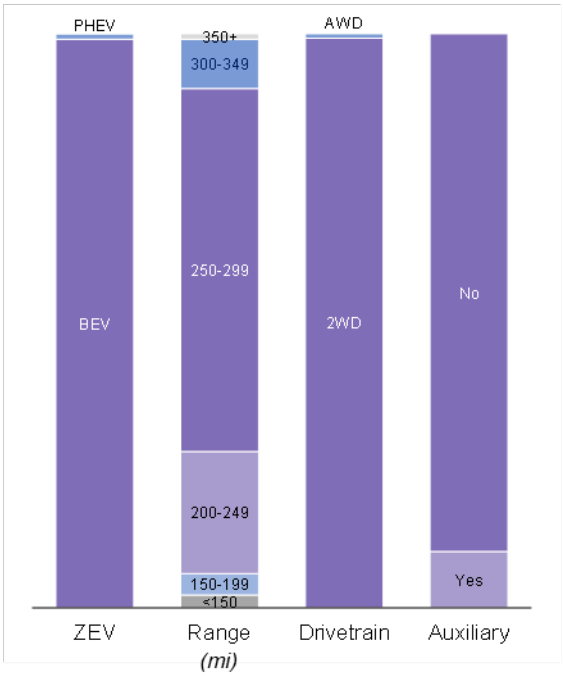
Figure 19. Cargo Vans: Planned Procurements

20 respondents collectively indicated a need for nearly 42,000 zero emission cargo vans (though one respondent accounted for 60% of planned procurements).



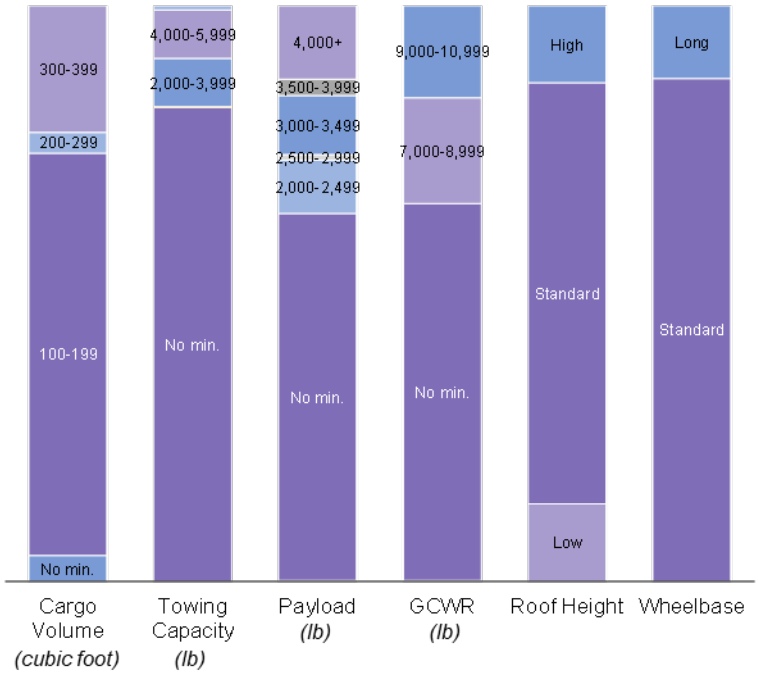
Each segment corresponds with respondent share of total vehicles

Figure 20. Cargo Vans: Base Specifications



Results are weighted by reported planned vehicle procurements

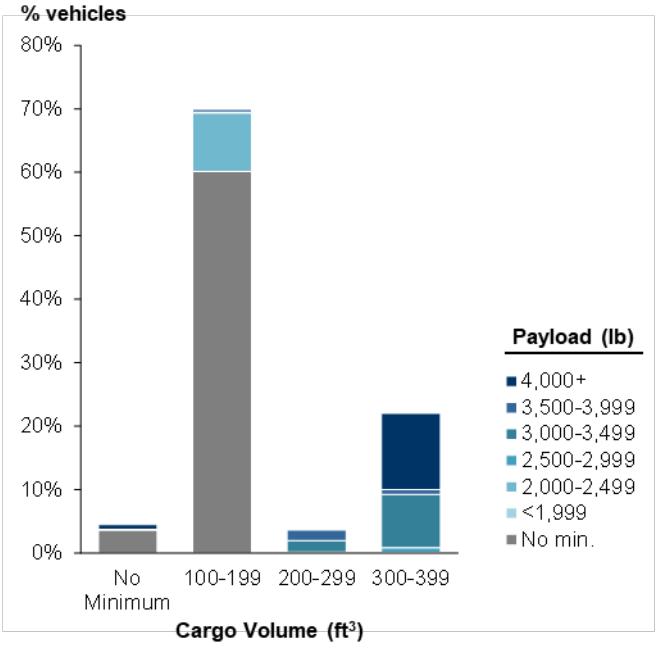
Figure 21. Cargo Vans: Physical Considerations



Results are weighted by reported planned vehicle procurements

Figure 22. Cargo Vans: Payload Requirements by Cargo Volume

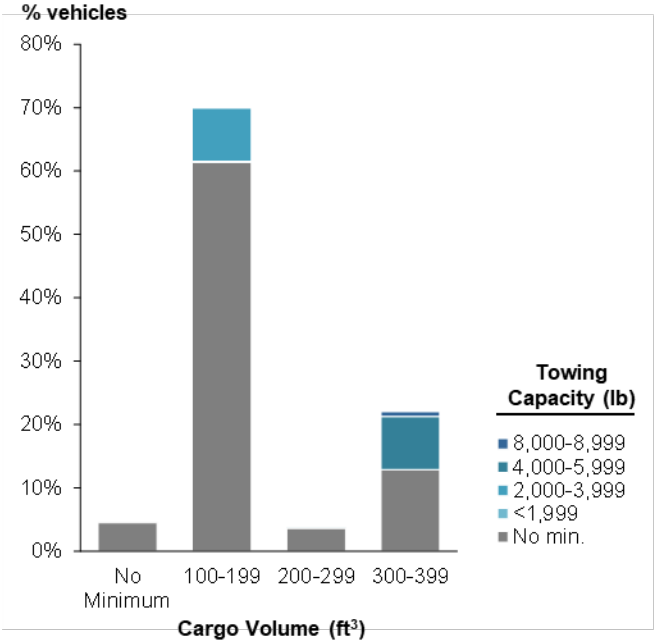
In general, higher cargo volume requirements were also paired with higher payload requirements as well as, in some cases, higher towing capacity requirements.



Results are weighted by reported planned vehicle procurements

Figure 23. Cargo Vans: Towing Capacity by Cargo Volume

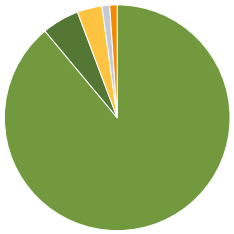
In general, higher cargo volume requirements were also paired with higher payload requirements as well as, in some cases, higher towing capacity requirements.



Results are weighted by reported planned vehicle procurements

Figure 24: Step Vans: Planned Procurements

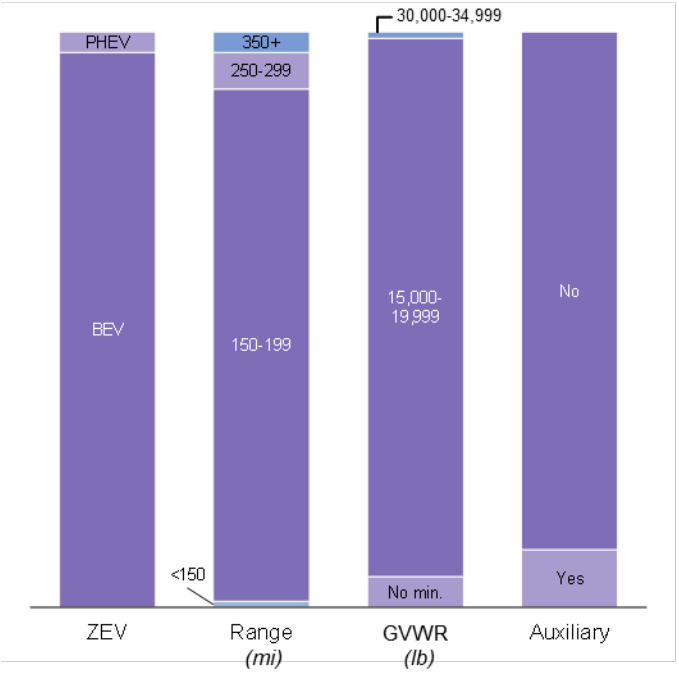
Only five Alliance members stated short-term step van procurement plans, the smallest number of any MHDV vehicle type.



Each segment corresponds with respondent share of total vehicles

Figure 25. Step Vans: Base Specifications

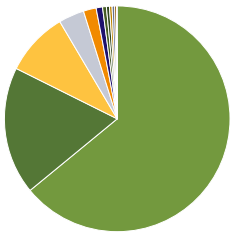
Procurement-weighted results are very consistent, with a mid-range (150-199 miles), mid-gross vehicle weight rating BEV being the most common combination of specifications.



Results are weighted by reported planned vehicle procurements

Figure 26. Box Trucks: Planned Procurements

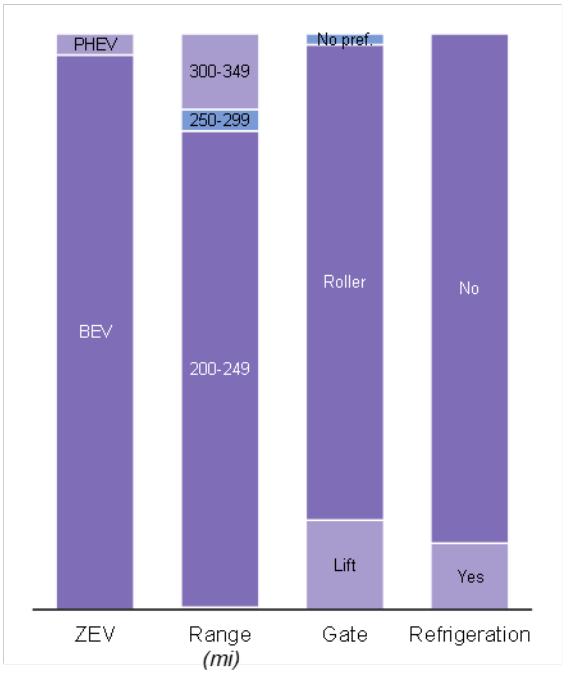
13 Alliance members collectively indicated a need for over 5,000 zero emission box trucks; demand is less concentrated in this category than it is for other MHDV types.



Each segment corresponds with respondent share of total vehicles

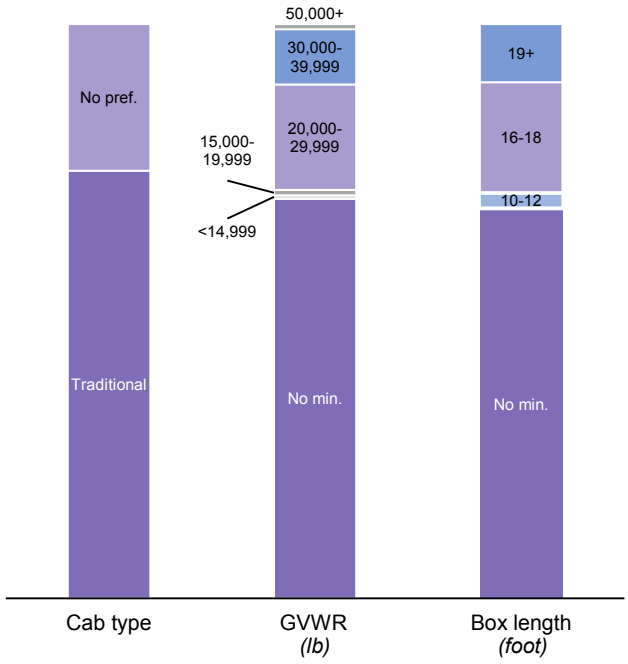
Figure 27. Box Trucks: Base Specifications

A BEV configuration with a 200-250 mile range and a roller gate without refrigeration is the most common response and accounts for 4,500 planned vehicle procurements.



Results are weighted by reported planned vehicle procurements

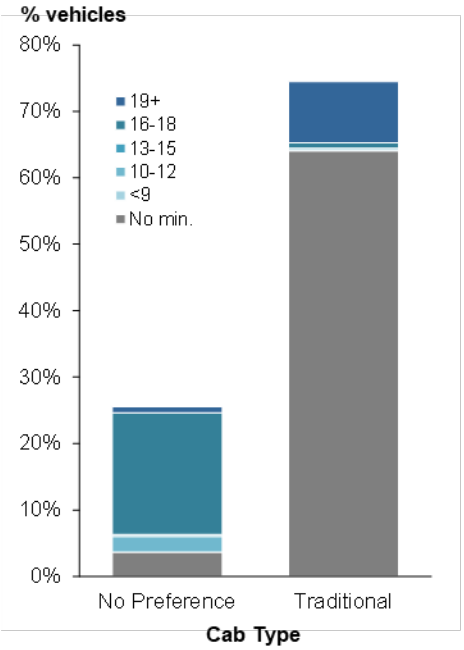
Figure 28. Box Trucks: Physical Considerations



Results are weighted by reported planned vehicle procurements

Figure 29. Box Trucks: Box Length by Cab Type

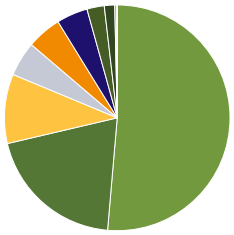
The majority of planned procurement of traditional cab types are paired with no minimum necessary box length, while most of those respondents who have no preference on cab type do have a preference on cab length.



Results are weighted by reported planned vehicle procurements

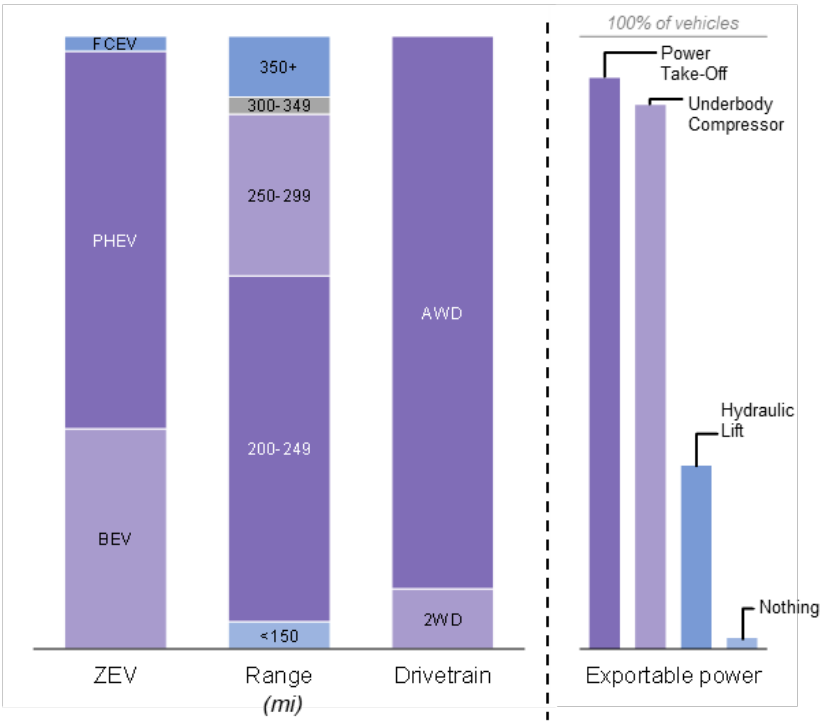
Figure 30. Utility/Service Trucks: Planned Procurements

11 Alliance members plan to procure around 2,000 zero emission utility/service trucks in the next five years. These anticipated procurements are the least concentrated of all MHDV types.



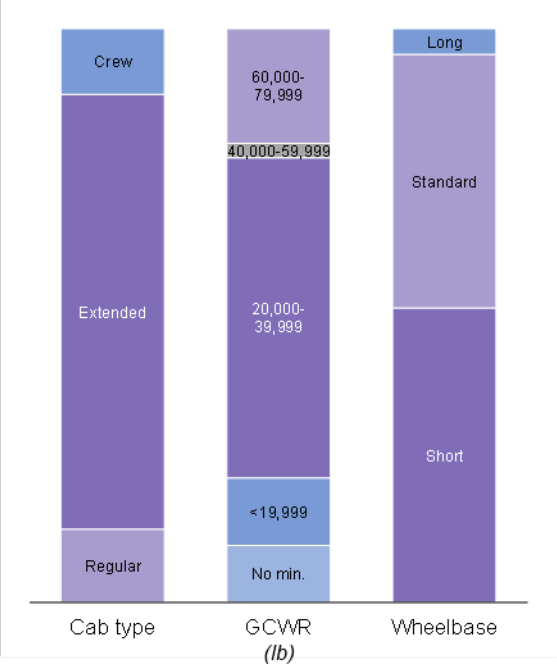
Each segment corresponds with respondent share of total vehicles

Figure 31. Utility/Service Trucks: Base Specifications



Results are weighted by reported planned vehicle procurements

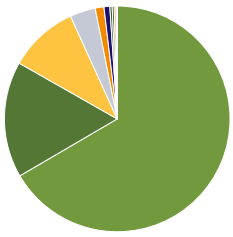
Figure 32. Utility/Service Trucks: Physical Considerations



Results are weighted by reported planned vehicle procurements

Figure 33. Tractor Trailers: Planned Procurements

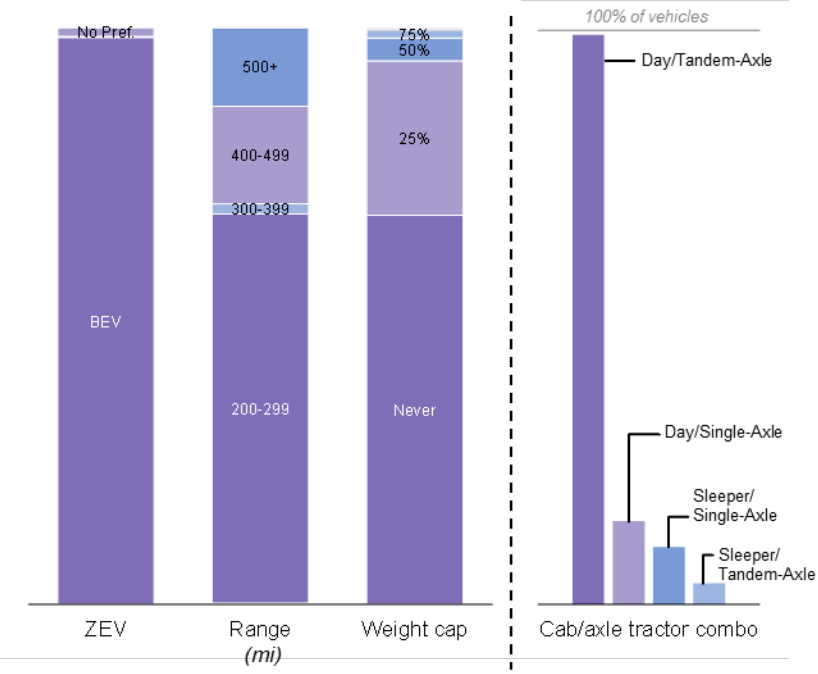
11 respondents plan to procure over 6,000 tractor trailers in the next five years.



Each segment corresponds with respondent share of total vehicles

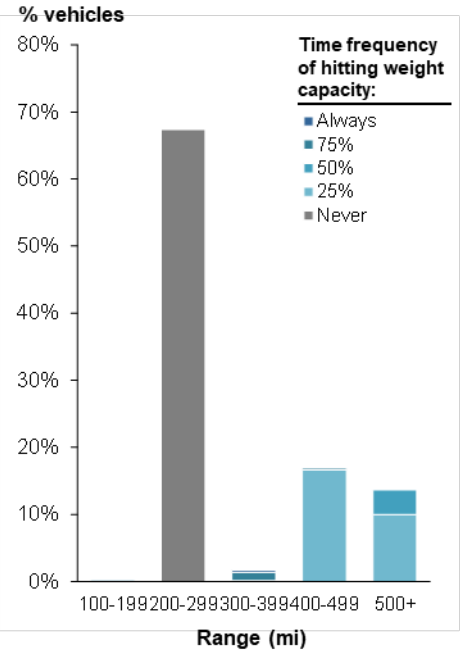
Figure 34. Tractor Trailers: Base Specifications

Very few use case needs would be met by a 300–400 mile range vehicle. Instead, most respondents require shorter (less than 300 mile) or longer (more than 400 mile or even 500 mile) ranges. Nearly all planned procurements would require a day/tandem-axle configuration.



Results are weighted by reported planned vehicle procurements

Figure 35. Tractor Trailers: Weight Capacity, by ZEV Range

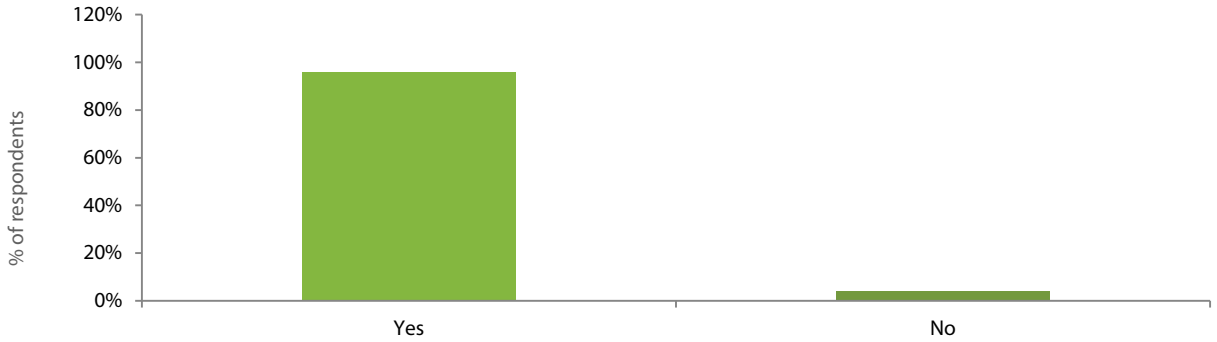


Ceres
Sustainability is the bottom line.

Appendix B: Survey Aggregate Results

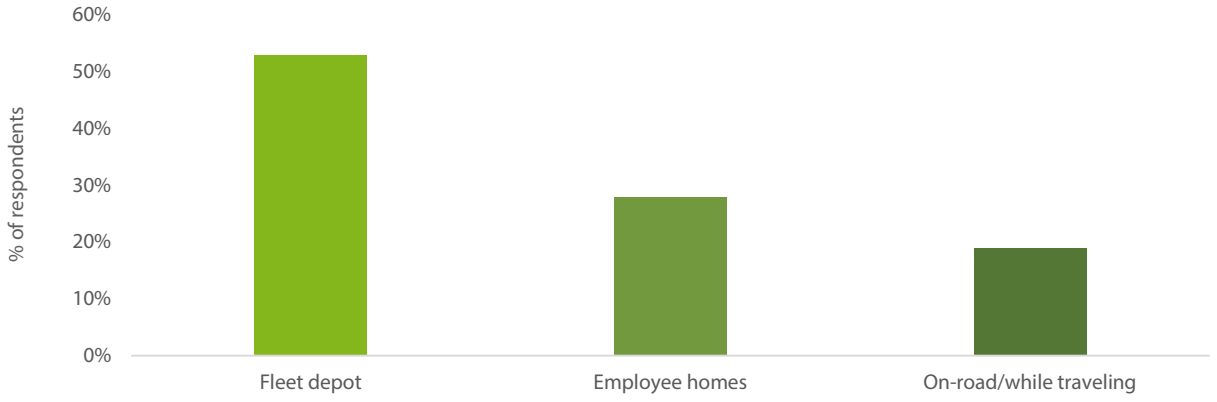
A. General

A2. Would your company be willing to switch vehicle brands in order to procure a desired zero emission vehicle (ZEV) configuration?

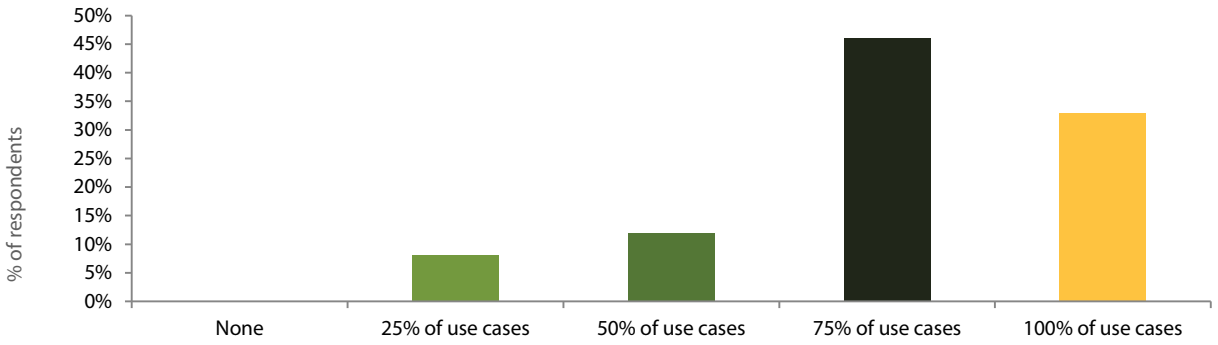


B. Charging Behavior

B1. Approximately what percentage of your company's total vehicle charging (or hydrogen fueling) would likely be done at each of the following locations between calendar years 2022 - 2026?

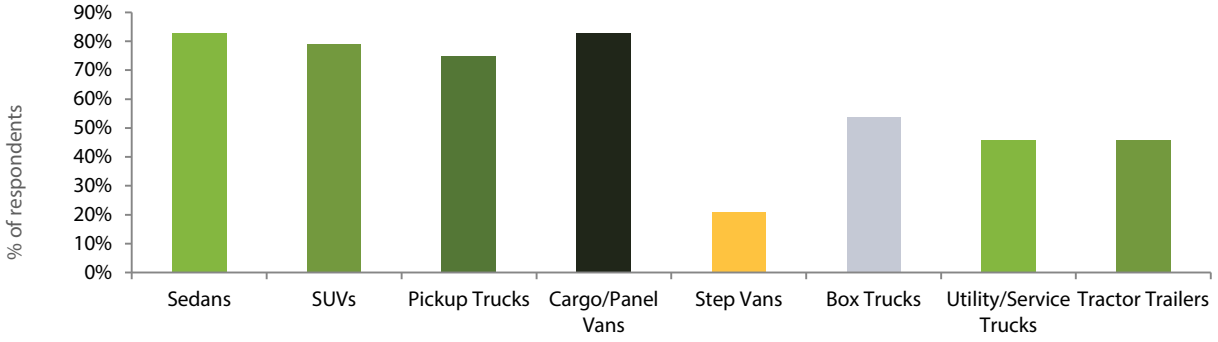


B2. Approximately what percentage of your company's vehicle use cases would likely allow overnight (or 8-10 hours of) charging?



C. Vehicle Segments in Use

C1. Which of the following vehicle segments does your company (or drivers on your platform) operate? Include all vehicle categories owned, leased, or contracted through a 2nd party logistics provider. (select ALL that apply)



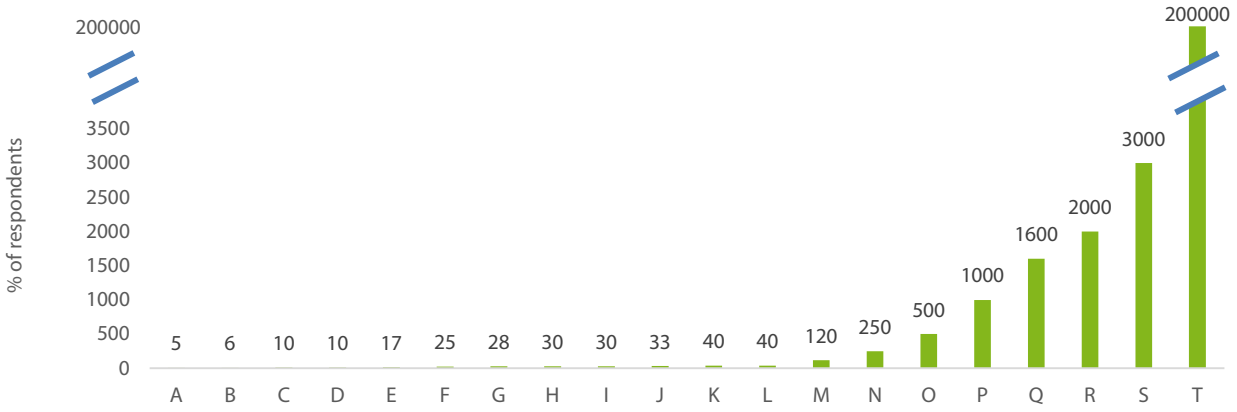
Ceres
Sustainability is the bottom line.

D. Sedans

D1. Procurement Plans

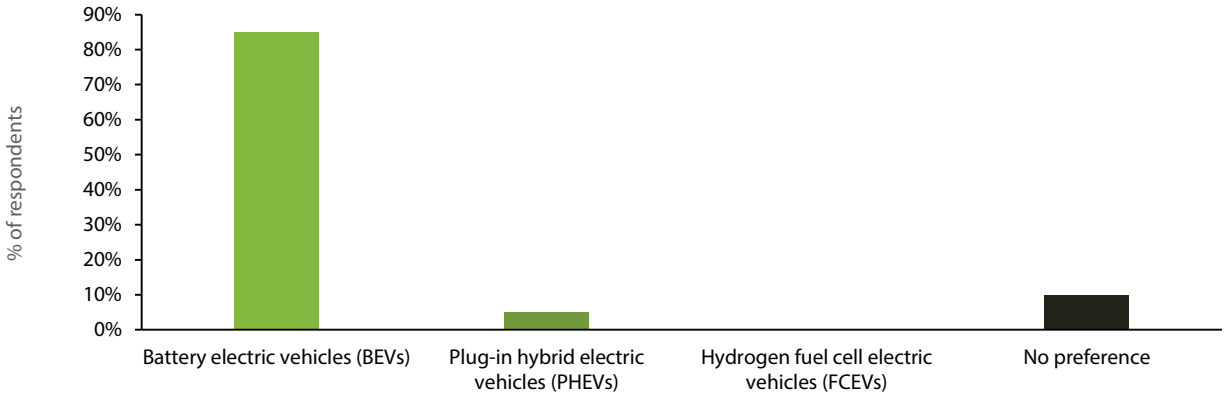
Assuming new ZEV models meet most of your company's performance and cost requirements, how many zero emission sedans would your company likely procure between calendar years 2022 - 2026? Please include all vehicles you would purchase, lease directly or through a fleet management company, or contract through a 2nd party logistics provider (exclude 3PL supply chain management).

(Y-Axis = number of vehicles. Responses are anonymized and sorted by magnitude; letters are not matched to specific respondents or kept consistent across procurement questions.)



D2. Zero Emission Vehicle (ZEV) Preference

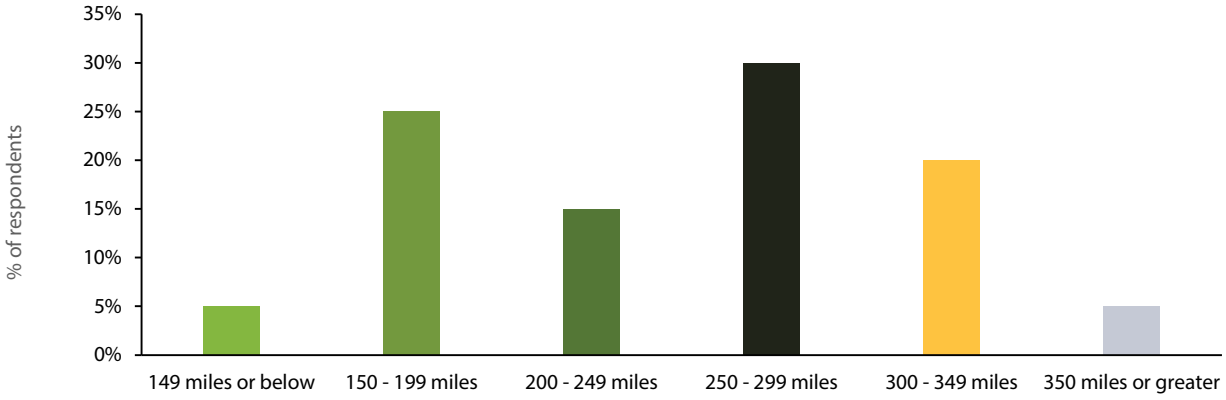
Which of the following ZEV categories would your company most likely procure for sedans between calendar years 2022 - 2026? (select one)



Ceres
Sustainability is the bottom line.

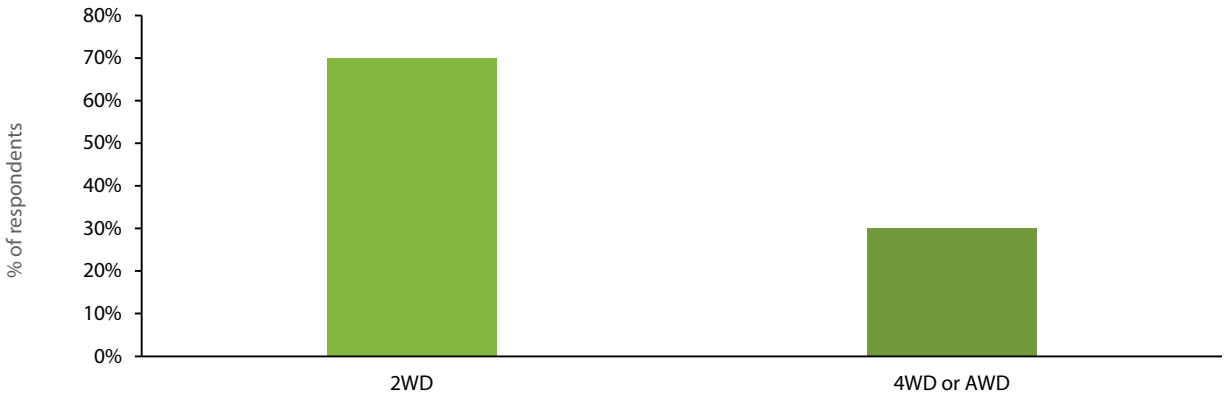
D3. Range

Which minimum electric range would meet the needs of the majority of your sedan use cases in average climate conditions? (select one)



D4. Drivetrain

Which drivetrain would meet the needs of the majority of your sedan use cases? (select one)



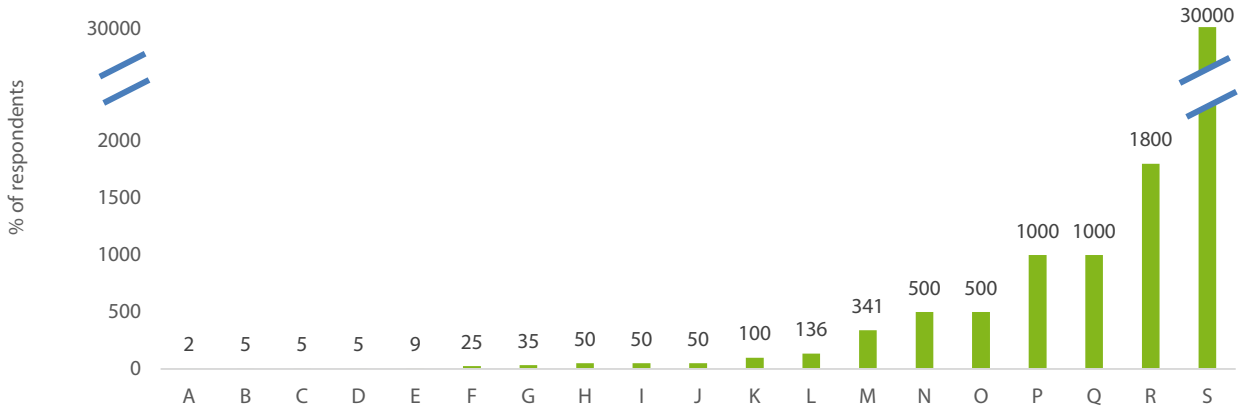
Ceres
Sustainability is the bottom line.

E. SUVs

E1. Procurement Plans

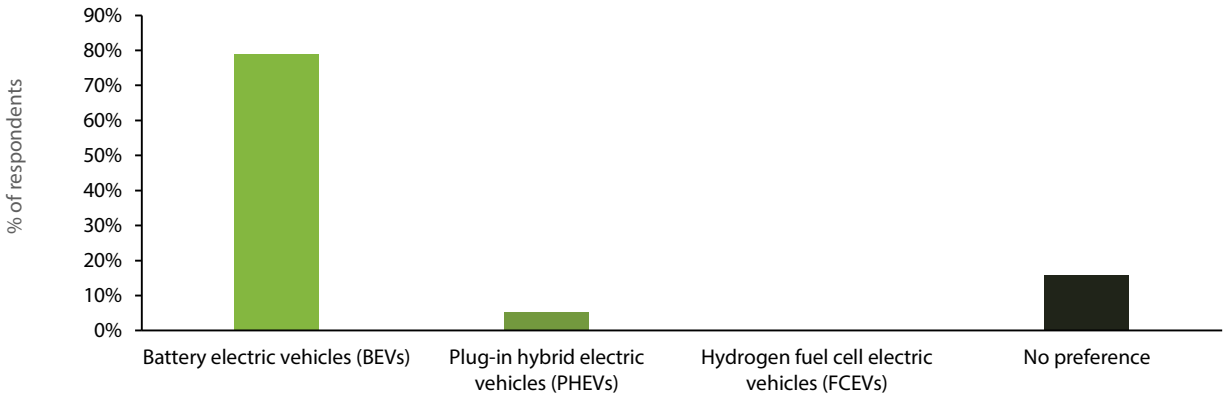
Assuming new ZEV models meet most of your company's performance and cost requirements, how many zero emission SUVs would your company likely procure between calendar years 2022 - 2026? Please include all vehicles you would purchase, lease directly or through a fleet management company, or contract through a 2nd party logistics provider (exclude 3PL supply chain management).

(Y-Axis = number of vehicles. Responses are anonymized and sorted by magnitude; letters are not matched to specific respondents or kept consistent across procurement questions.)



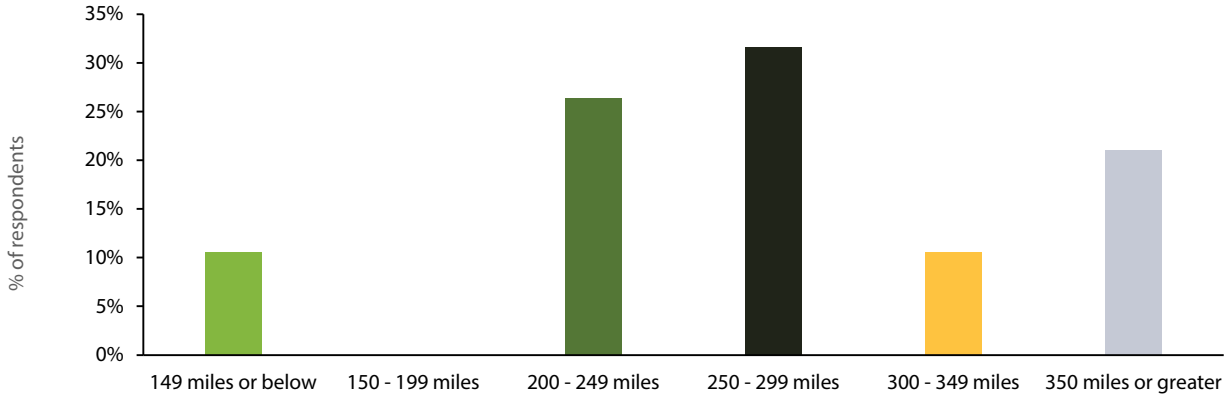
E2. Zero Emission Vehicle (ZEV) Preference

Which of the following ZEV categories would your company most likely procure for SUVs between calendar years 2022 - 2026? (select one)



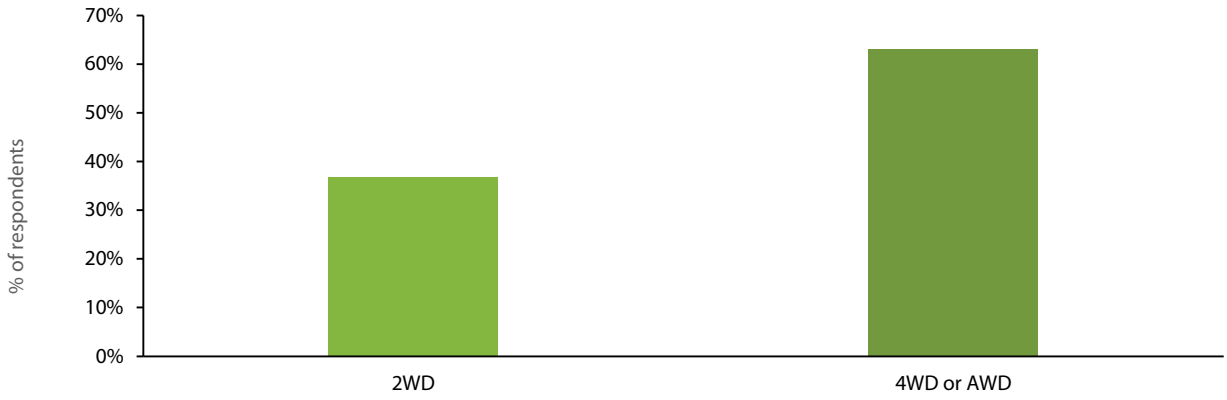
E3. Range

Which minimum electric range would meet the needs of the majority of your SUV use cases in average climate conditions? (select one)

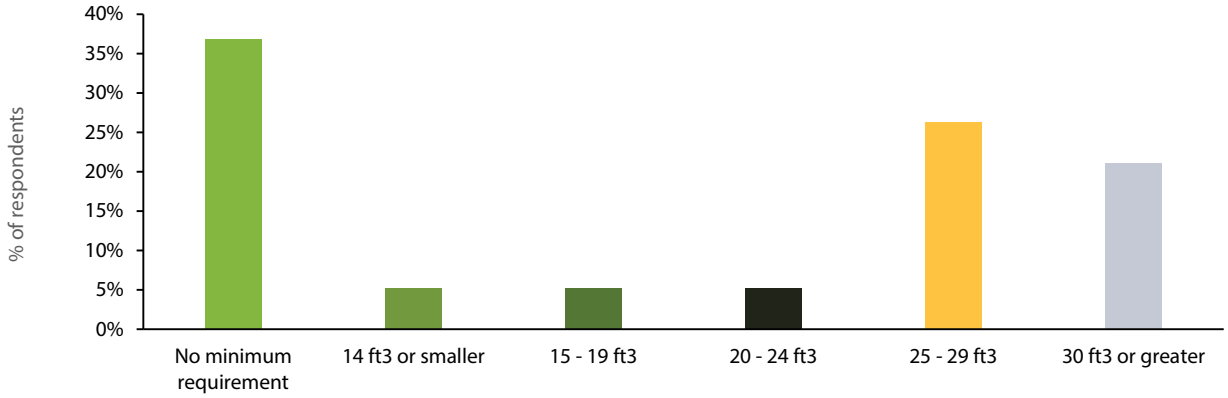


E4. Drivetrain

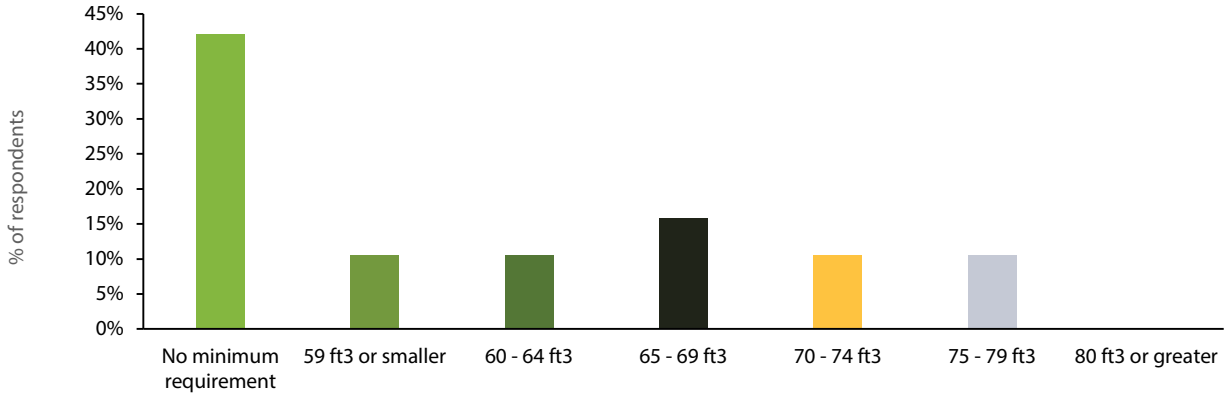
Which drivetrain would meet the needs of the majority of your SUV use cases? (select one)



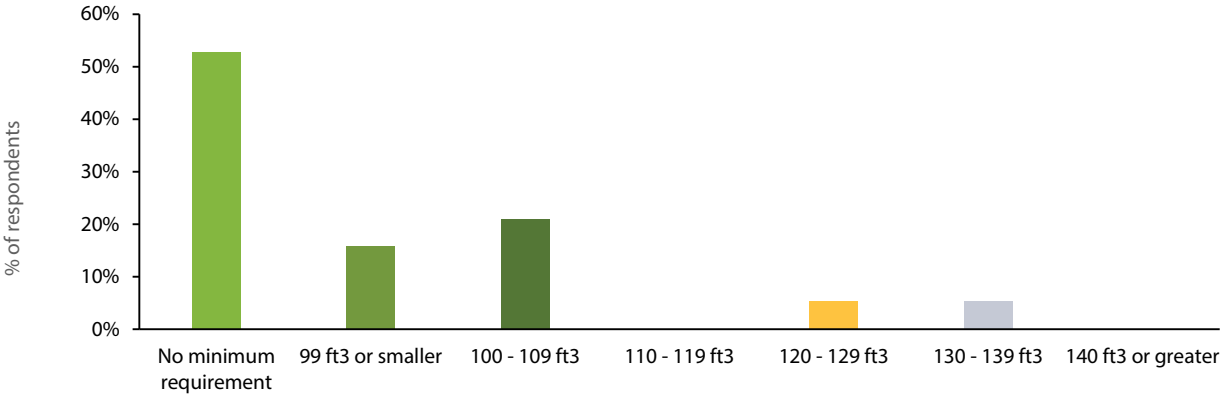
E5. Cargo Volume (Part 1)
Which minimum rear hatch-to-last row cubic volume would meet the majority of your SUV use case needs? (select one)



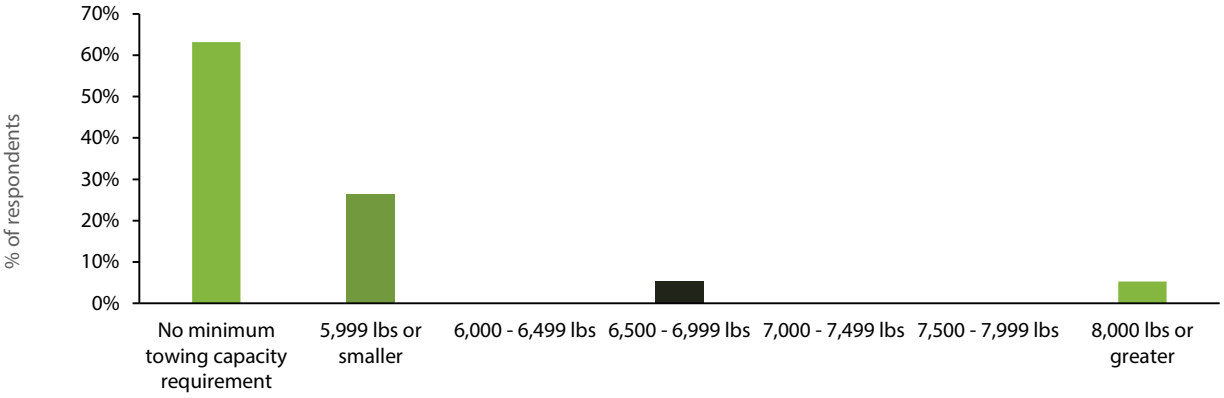
E6. Cargo Volume (Part 2)
Which minimum rear hatch-to-first row of seats cubic volume would meet the majority of your SUV use case needs? (select one)



E7. Cargo Volume (Part 3)
Which minimum front row passenger cubic volume would meet the majority of your SUV use case needs? (select one)



E8. Towing Capacity
Which minimum towing capacity range would meet the needs of the majority of your SUV use cases? (select one)



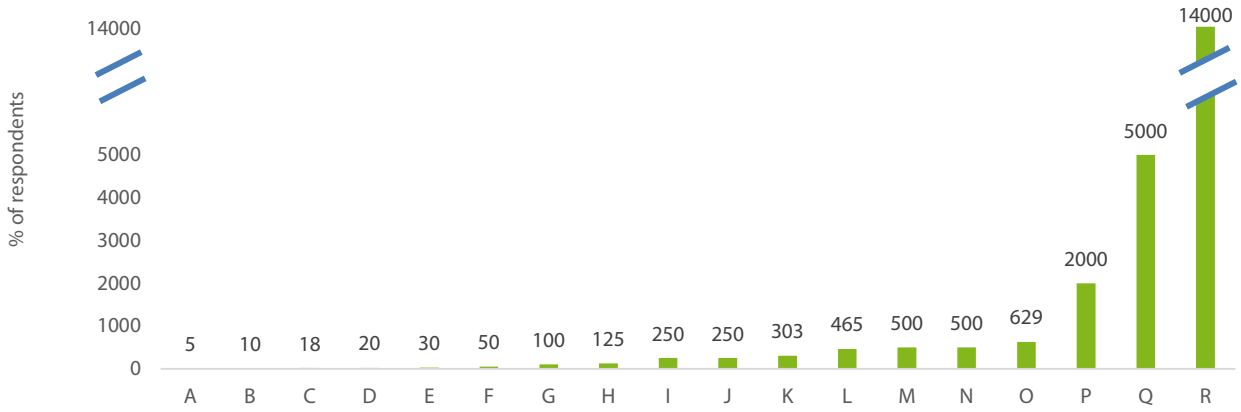
Ceres
Sustainability is the bottom line.

F. Pickup Trucks

F1. Procurement Plans

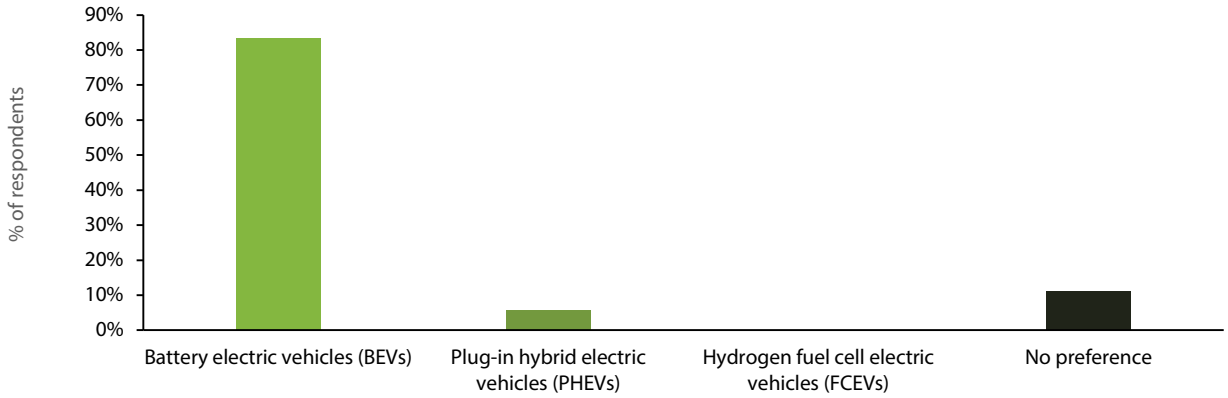
Assuming new ZEV models meet most of your company's performance and cost requirements, how many zero emission pickup trucks would your company likely procure between calendar years 2022 - 2026? Please include all vehicles you would purchase, lease directly or through a fleet management company, or contract through a 2nd party logistics provider (exclude 3PL supply chain management).

(Y-Axis = number of vehicles. Responses are anonymized and sorted by magnitude; letters are not matched to specific respondents or kept consistent across procurement questions.)



F2. Zero Emission Vehicle (ZEV) Preference

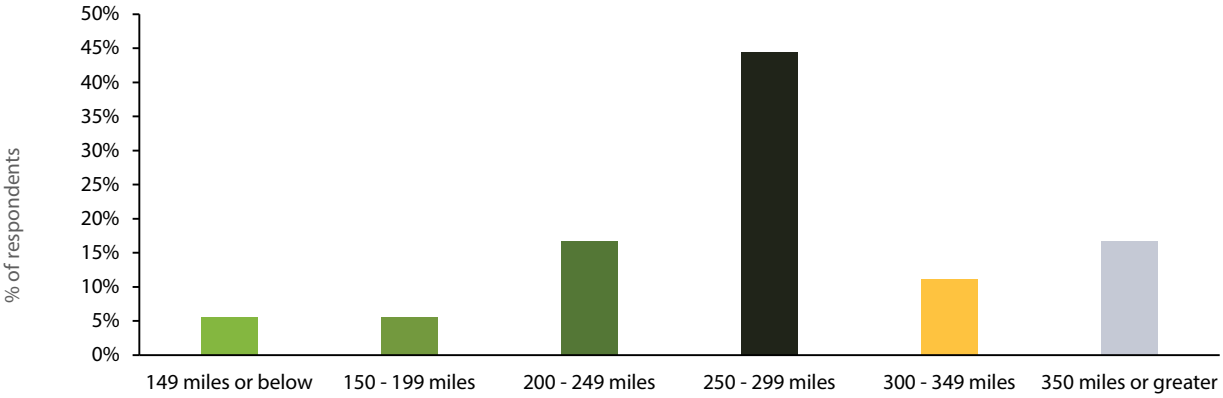
Which of the following ZEV categories would your company most likely procure for pickup trucks between calendar years 2022 - 2026? (select one)



Ceres
Sustainability is the bottom line.

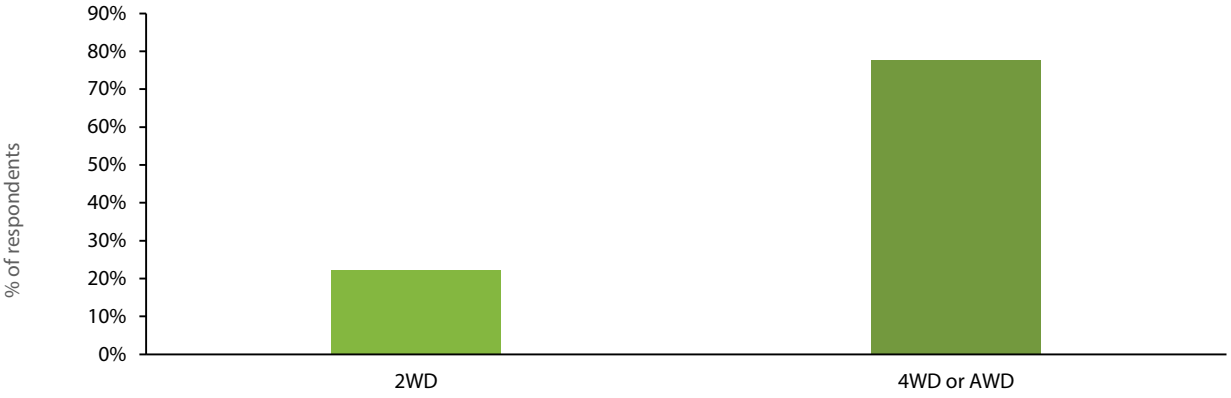
F3. Range

Which minimum electric range would meet the needs of the majority of your pickup truck use cases in average climate conditions? (select one)



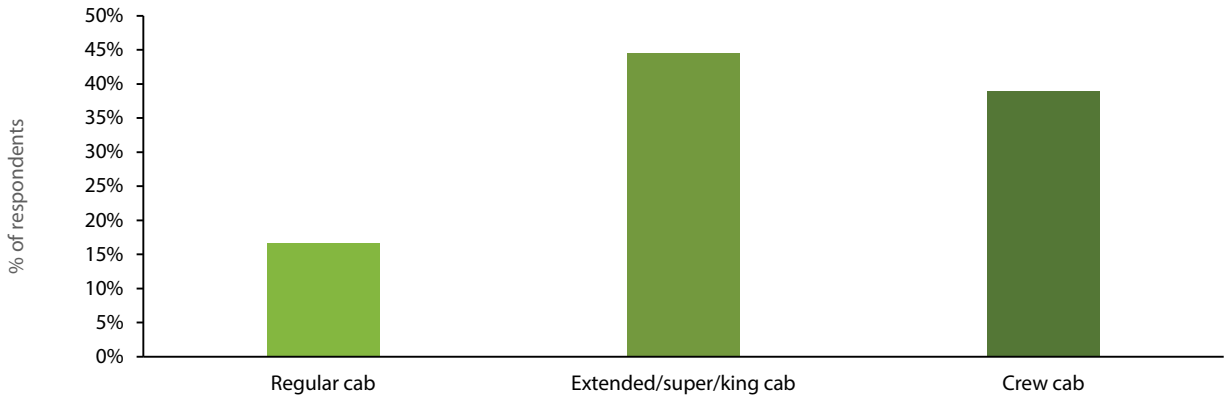
F4. Drivetrain

Which drivetrain would meet the needs of the majority of your pickup truck use cases? (select one)



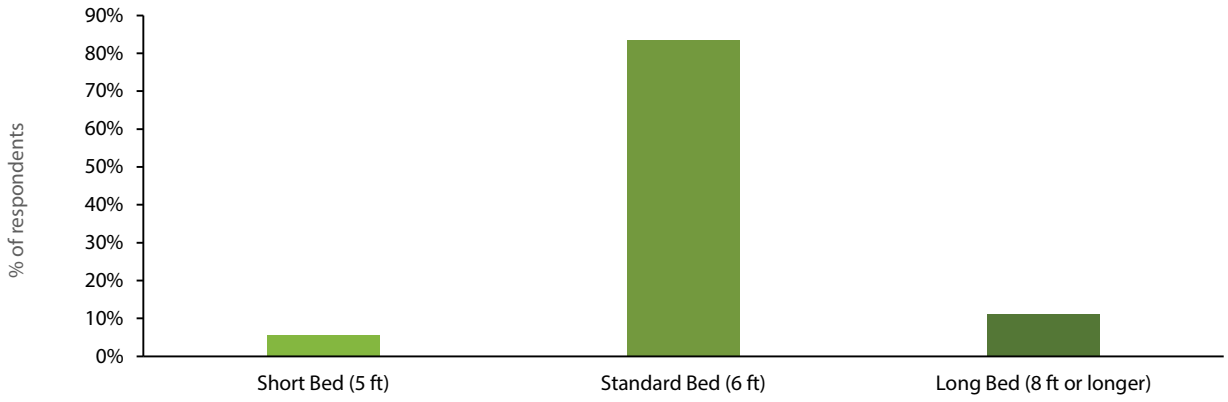
F5. Cab Type

Which cab options would meet the needs of the majority of your pickup truck use cases? (select one)



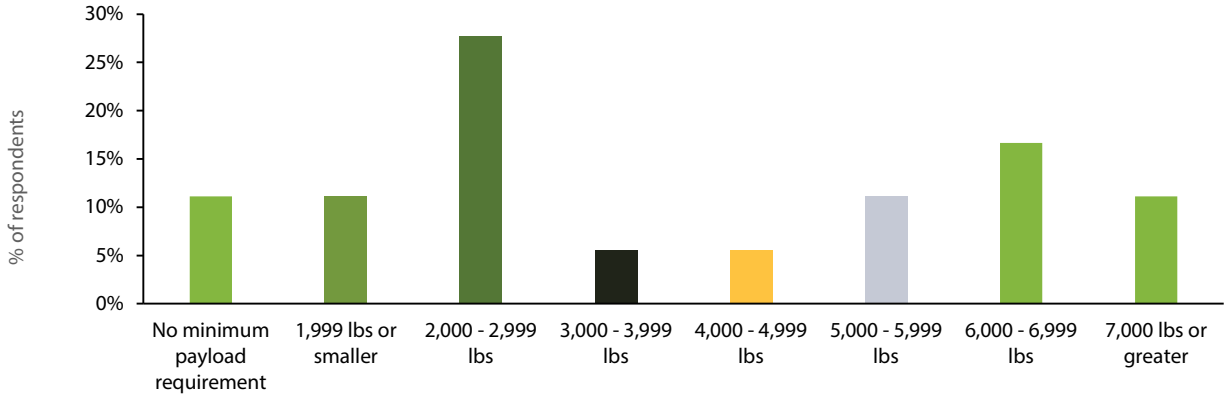
F6. Bed Size

Which minimum bed length would meet the needs of the majority of your pickup truck use cases? (select one)



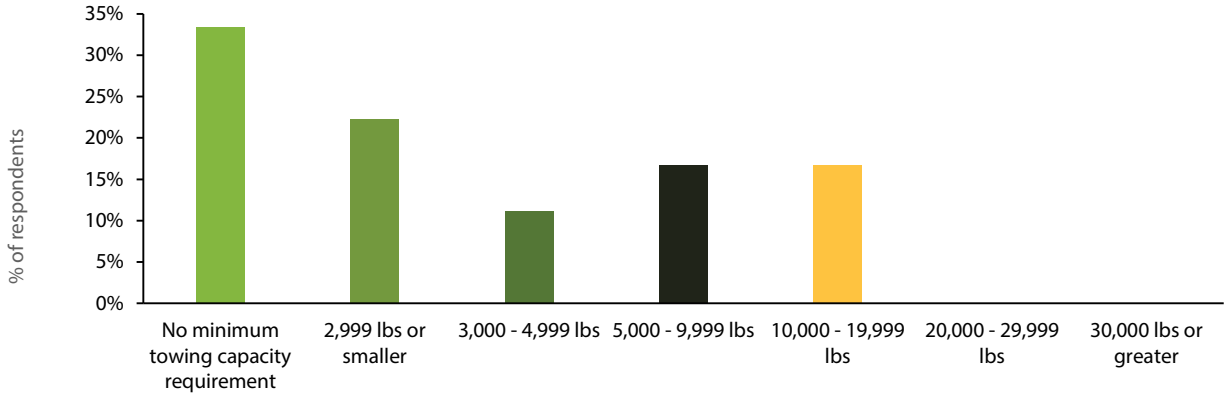
F7. Payload

Which minimum payload capacity would meet the needs of the majority of your pickup truck use cases? (select one)

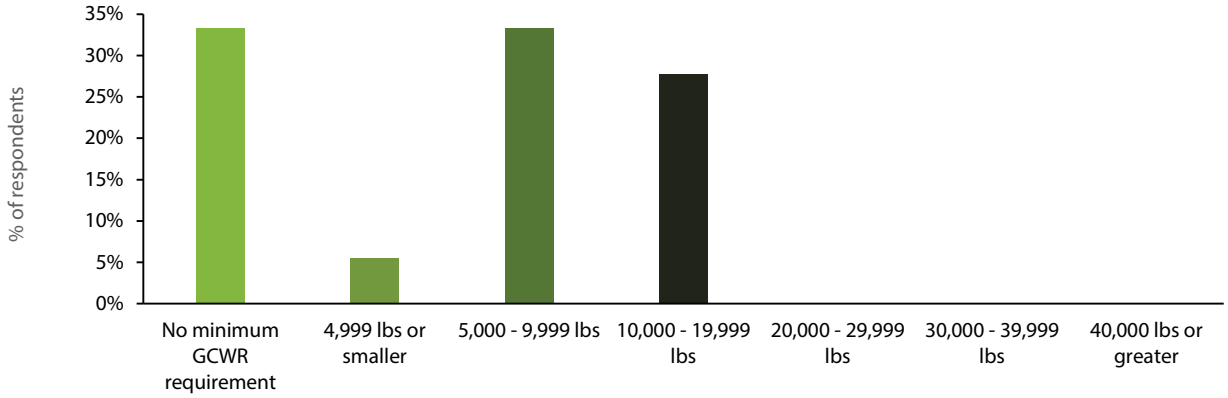


F8. Towing Capacity

Which minimum towing capacity would meet the needs of the majority of your pickup truck use cases? (select one)

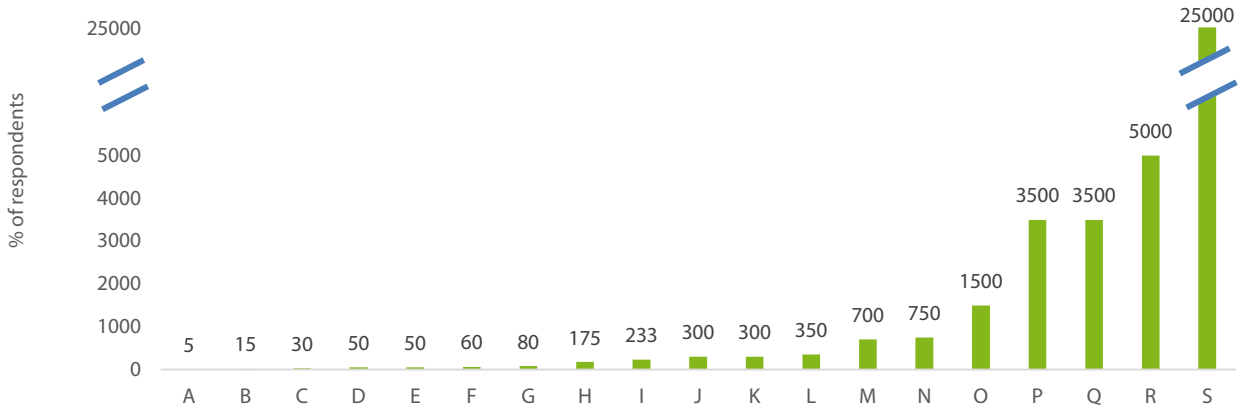


F9. Gross Combined Weight Rating (GCWR)
Which minimum GCWR would meet the needs of the majority of your pickup truck use cases? (select one)



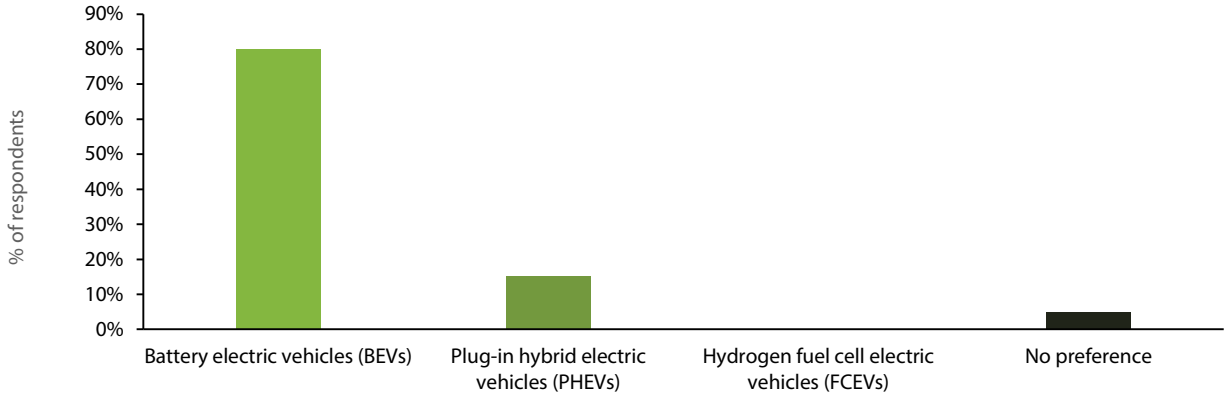
G. Cargo/Panel Vans

G1. Procurement Plans
Assuming new ZEV models meet most of your company's performance and cost requirements, how many zero emission cargo/panel vans would your company likely procure between calendar years 2022 - 2026? Please include all vehicles you would purchase, lease directly or through a fleet management company, or contract through a 2nd party logistics provider (exclude 3PL supply chain management).
(Y-Axis = number of vehicles. Responses are anonymized and sorted by magnitude; letters are not matched to specific respondents or kept consistent across procurement questions.)



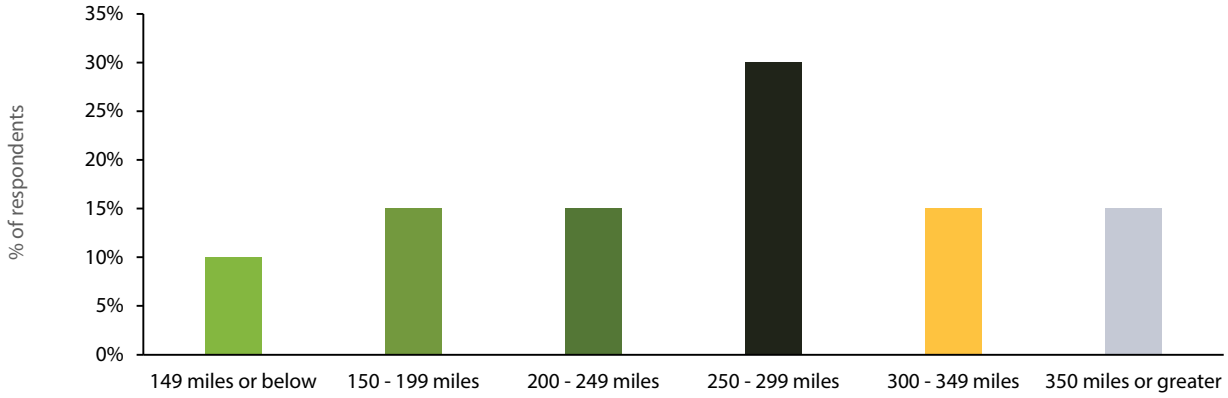
G2. Zero Emission Vehicle (ZEV) Preference

Which of the following ZEV categories would your company most likely procure for cargo/panel vans between calendar years 2022 - 2026? (select one)



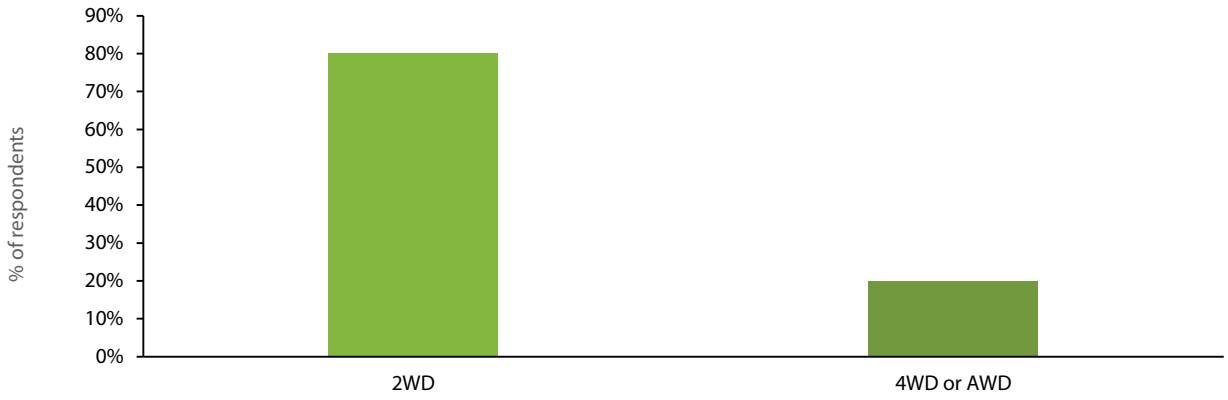
G3. Range

Which minimum electric range would meet the needs of the majority of your cargo/panel van use cases in average climate conditions? (select one)



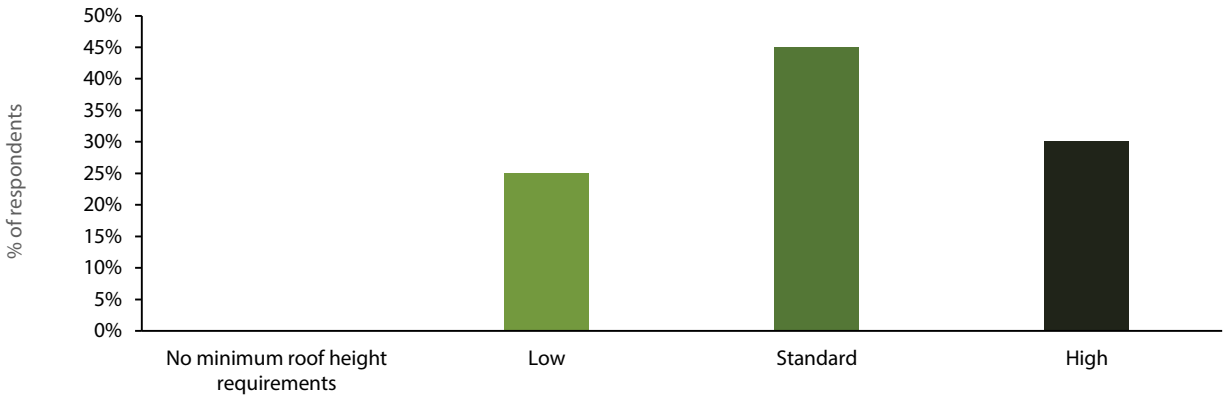
G4. Drivetrain

Which drivetrain would meet the needs of the majority of your cargo/panel van use cases? (select one)



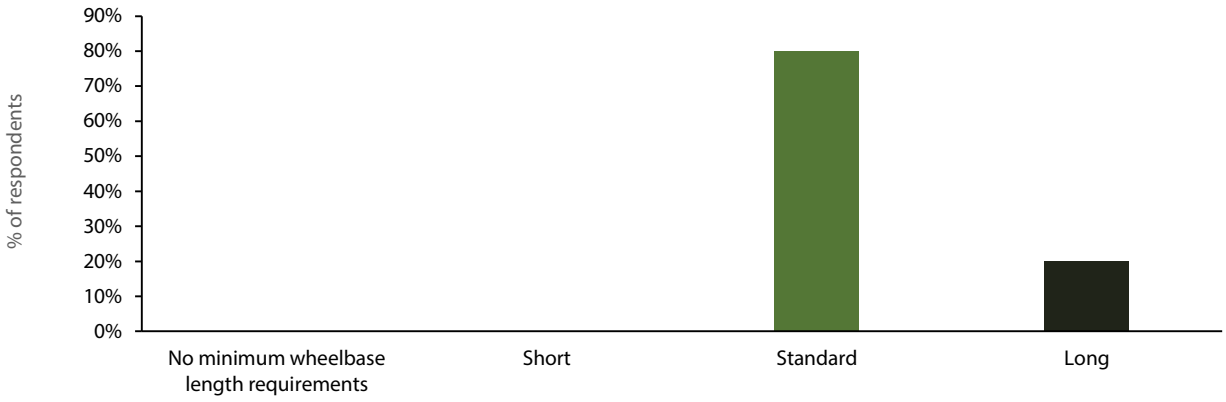
G5. Roof Height

Which minimum roof height option would meet the needs of the majority of your cargo/panel van use cases? (select one)



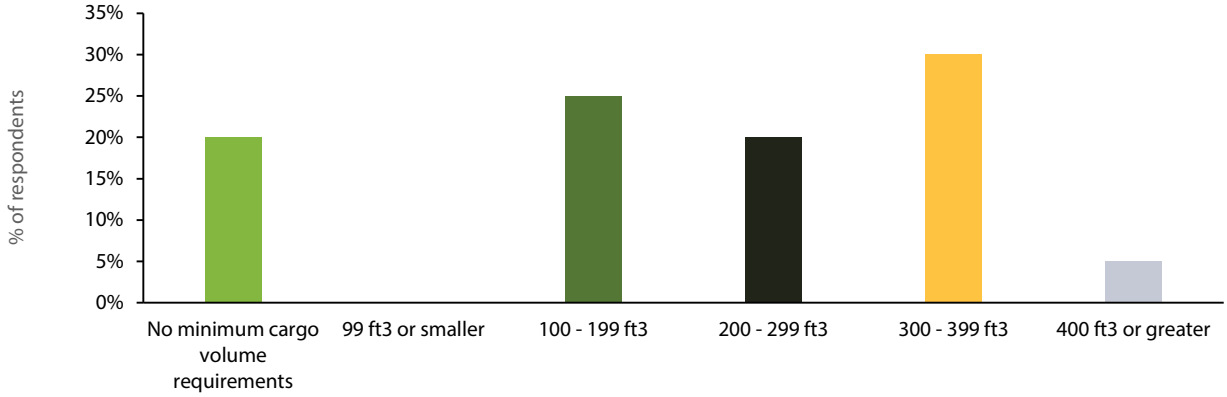
G6. Wheelbase Length

Which minimum wheelbase classification would meet the needs of the majority of your cargo/panel van use cases? (select one)



G7. Cargo Volume

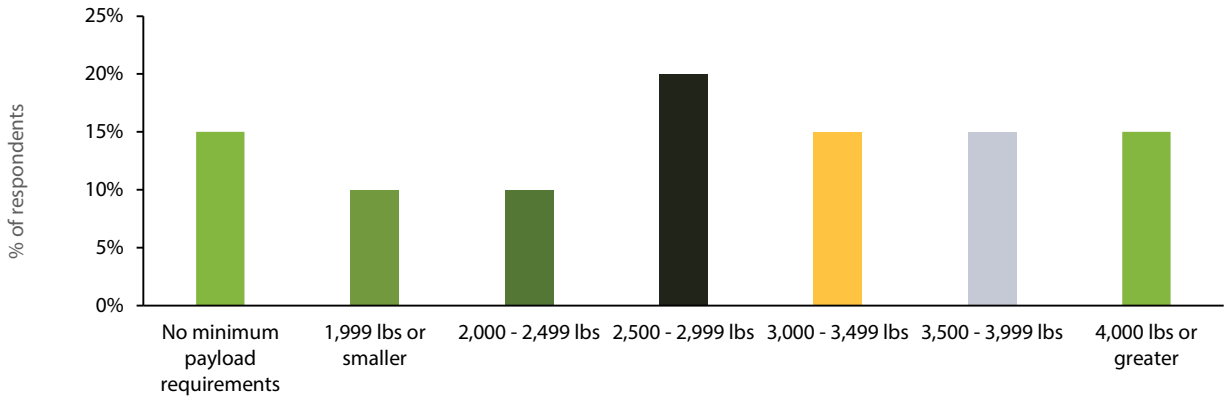
Which minimum cargo volume would meet the needs of the majority of your cargo/panel van use cases? (select one)



Ceres
Sustainability is the bottom line.

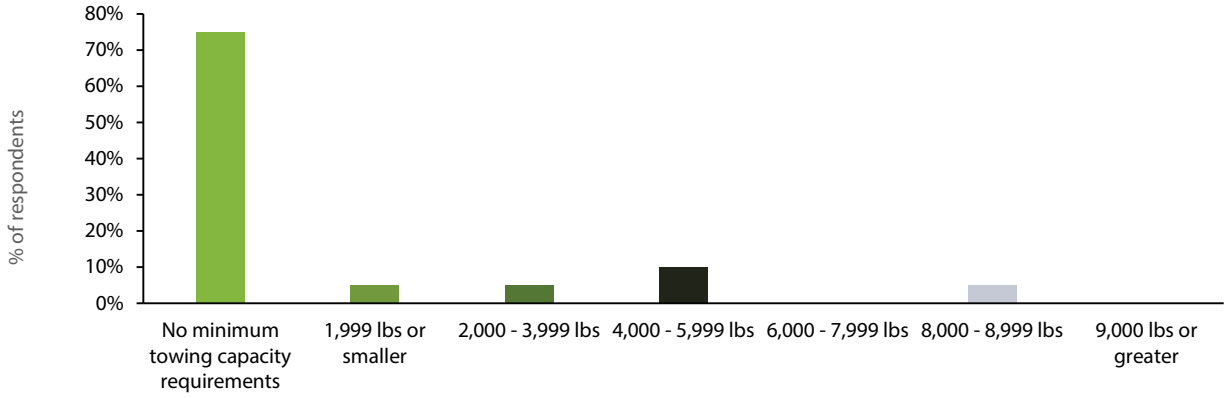
G8. Payload

Which minimum payload would meet the needs of the majority of your cargo/panel van use cases? (select one)

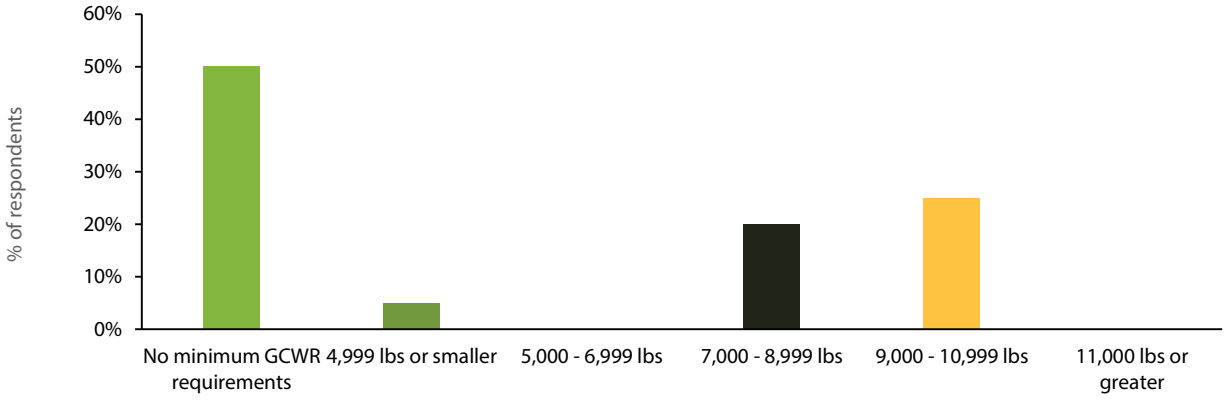


G9. Towing Capacity

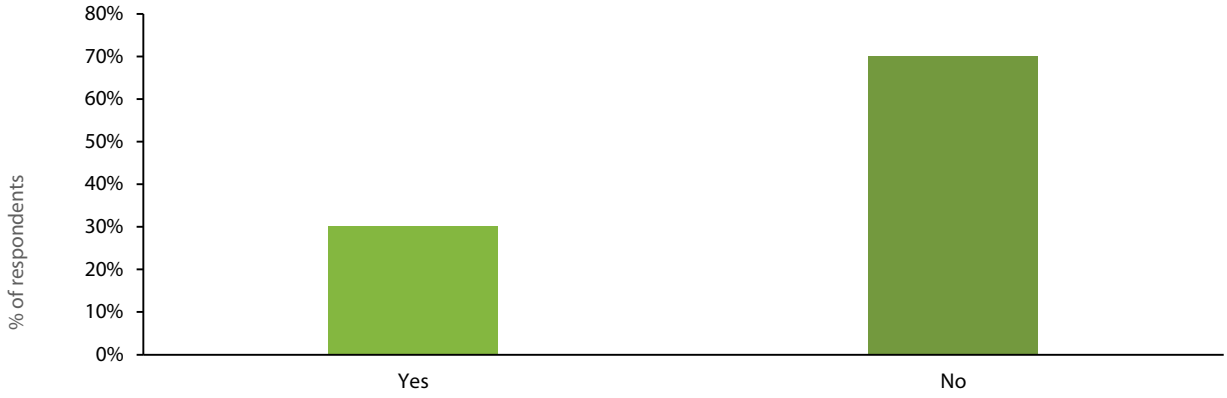
Which minimum towing capacity would meet the needs of the majority of your cargo/panel van use cases? (select one)



G10. Gross Combined Weight Rating (GCWR)
Which minimum GCWR would meet the needs of the majority of your cargo/panel van use cases? (select one)



G11. Auxiliary Tools
Do you require auxiliary power for tools or equipment on the majority of your cargo/panel vans?

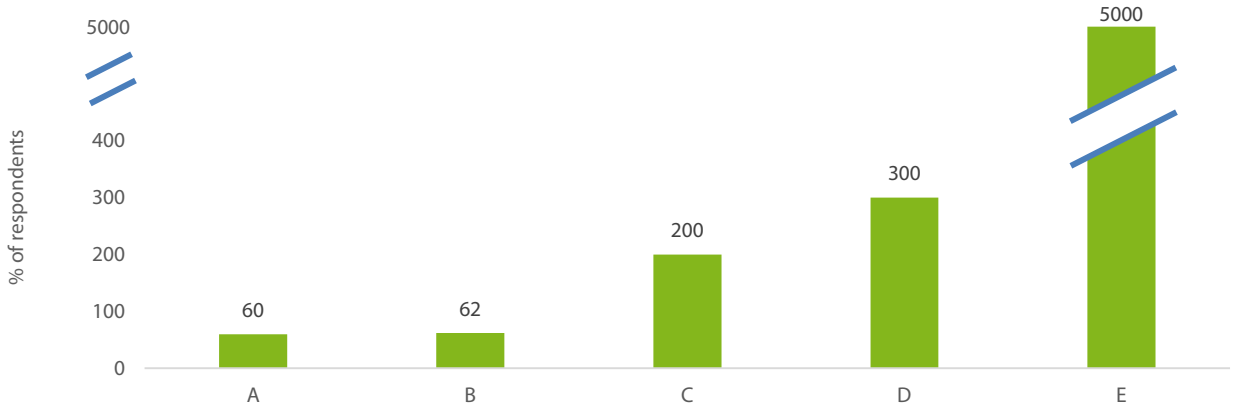


Ceres
Sustainability is the bottom line.

H. Step Van

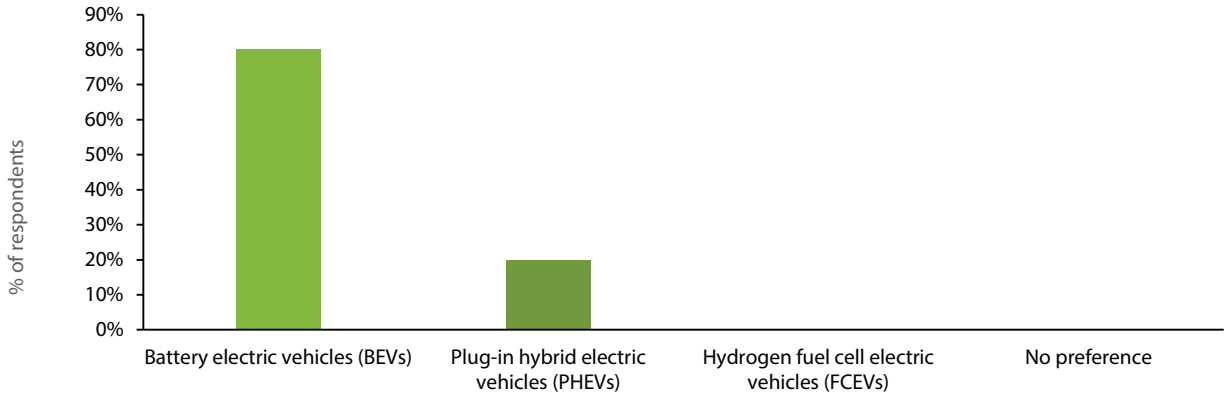
H1. Procurement Plans

Assuming new ZEV models meet most of your company's performance and cost requirements, how many zero emission step vans would your company likely procure between calendar years 2022 - 2026? Please include all vehicles you would purchase, lease directly or through a fleet management company, or contract through a 2nd party logistics provider (exclude 3PL supply chain management).
(Y-Axis = number of vehicles. Responses are anonymized and sorted by magnitude; letters are not matched to specific respondents or kept consistent across procurement questions.)



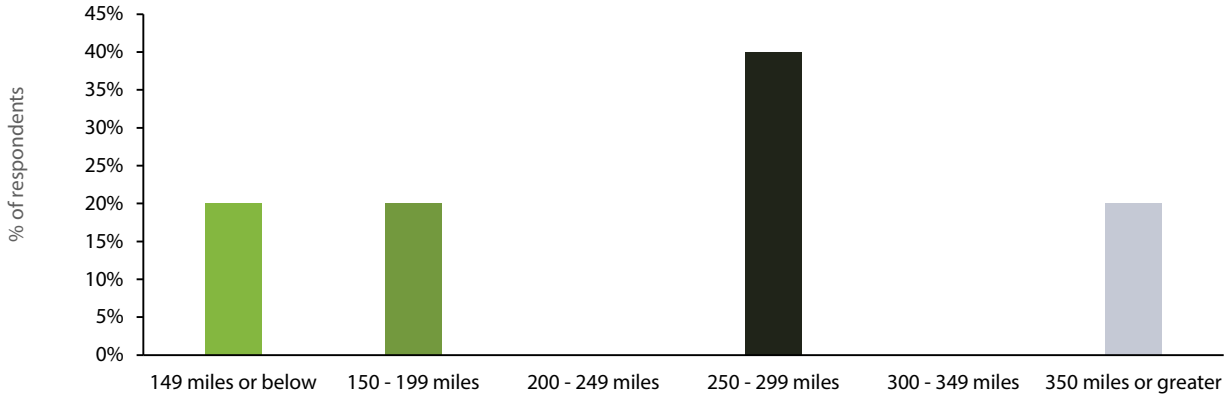
H2. Zero Emission Vehicle (ZEV) Preference

Which of the following ZEV categories would your company most likely procure for step vans between calendar years 2022 - 2026? (select one)



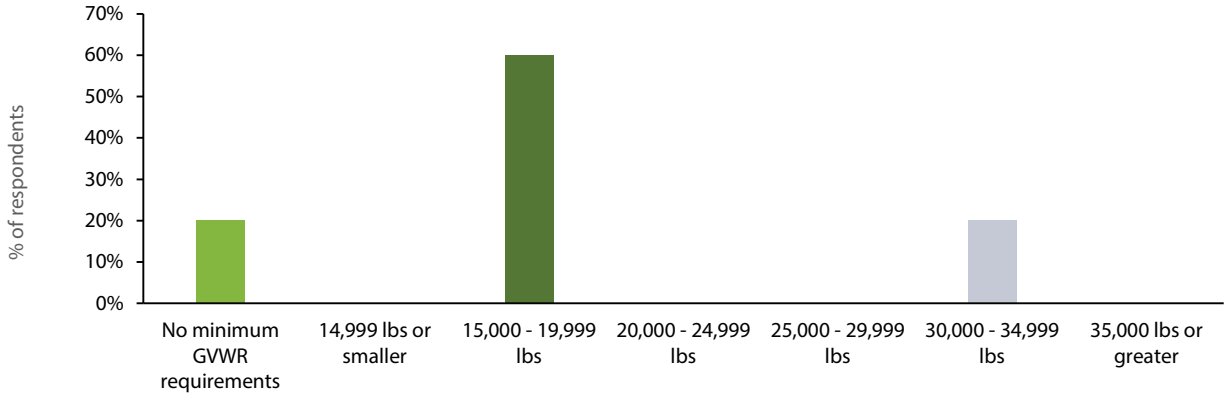
H3. Range

Which minimum electric range would meet the needs of the majority of your step van use cases in average climate conditions? (select one)



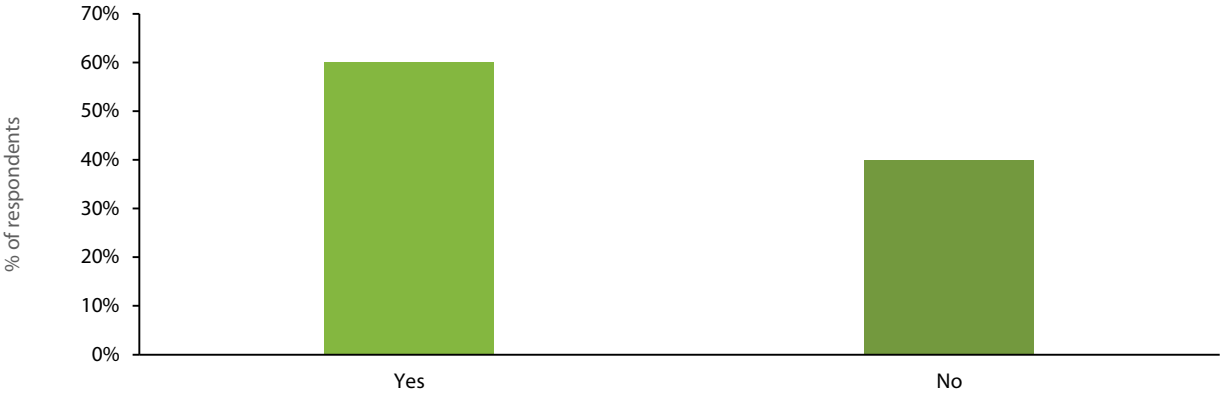
H4. Gross Vehicle Weight Rating (GVWR)

Which minimum GVWR would meet the majority of your step van use case needs? (select one)



H5. Auxiliary Tools

Do you require auxiliary power for tools or ePTO equipment on the majority of your step vans?

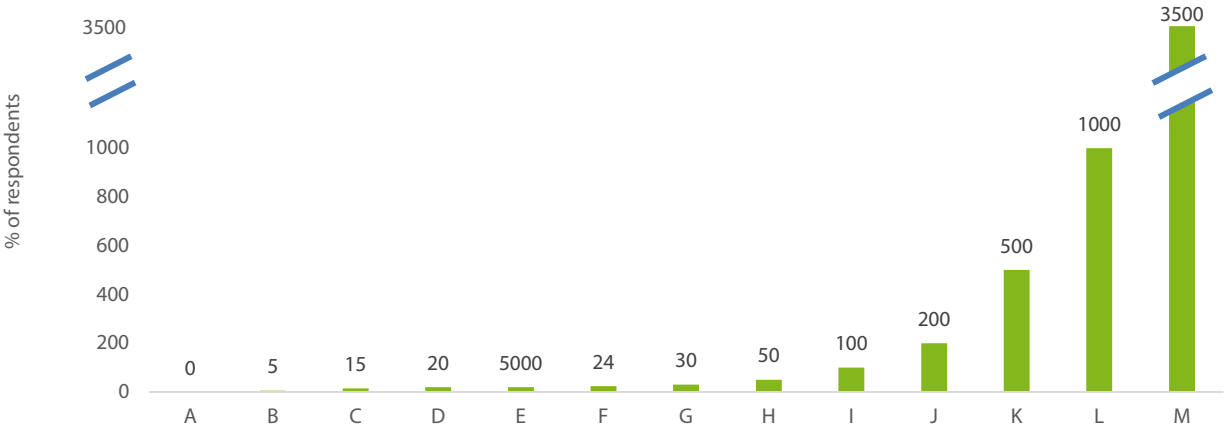


I. Box Truck

I1. Procurement Plans

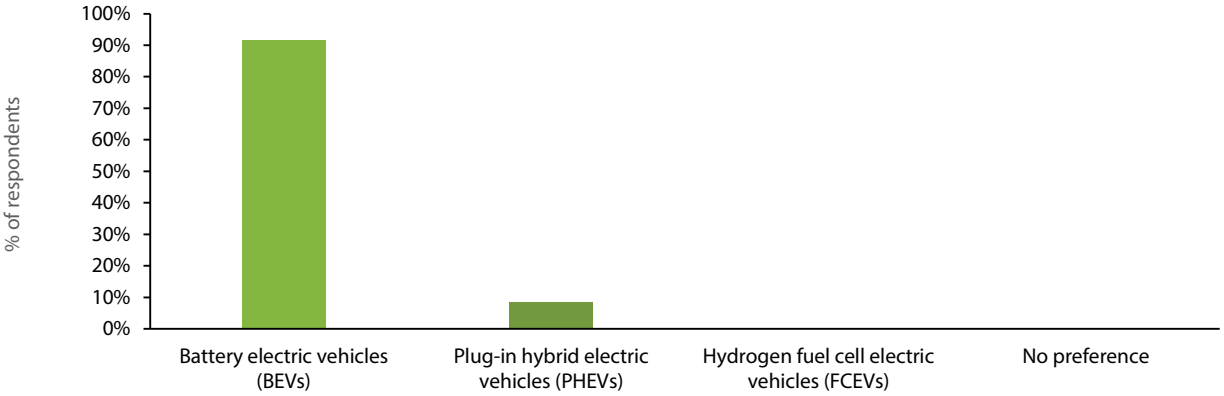
Assuming new ZEV models meet most of your company's performance and cost requirements, how many zero emission box trucks would your company likely procure between calendar years 2022 - 2026? Please include all vehicles you would purchase, lease directly or through a fleet management company, or contract through a 2nd party logistics provider (exclude 3PL supply chain management).

(Y-Axis = number of vehicles. Responses are anonymized and sorted by magnitude; letters are not matched to specific respondents or kept consistent across procurement questions.)



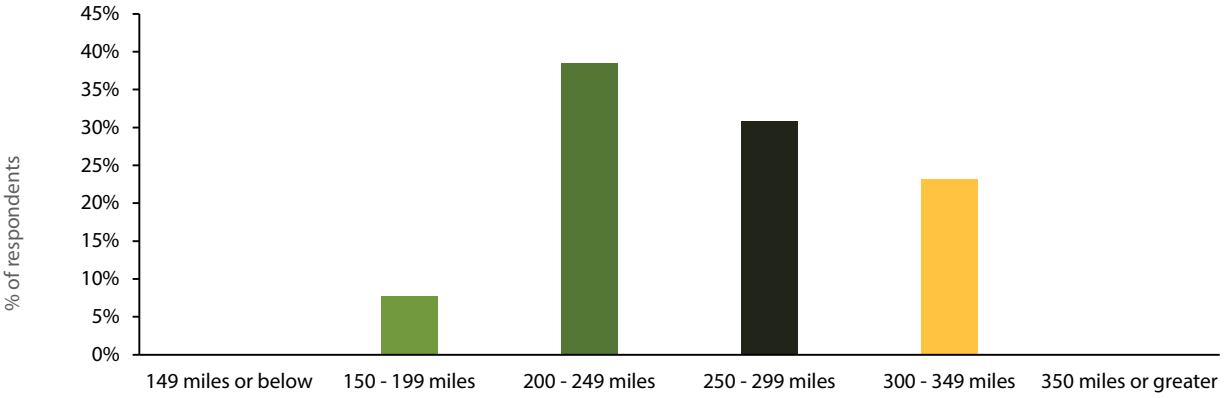
I2. Zero Emission Vehicle (ZEV) Preference

Which of the following ZEV categories would your company most likely procure for box trucks



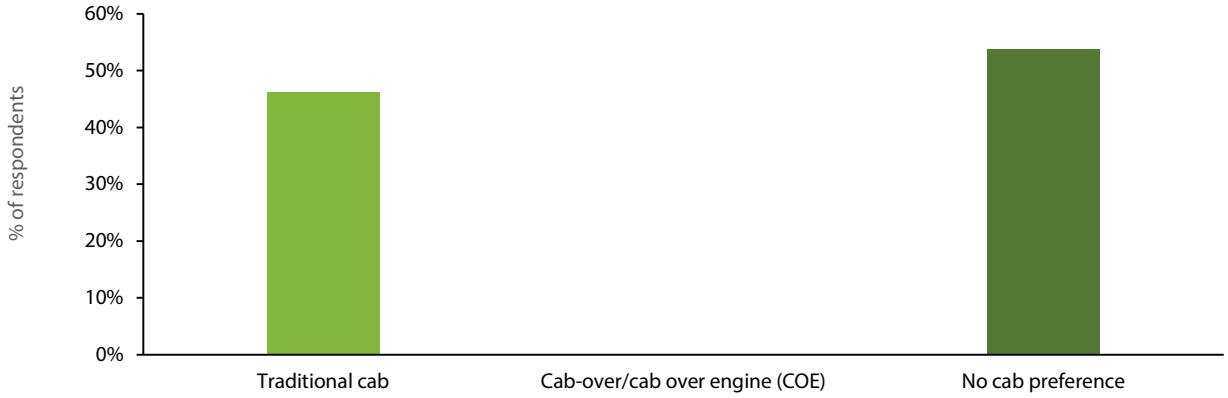
I3. Range

Which minimum electric range would meet the needs of the majority of your box truck use cases in average climate conditions? (select one)



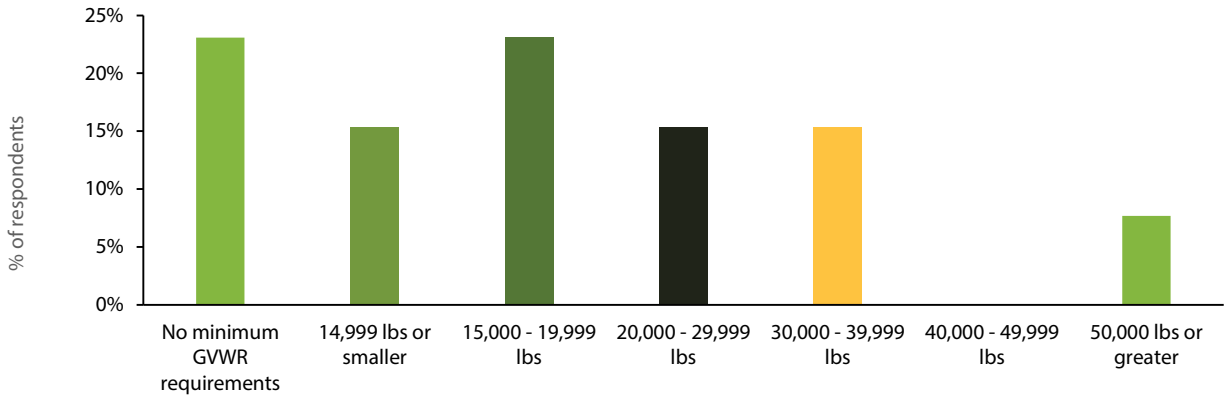
I4. Cab Type

Which cab option would meet the needs of the majority of your box truck use cases? (select one)



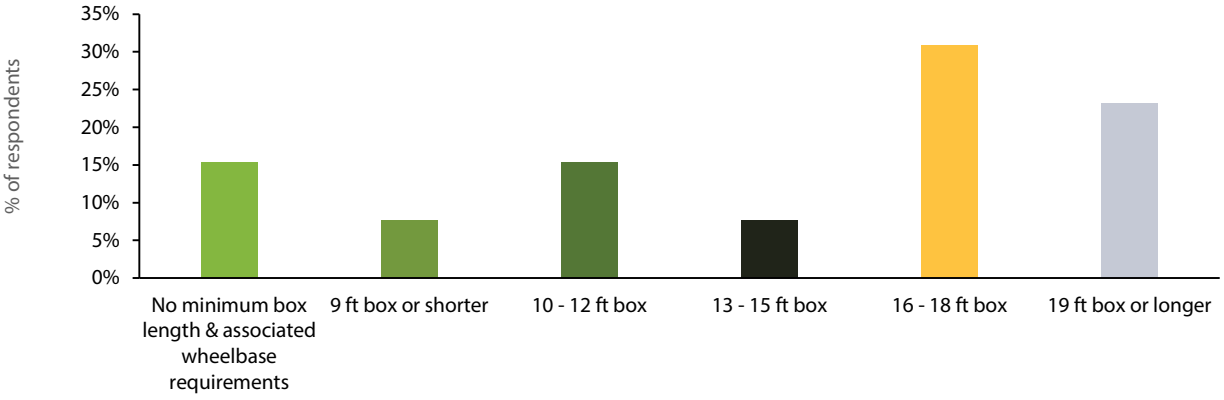
I5. Gross Vehicle Weight Rating (GVWR)

Which minimum GVWR would meet the needs of the majority of your box truck use cases? (select one)



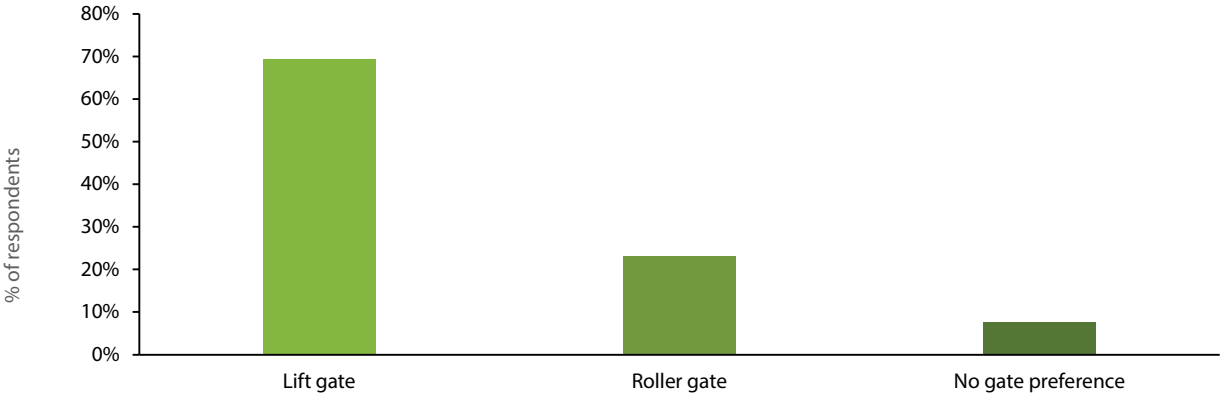
I6. Box Length

Which minimum box length would meet the needs of the majority of your box truck use cases? (select one)



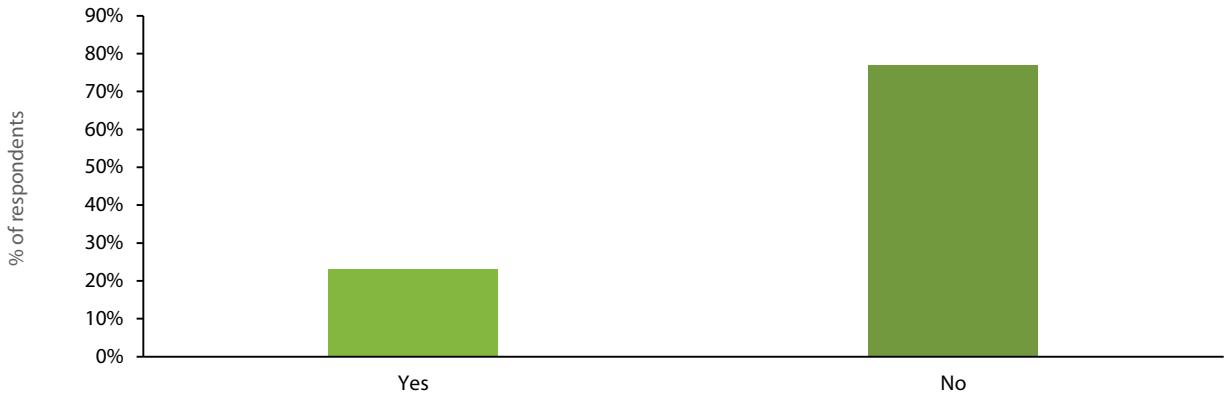
I7. Gate

Which gate options would meet the needs of the majority of your box truck use cases? (select one)



I8. Refrigeration

Do you require refrigeration (reefer) options?

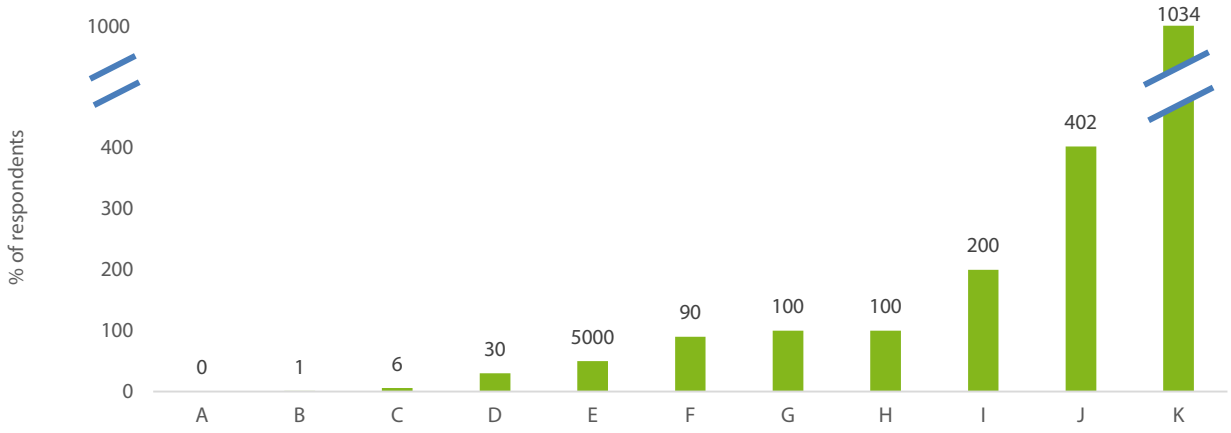


J. Utility/Service Trucks

J1. Procurement Plans

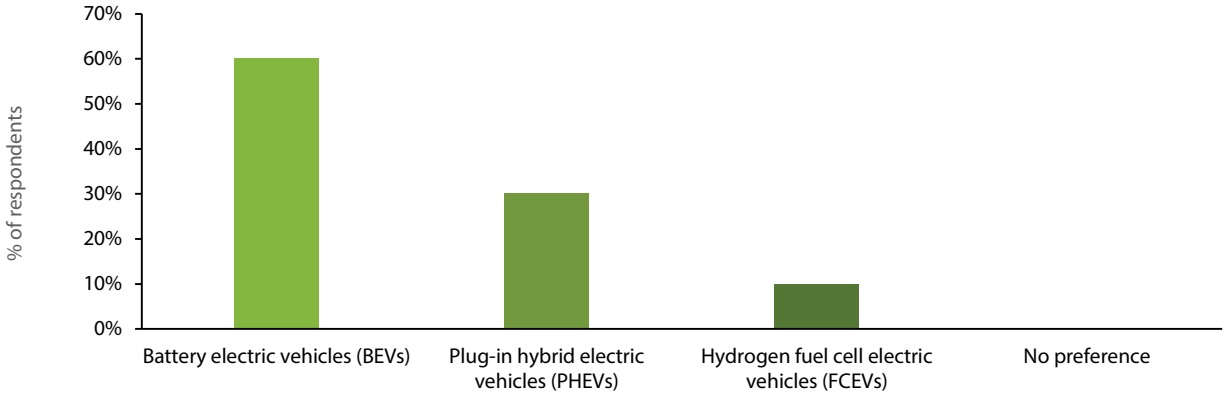
Assuming new ZEV models meet most of your company's performance and cost requirements, how many zero emission utility/service trucks would your company likely procure between calendar years 2022 - 2026? Please include all vehicles you would purchase, lease directly or through a fleet management company, or contract through a 2nd party logistics provider (exclude 3PL supply chain management).

(Y-Axis = number of vehicles. Responses are anonymized and sorted by magnitude; letters are not matched to specific respondents or kept consistent across procurement questions.)



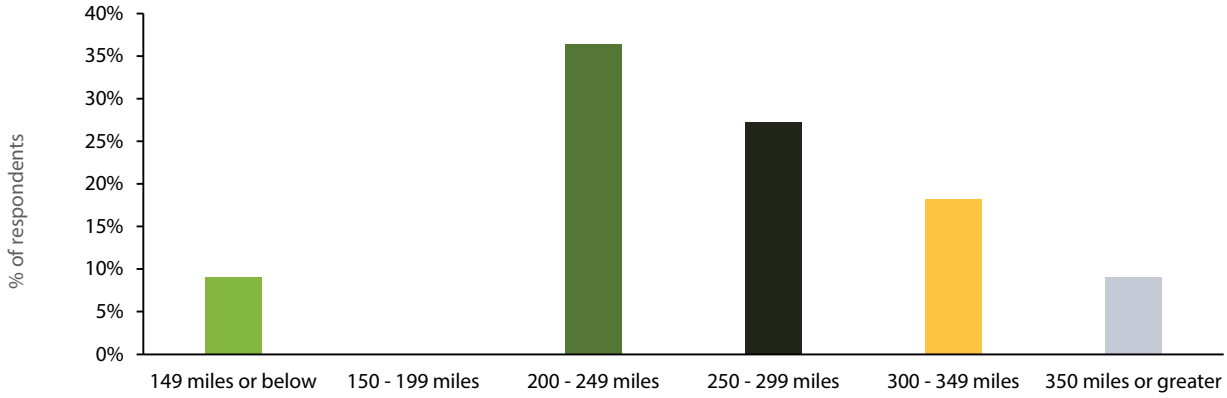
J2. Zero Emission Vehicle (ZEV) Preference

Which of the following ZEV categories would your company most likely procure for utility/service trucks between calendar years 2022 - 2026? (select one)



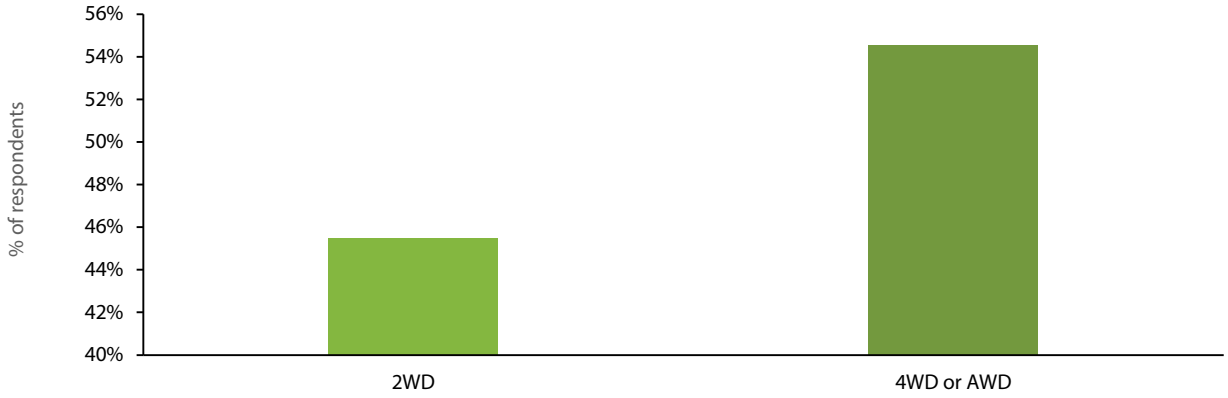
J3. Range

Which minimum electric range would meet the needs of the majority of your utility/service truck use cases in average climate conditions? (select one)



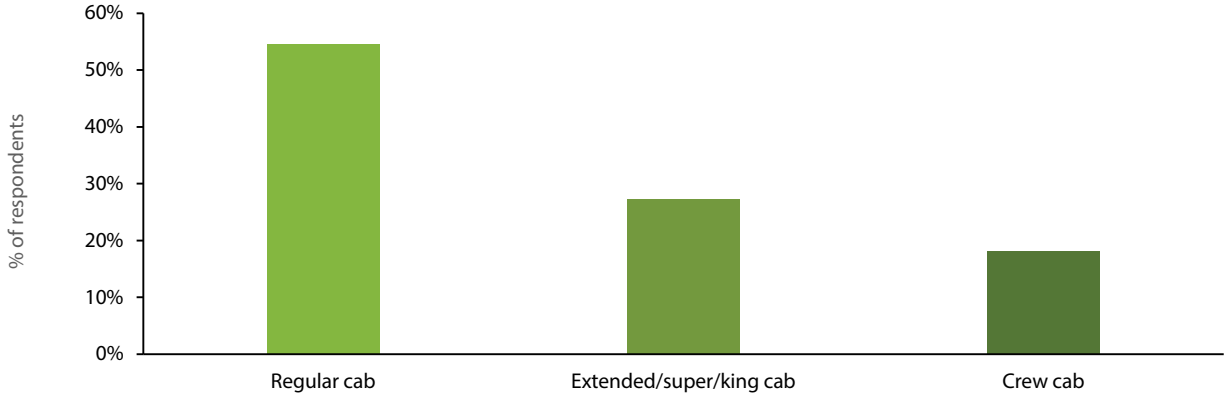
J4. Drivetrain

Which drivetrain would meet the needs of the majority of your utility/service truck use cases? (select one)



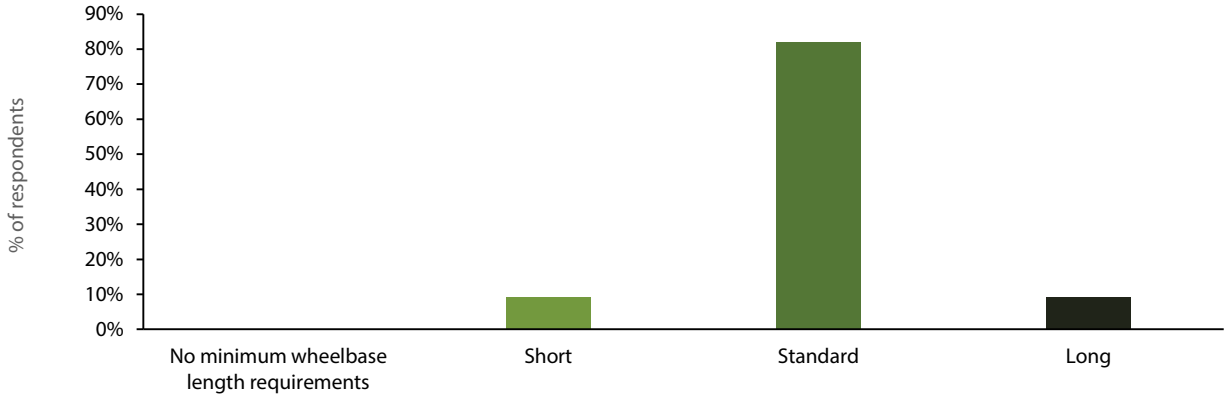
J5. Cab Type

Which cab options would meet the needs of the majority of your utility/service truck use cases? (select one)



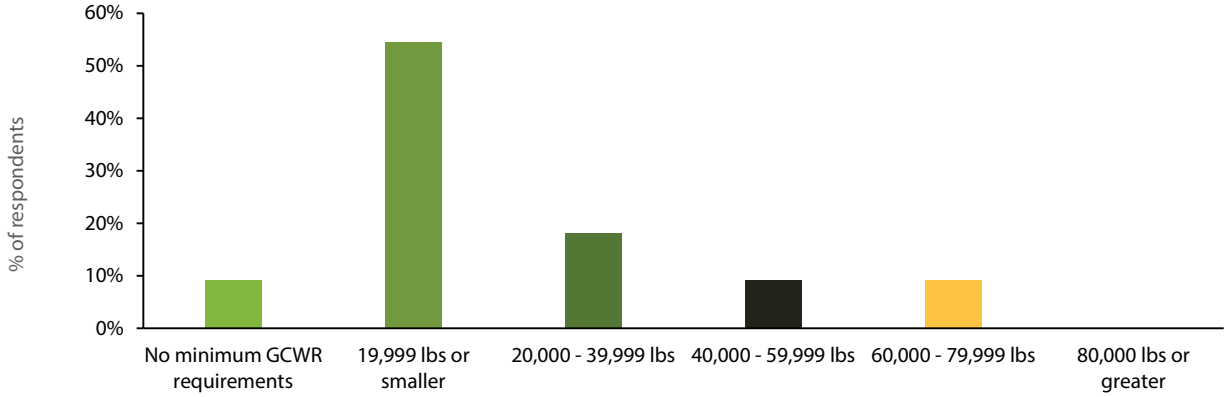
J6. Wheelbase Length

Which minimum wheelbase classification would meet the needs of the majority of your utility/service truck use cases? (select one)



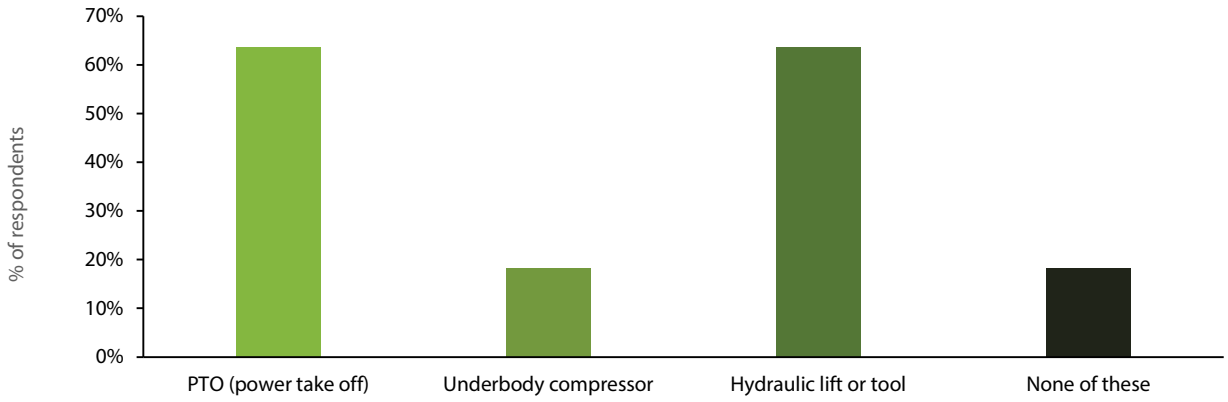
J7. Gross Combined Weight Rating (GCWR)

Which minimum GCWR would meet the needs of the majority of your utility/service truck use cases? (select one)



J8. Exportable Power and Tools

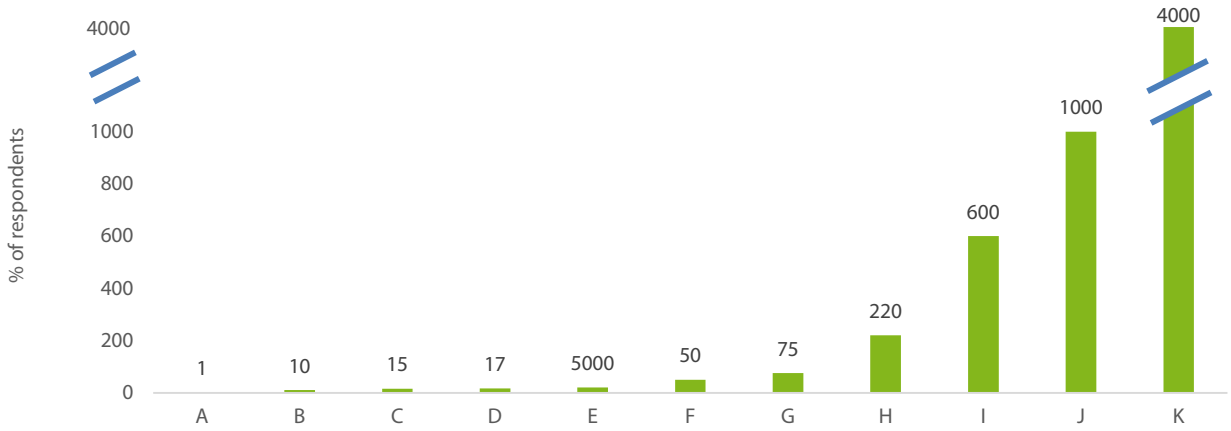
Select the exportable power and tool options (if any) that you require to operate your utility/service trucks. (select ALL that apply).



K. Tractor Trailer

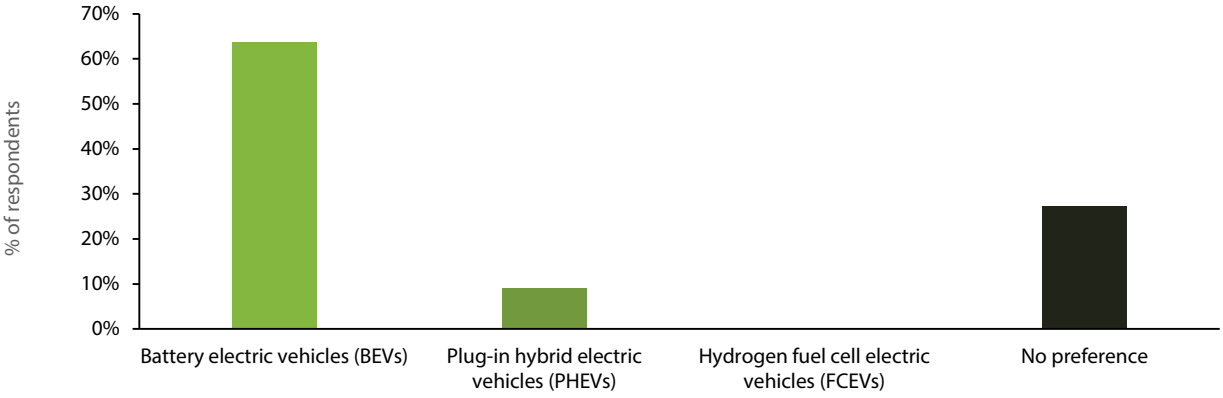
K1. Procurement Plans

Assuming new ZEV models meet most of your company's performance and cost requirements, how many zero emission tractor trailers would your company likely procure between calendar years 2022 - 2026? Please include all vehicles you would purchase, lease directly or through a fleet management company, or contract through a 2nd party logistics provider (exclude 3PL supply chain management). (Y-Axis = number of vehicles. Responses are anonymized and sorted by magnitude; letters are not matched to specific respondents or kept consistent across procurement questions.)



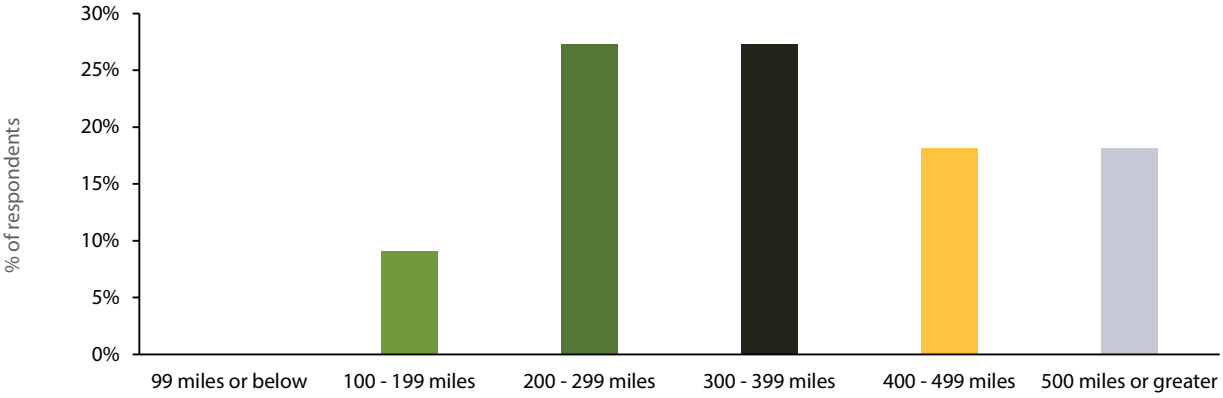
K2. Zero Emission Vehicle (ZEV) Preference

Which of the following ZEV categories would your company most likely procure for tractor trailers between calendar years 2022 - 2026? (select one)



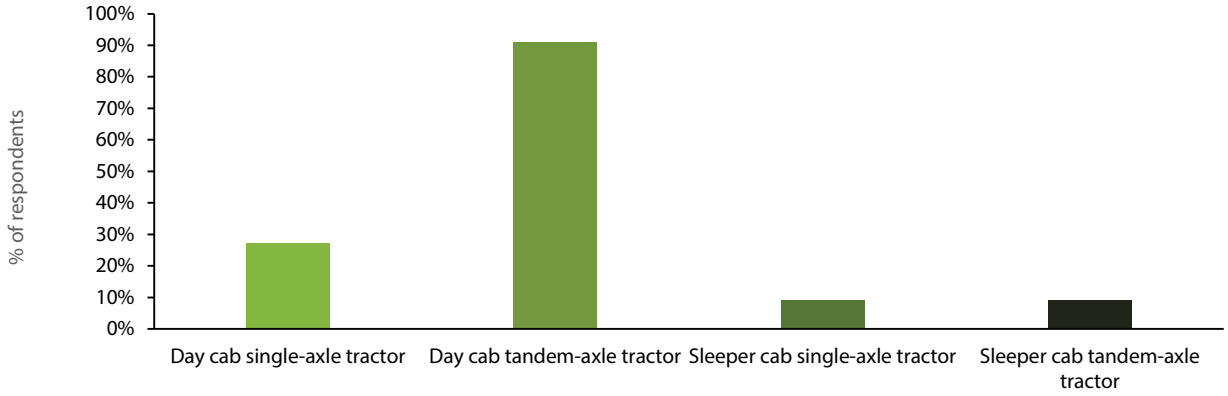
K3. Range

Which minimum electric range would meet the needs of the majority of your tractor trailer use cases in average climate conditions? (select one)



K4. Cab and Axle Tractor Combination

Select the cab and axle tractor combinations you require to meet the majority of your tractor trailer use cases. (select ALL that apply).



K5. Weight Capacity

What estimated percentage of the time do you max out your weight capacity in an internal combustion engine (ICE) tractor trailer? (select the closest option)