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# Europe's ZE truck transition: Key for decarbonization—and competitiveness

The European truck industry is at a crossroads, where a successful transition to zero-emission (ZE) trucks is not only needed to decarbonize road transport, but is key to future competitiveness.

*This article is a collaborative effort by Anders Suneson, Matthias Kässer, and Tobias Schneiderbauer, with Alina Blos and Henrik Becker, representing views from McKinsey's Automotive & Assembly Practice.*

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**Europe's truck industry is approaching a pivotal moment:** Accelerating the shift to zero-emission vehicles is now essential for both meeting emissions targets and preserving long-term competitiveness. Success will depend on advancing three interconnected pillars—competitive vehicles, robust infrastructure, and strong enabling conditions.

## Building on a legacy of technology leadership

Recognized as the top source for high-quality trucks worldwide, European truck OEMs play an important role in Europe's economic health. The sector employs over 250,000 people in high-value roles, sustains large supply chains, and hence contributes to economic growth across Europe. Players are global market leaders, holding a dominant market leadership position in key regions like Europe and the Americas, where they command a combined market share of more than 80 percent.[1]

Today the sector is building momentum toward zero-emission vehicles (ZEV): Every major European OEM has invested in respective technologies and has brought a range of technologically advanced ZEV models to the market, ranging from battery-electric trucks (BEV), fuel cell electric trucks (FCEV), and hydrogen combustion trucks (H2-ICE).

## At a turning point

The European truck industry's leading position is being challenged on multiple fronts. The slow adoption of zero-emission trucks in Europe not only inhibits the learning curve for further advances in the technology but also exposes the industry to penalties estimated at 2.2 billion euros[2] or more for failing to comply with the European $CO_2$ emissions targets in 2030 if the transition in the market continues on its current, rather slow trajectory.[3] At the same time, current economic realities in Europe leading to a drop in new truck registrations by 16 percent in the first three quarters of 2025 versus 2023[4] pose additional challenges, such as the ability for investments in that transition. The combination of the above presents significant challenges to incumbent European players, while opening up a window for new market entrants—for example, from China—with the potential of a significant redistribution of value pools.

### Obstacles across the ecosystem are slowing the ZEV transition

Unlocking adoption of zero-emission trucks requires vehicles capable of fulfilling a fleet's operational requirements, availability of infrastructure, as well as unit economics competitive with current diesel trucks (Exhibit 1). While 46 zero-emission truck models are already available on the European market across OEMs,[5] covering a broad range of applications, there are challenges to be addressed in economics and infrastructure until 2030:

— **Economics.** While zero-emission trucks offer the potential for advantageous total cost of ownership (TCO) across use cases, only around 30 percent of truck sales in Europe are estimated to already be TCO competitive today. These are typically distribution or line-haul applications in countries with favorable road toll incentives and significant fuel taxes. Given the generally lower margins across the logistics

[1] "European heavy duty vehicle market development quarterly," ICCT, June 5, 2025; "Race to zero: zero-emission bus and truck market in the United States," ICCT, June 24, 2025; "Brazilian truck manufacturer that sold 31 units in 2024, a giant that has dominated the highways for six years and shows how agribusiness dictates the rules of transportation in the country," Click Petroleo e Gas, May 7, 2025.
[2] McKinsey Center for Future Mobility estimate, based on European $CO_2$ performance standards for new heavy-duty vehicles (https://eur-lex.europa.eu/eli/reg/2024/1610/oj).
[3] "Electric trucks have taken a 3.6 percent share of new truck sales in the first half of 2025," ACEA press release: new commercial vehicle registrations.
[4] "New commercial vehicle registrations: vans -8.2%, trucks -9.8%, buses +3.6% in Q1-Q3 2025," ACEA press release, October 30, 2025.
[5] "Truck and bus manufacturers' contribution to climate-neutral road transport," ACEA, November 28, 2025.

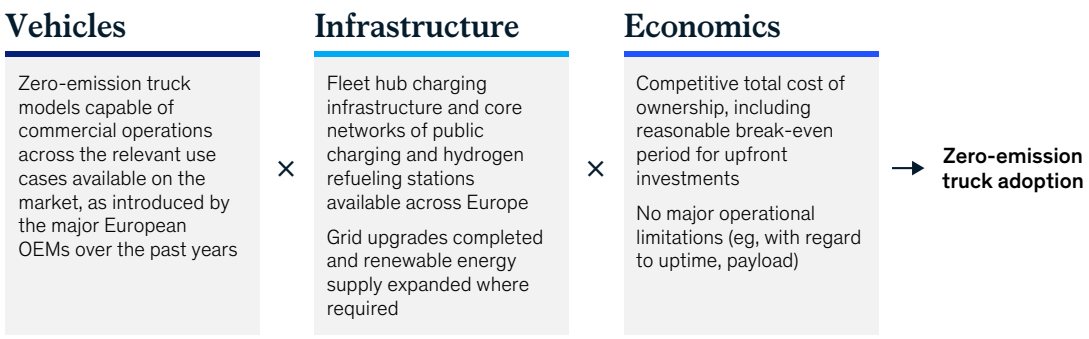
value chain, such favorable TCO economics across the majority of use cases and segments are a key prerequisite for faster adoption.

— **Infrastructure.** Fewer than 2,000 public charging points are available for trucks today,[6] compared to more than 120,000 conventional diesel and gasoline fuel stations. Challenges with grid access and slow permitting are delaying the rollout of charging infrastructure. According to projections by the McKinsey Center for Future Mobility, a 25-fold increase in public charging points will be required by 2030 to support the transition.[7]

Exhibit 1

## Zero-emission truck demand is determined by three essential, interdependent factors: Vehicles, infrastructure, and economics.

**Determinants of zero-emission truck adoption until 2030**




Source: McKinsey Center for Future Mobility

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Solving these challenges will be essential to bringing more than one million zero-emission trucks on the road by 2035, and to securing more than 75 billion euros in additional investments across infrastructure and vehicles.[8]

The large volume of investments and number of zero-emission trucks to be deployed meet a complex and fragmented industry structure with many different stakeholders. The road transport sector is dominated by small and medium-size fleet operators often engaged under short-term contracts (below two years or even by the individual trip). These operators can only transition toward zero-emission trucks if they can be sure they can utilize them during the entire holding period. This requires both favorable economics across a broad range of applications, and a comprehensive public infrastructure. Fleet- and use-case-specific solutions only work for a limited share of the market. In turn, infrastructure investors require clear visibility

[6] European Alternative Fuels Observatory, updated August 15, 2025.
[7] McKinsey Center for Future Mobility: Commercial Vehicle Decarbonization Model (2025 release).
[8] McKinsey Center for Future Mobility: Commercial Vehicle Decarbonization Model (2025 release); estimates do not include any investments required in the power grid, renewable electricity supply, or hydrogen supply.

regarding the utilization of their assets, which can be particularly challenging for public infrastructure unless a major anchor customer is found.

### Economics: Real-life TCO remains challenging

Today, for most use cases, conventional ICE trucks still hold a TCO advantage over their zero-emission counterparts. Analysis by the McKinsey Center for Future Mobility suggests that for around 30 percent of European trucks sold today, zero-emission powertrains would be TCO competitive.[9] That portion is increasing as zero-emission trucks become more affordable, and differentiated road tolls and carbon pricing further shift the balance in their favor.

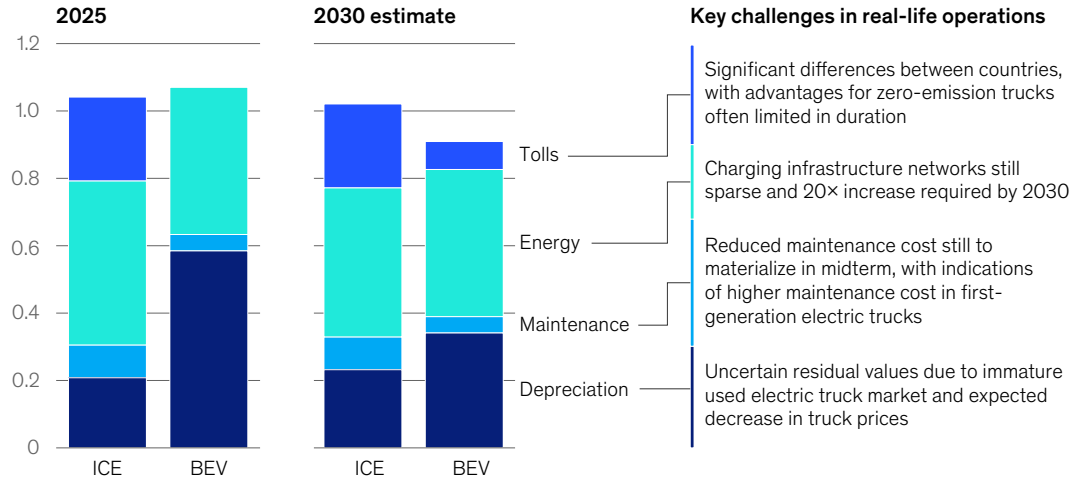
No single TCO value exists for the entire industry. TCO performance can vary significantly, ranging from a 20 percent TCO advantage to a 50 percent TCO disadvantage compared to ICE trucks, depending on the specific use case and country. The main drivers include upfront costs and truck utilization, as well as the differences in operating costs—specifically, tolls, fuel, and electricity (Exhibit 2). The large variation in TCO is also a challenge to cross-border operations, where fleet operators face a mix of economics. For example, a 2 percent TCO disadvantage for an electric line-haul truck in Germany meets a 23 percent TCO disadvantage in Poland. In addition, TCO is a moving target, as road toll incentives and energy prices change over time and uncertainty about residual values of used zero-emission trucks remains.

[9] McKinsey Center for Future Mobility: Commercial Vehicle Decarbonization Model (2025 release).

Exhibit 2

## Electric trucks can already show favorable total cost of ownership on paper today, but key challenges still need to be solved.

**Total cost of ownership for heavy-duty line-haul truck, internal combustion engine (ICE) vs battery electric vehicle (BEV),[1]** €/km




[1] Includes distributed cost of charging infrastructure required for battery electric vehicle (assumes ~50% of on-the-go charging); assuming model 40T tractor; 90,000 km/year; 500 km fuel range; 350 kW engine power; upfront cost €100,000/€110,000 for internal combustion engine, €260,000/€150,000 for battery electric vehicle, diesel price of €1.52/liter, charging price of €0.44/kilowatt-hour in 2025. Valid for new truck sold in year X, assuming 4-year initial holding period.
Source: McKinsey Center for Future Mobility

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TCO is often the most important purchasing factor for fleets. The McKinsey Truck Buyer Survey[10] supports this: Only about 7 percent of truck buyers would be willing to switch to ZEVs if their TCO was 20 percent higher than that of ICE vehicles. Nearly half of all respondents, however, state they would switch at parity.

The latter contrasts with the low actual adoption of ZEV trucks in the market today.[11] A key reason for this are the additional complexities and challenges in real-life operations that are often not fully captured in such model calculations, such as availability of charging infrastructure (and sufficient access to the power grid), access to capital, uncertainties in residual values, short contract durations with freight buyers, or cross-border operations across countries with different TCO gaps. Unlocking ZEV truck adoption requires addressing these factors along with enabling positive business cases.

### Infrastructure: The infrastructure rollout requires a significant acceleration

The rather slow expansion of truck charging infrastructure has become a significant barrier to the ZEV transition. Public charging infrastructure requires a rapid rollout because it is crucial for electrifying the long-haul use cases needed to reach decarbonization targets.

According to McKinsey Center for Future Mobility analyses,[12] most EV charging infrastructure will be in private depots, which will probably include up to 90 percent of available charging points in 2030 (Exhibit 3) to service shorter-haul and predictable line-haul routes, which already are being electrified. Their lower daily driving distances and frequent depot returns make it economically viable to charge ZEVs mainly via depot charging points. This enables clearer business cases, potentially leading to an early expansion of depot charging. It is expected that the segment will account for 75 percent (10.5 billion euros) of all cumulative charging infrastructure investments through 2030 and provide over 70 percent of the required electricity.[13] The total emissions reduction of the enabled use cases, however, will likely fall short of the EU emissions targets for 2030, which is why long-haul use cases will also have to be addressed.

Public charging is essential for the electrification of those long-haul use cases, which travel longer distances and have operating models that limit depot charging opportunities. McKinsey Center for Future Mobility research suggests that up to half of all BEV trucks will utilize public charging by 2030—primarily in on-demand and line-haul use cases, as well as for some regional and urban applications. The expansion of public fast-charging infrastructure would require approximately 3.5 billion euros until 2030 alone, excluding grid upgrades.

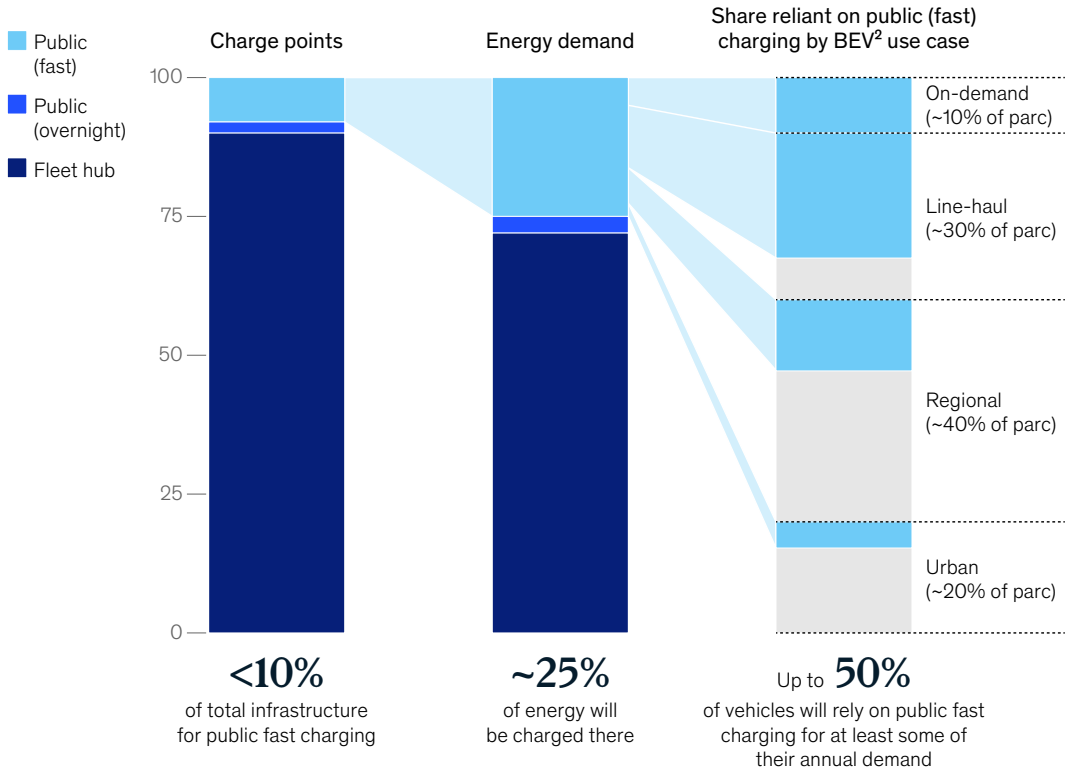
To achieve the EU targets, public charging points must expand 25-fold by 2030 in support of the deployment of long-haul ZEVs. Currently, Europe's public charging points are often inaccessible for heavy vehicles, with only about 2 to 3 percent of the roughly 50,000 stations over 300 kilowatts (kW) suitable for trucks.[14] This is due to factors such as space constraints for trailers and rooftop access issues that prevent large trucks from reaching charging points. Additionally, fleet depot infrastructure should be expanded 20-fold by 2030. To rightsize the infrastructure, the resulting utilization of the charging points needs to be economical, and the derisking of the public or depot infrastructure against lower uptake by increasing the availability of alternatives would need to be considered.

[10] McKinsey Center for Future Mobility Truck Buyer Survey, n = 288 truck buyers from five countries (France, Germany, Italy, Poland, UK) across diverse fleet sizes, activities, and business focus, May 2025.
[11] "Electric trucks have taken a 3.6 percent share of new truck sales in the first half of 2025," ACEA press release: new commercial vehicle registrations.
[12] Anna Herlt and Eugen Hildebrandt, with Henrik Becker, "Building Europe's electric-truck charging infrastructure," McKinsey, September 19, 2024.
[13] McKinsey Center for Future Mobility: Commercial Vehicle Decarbonization Model (2025 release).
[14] "New public HDV recharging infrastructure data now live on EAFO," European Alternative Fuels Observatory, October 20, 2025.

Exhibit 3

## The buildout of public charging infrastructure is essential to enable electrification across use cases.

**Public charging infrastructure, 2030 estimate,[1] %**




Note: Scope of analysis: medium- and heavy-duty trucks.
[1]Indicative; includes hardware, installation and civil works, planning and engineering, canopy, transformer, and grid connection; does not include further costs for, eg, increased parking space of depot modernization.
[2]Battery electric vehicle.
Source: McKinsey Center for Future Mobility (Current Trajectory Scenario); McKinsey Commercial Vehicle Segment

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Achieving such a significant expansion of charging infrastructure requires the whole charging ecosystem to address several major bottlenecks. For fleet hubs, securing enough grid access to charge a fleet of electric trucks often requires lead times of more than a year and significant investments. And the more electric trucks need to be charged in the same place, the more challenging the corresponding grid upgrades typically become. Microgrid solutions that use local renewable power generation and battery storage can address grid bottlenecks, but they also require substantial investments and capabilities beyond the core logistics operations. For public charging infrastructure, high initial capital expenditures (capex) and demand uncertainty make business cases more difficult, while long wait times for grid access and permits create additional delays.

In addition, to unlock adoption of H2-ICE and FCEV trucks, a significant scale-up of hydrogen refueling station networks would be required as well—from 200 today to more than 1,000 stations across European countries. Like for charging infrastructure, it is key to secure offtake to support business cases and attract private investment.

### The current transition trajectory risks falling short of emissions targets in 2030 and could trigger approximately 2.2 billion euros or more in EU emissions penalties

The EU has defined the emissions targets for new trucks. By the 2030 reporting window, the average emissions from regulated medium- and heavy-duty trucks must be reduced by 43 percent compared to 2019 levels.[15] The targets will increase stepwise to 65 percent by 2035 and 90 percent by 2040. The regulation foresees significant penalties for OEMs in case of noncompliance.[16]

To achieve the targets, OEMs must scale up the sales of zero-emission trucks and can complement this with efficiency improvements in their ICE portfolios. In the currently projected scenario by the McKinsey Center for Future Mobility, the zero-emission truck ramp-up could fall three percentage points short of the target, triggering a potential penalty for European OEMs of around 2.2 billion euros or more, equivalent to roughly half of the entire European truck profit pool.[17]

To avoid the penalties from failing to meet the emissions targets, the industry should also address long-haul use cases, which account for almost 75 percent of all emissions. The way forward involves solving challenges around public charging infrastructure and derisking zero-emission truck operations for small fleet operators.

### The recent market slowdown limits the investment flexibility of Europe-based OEMs

To prepare for the transition to zero-emission trucks (and, later, autonomous trucks and software-defined vehicles), Europe-based OEMs have increased their investments in R&D by more than 50 percent since 2020, reaching a total of more than 7 billion euros in 2024.[18]

The transition toward zero-emission trucks will require even more investments. At the same time, a continued slowdown in momentum toward zero-emission trucks in North America would result in a decoupling of powertrain technologies and hence limited opportunities for synergies. As a result, the increased technology investments will likely have to be recovered predominantly in the European market.

This need for additional investment comes at a time when the market offers limited flexibility for incumbent OEMs amid pressures on revenues and margins. Truck sales in Europe have declined by over 16 percent from their 2023 peak,[19] with no quick recovery in EU GDP and therefore truck demand expected for 2025 or 2026. Most McKinsey macro scenarios do not foresee a significant boost in the EU economy during this period, with limited demand support anticipated. The stagnant market continues to affect the profitability of most OEMs negatively. For example, EU truck OEM operating margins have decreased from their 2023 peak (8 to 15 percent) by an average of 20 percent, leaving OEMs with limited room to act.[20]

[15] Specified in regulation EU 2024/1610, detailed in chapter 4.3.1; vocational vehicles are excluded.
[16] "The revised $CO_2$ standards for heavy-duty vehicles in the European Union," ICCT Policy Update, May 2024.
[17] Based on McKinsey Center for Future Mobility "Current Trajectory" scenario, 2025 release: penalties of more than 200,000 euros per ICE truck sold in excess of target. Target and penalties based on EU legislation as of October 15, 2025.
[18] Company reports.
[19] New commercial vehicle registrations: vans -8.2%, trucks -9.8%, buses +3.6% in Q1-Q3 2025, ACEA press release, October 30, 2025.
[20] Company reports.

**The slow transition opens a window of opportunity for new market entrants**

One downside of the slow transition toward zero-emission trucks is that it takes incumbent OEMs longer to reach scale on zero-emission truck technologies. This opens a window for new entrants. While these new players may be able to leverage a competitive zero-emission truck portfolio, there is a risk that part of the value generation will move outside Europe.

Scale, cost and technology competition: Chinese OEMs can leverage a strong scale, cost and battery technology position

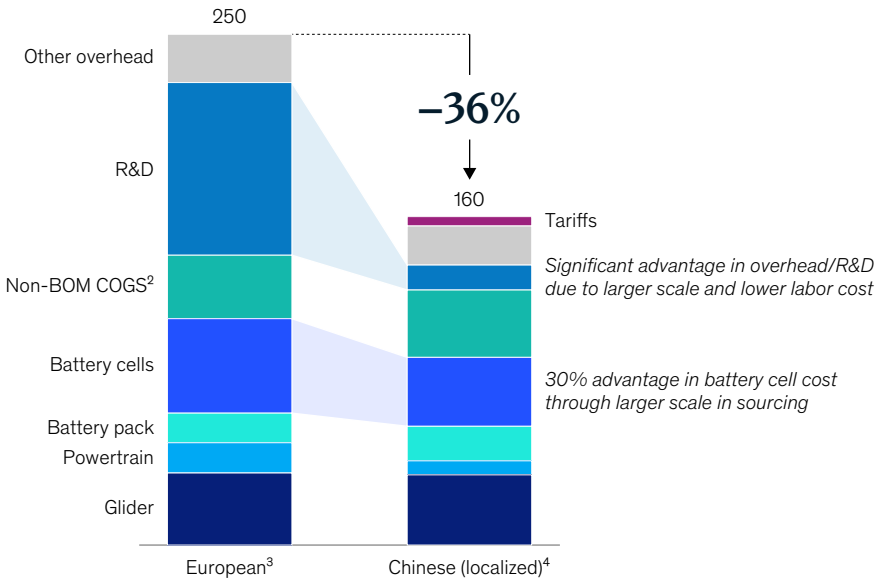
Driven by the large size of their home market and its significant electrification already today, as well as access to local battery technology, Chinese OEMs could have significant advantages. A hypothetical, localized battery-electric truck for line-haul use cases by a Chinese OEM could be around 36 percent less expensive than a comparable model by an incumbent European OEM, even when considering final assembly in Europe. The main drivers of this advantage are a potential 30 percent cost advantage in battery sourcing along with improved R&D and fixed cost allocations driven by a larger global production volume of electric trucks (Exhibit 4). This significant cost gap would translate into an approximate 35 percent advantage in TCO.

A key source of this cost advantage is Chinese OEMs' proximity to other Chinese players that have become a leading source for several strategic components and materials. For example, Chinese players have a leading

Exhibit 4

## Chinese OEMs with local production can achieve a significant cost advantage.

**Total cost breakdown for European and Chinese battery electric vehicle (BEV),[1] €**




[1]Heavy-duty line-haul truck (model 40T tractor), 350km daily range (90,000 km per annum), 350 kilowatts.
[2]Non–bill of materials cost of goods sold.
[3]Includes distributed cost of charging infrastructure required for BEV (assumes ~50% of on-the-go charging)/energy prices: diesel—US $1.65/liter (2025), $1.57 (2030)/electricity—US $0.33/kWh (2024), $0.33 (2030).
[4]Defined as Chinese OEMs tailoring trucks for the European market and building them in Europe, with some part (kits) (eg, chassis, cabin) delivered from China; assumes that mostly third parties will be used to offer service network; non-BOM COGS difference driven by transport duties.
Source: McKinsey Center for Future Mobility; McKinsey Commercial Vehicle Segment

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position across the entire battery value chain, with market share in certain processing steps exceeding 80 percent. Chinese players also control the market for rare earth elements through mining and refining.[21]

### Customer acceptance: Most European fleet operators would consider trucks from Chinese OEMs

Brand awareness for Chinese OEMs in Europe is already significant, with 81 percent of fleet operators "familiar with" or "aware of" BYD, and 41 to 46 percent aware of FAW, CNHTC, or Windrose according to the McKinsey Center for Future Mobility Truck Buyer Survey[22] (Exhibit 5), even though most of these truck brands are not yet widely available on the European market.

Of those fleet operators aware of Chinese OEMs, 73 percent would consider buying a truck from one, either at price parity (32 percent) or with a cost advantage of more than 10 percent (41 percent). Hence Chinese OEMs appear to be associated with competitive product maturity in electric trucks, given that most European fleets would source from them without an at-scale experience in the European market.

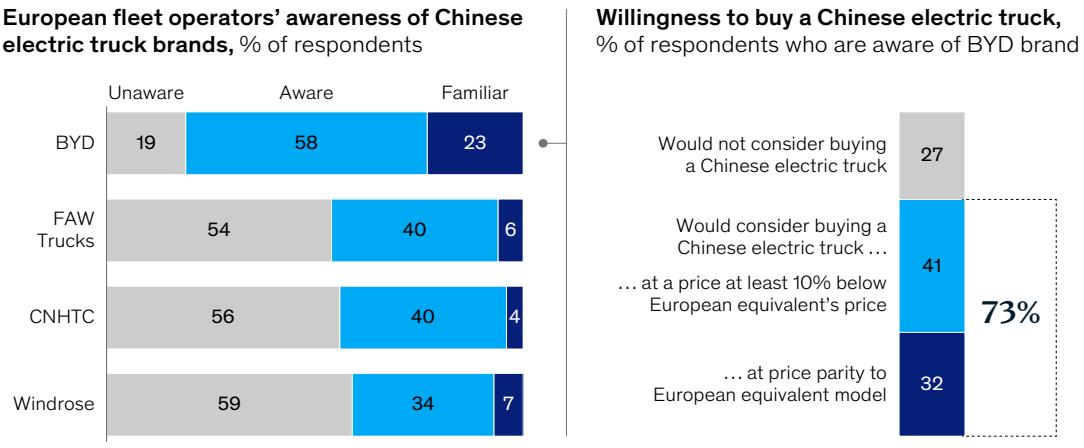
### Broader economic impact: Competitiveness matters

The bus and the forklift markets offer clear examples of such a transition in a similar business and industry context. Driven by electrification, Chinese OEMs increased their European market share to 21 percent for buses[23] and even 30 percent for forklifts,[24] carving out a new market segment and shaking up an incumbent European premium industry.

[21] "Study on the battery supply chain shows China's global dominance—and options for Europe," Fraunhofer FFB press release, February 18, 2025.
[22] McKinsey Center for Future Mobility Truck Buyer Survey, n = 288 truck buyers from five countries (France, Germany, Italy, Poland, UK) across diverse fleet sizes, activities, and business focus, May 2025.
[23] McKinsey Center for Future Mobility: Commercial Vehicle Decarbonization Model (2025 release).
[24] World Industrial Truck Statistics (WITS).

Exhibit 5

## The majority of European fleet operators know Chinese OEMs, and 73 percent are considering sourcing Chinese trucks.




Note: Scope of analysis: medium- and heavy-duty trucks.
Source: McKinsey Center for Future Mobility Truck Buyer Survey, n = 288 truck buyers from 5 countries (France, Germany, Italy, Poland, and the United Kingdom) across diverse fleet sizes, activities, and business focus, May 2025; McKinsey Commercial Vehicle Segment

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It is yet unclear how the dynamics will play out in the truck market—also because extensive service networks pose a significantly larger barrier to entry than in other industries. In the case of a market entry of new players with sizeable volume, however, McKinsey Center for Future Mobility projections suggest that the total annual value generated by the European truck market—currently about 40 billion euros—would either stagnate or decline by up to 30 percent,[25] depending on the scenario.

## Ensuring the European truck industry's future leadership position

The truck industry is at a crossroads. Regulatory targets demand a rapid transition to zero-emission powertrains, which—as outlined above—will challenge the broader ecosystem's capabilities, especially for energy, infrastructure, and road transport. Dependent on progress in sectors beyond their core businesses—such as the power grid—OEMs are challenged: A slow transition bears the risk of penalties or misallocated capital while it also opens the window for new entrants to gain market share in Europe.

Consequently, the successful switch to zero-emission trucks will not only help stakeholders comply with emissions targets but also maintain global competitiveness in an industry that European players have championed for decades. It is time to unlock the transition across the trucking sector now, to set things in motion, where larger scale directly translates into lower ownership and operating costs per truck, and higher infrastructure utilization translates into lower cost per charge. Failure would put both the decarbonization targets and the local truck industry at risk.

**Actions: Accelerate momentum with an action plan for the European truck industry**

The shift to zero-emission trucks could only succeed if all players across the trucking sector work together to provide:

— a competitive truck offering

— a solid infrastructure and access to technology

— the best enabling conditions for the adoption of zero-emission trucks

A solid infrastructure and supply base will enable the deployment of zero-emission trucks; and the more trucks deployed, the more these trucks will be further optimized, leading to an even more attractive offering. In turn, increased truck sales will boost infrastructure and supply chain utilization, ultimately funding new growth. Launching this flywheel, however, will require the best enabling conditions, with effective matching of infrastructure players, fleet operators, and freight buyers to unlock those viable use cases today. It will also require a predictable, comprehensive regulatory environment and incentive framework to increase the share of viable use cases over time (Exhibit 6).

Competitive truck offering

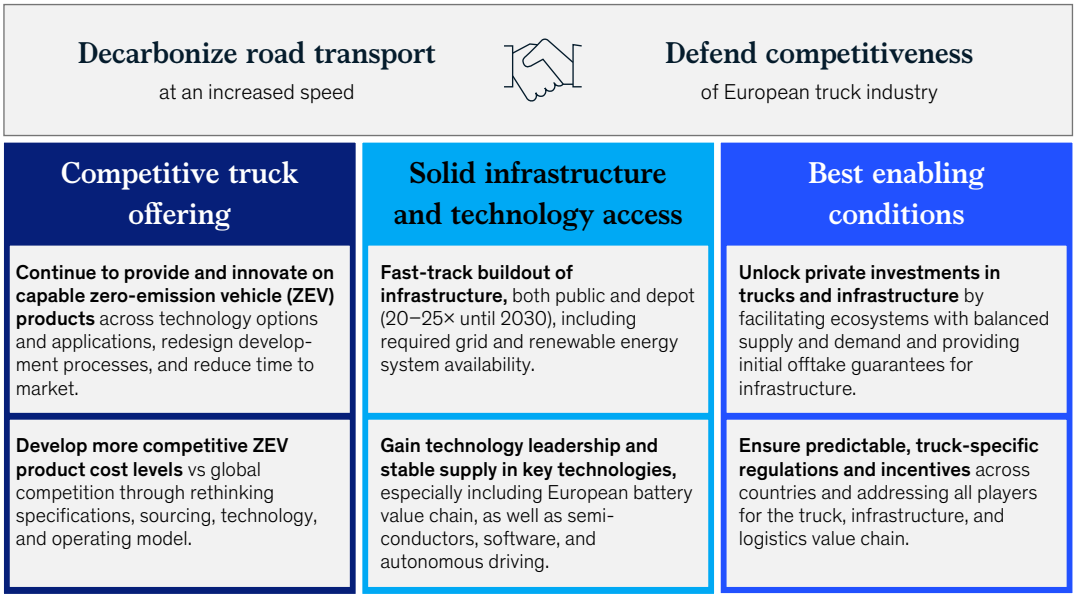
OEMs have already introduced a wide range of zero-emission truck models to the market that cover the most relevant applications, including heavy-duty long-haul. As the market accelerates, OEMs have an opportunity to address additional, smaller segments such as vocational applications and to develop zero-emission-native truck platforms to unlock the next level of performance. This includes rethinking design principles such as driver positioning, cabin design, and automation to access the full potential of the latest technologies. The key to this journey involves a faster development process that incorporates simulation methods and artificial intelligence, reducing time to market to two to three years from four to five years.

[25] McKinsey Center for Future Mobility: Commercial Vehicle Decarbonization Model (2025 release).

Exhibit 6

## A concerted effort is required across trucks, infrastructure, and fleet operators for a successful transition to zero-emission trucks.

**An action plan for the European truck industry**




Note: Scope of analysis: medium- and heavy-duty trucks.
Source: McKinsey Center for Future Mobility; McKinsey Commercial Vehicle Segment

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In addition, OEMs will continue to reduce the TCO of zero-emission trucks. While production scale will be a key cost-reduction driver in the midterm, reaching a competitive product cost level in comparison to potential new entrants—for example, from China—requires a fundamental redefinition of product specifications, component sourcing (including batteries), and the operating model, while also employing artificial intelligence across core business processes.

Given the rapid speed and magnitude of the transition, as well as the wide range of applications of trucks, the best future powertrain technologies are not fully clear today. OEMs are navigating these uncertainties about their best future powertrain portfolio for and beyond 2030 with different strategies. While all major European OEMs have launched BEV in the market, many are also working on hydrogen combustion (H2-ICE) or hydrogen FCEV. In other markets, range-extended electric trucks (REEV) or hybrid trucks (HEV) have also been presented. In addition, renewable fuels are already used by some fleet operators as an additional vector for decarbonizing their operations.

### Solid infrastructure and supply base

Europe will require a 25-fold increase in public charging infrastructure, a 20-fold increase in fleet hub charging infrastructure, and a five-fold increase in hydrogen refueling infrastructure to support the shift to zero-emission trucks through 2030—and further growth until 2035. That will require more than 45 billion

euros in investments in charging and hydrogen refueling infrastructure alone,[26] which must be made within a very short time.

Making it work requires concerted action by utilities, charge point operators, investors, and regulators. A main challenge is to provide access to power where and when it is needed to charge electric trucks. Depending on the location, use case, and fleet size, upgrades to the local distribution grid or local microgrid solutions, including dedicated power generation or battery storage, are potential solutions. In any case, these require significant additional capital investments and multiple-year lead times. Developing new business models around grid solutions, speeding up permitting, especially along the TEN-T[27] corridors, and implementing anticipatory grid expansions are necessary to ensure a timely rollout of infrastructure.

To maintain long-term competitiveness, European truck players will continue to master technology leadership and control over their supply chains around key areas of future competition, such as batteries, semiconductors, software-defined vehicles, and autonomous driving technology. Given the immense efforts required for all of these, partnerships are essential to bundle resources and capabilities, and get to scale faster.

### The best enabling conditions

Zero-emission truck technology is expected to be highly competitive once the vehicle and corresponding infrastructure reach scale. Getting there, however, will be challenging. In the early stages, it will require an effective matching of demand and supply among freight buyers, fleet operators, and infrastructure providers, all of which often have different motivations and investment horizons.

Key to scale-up are favorable long-term business cases for all stakeholders involved. That usually means creating the best enabling conditions through predictable regulations, potentially including consistent incentive schemes across countries; the predictability and reliability of targets and regulations throughout entire investment cycles; and effective incentivization that holds all participants and stakeholders along the entire value chain accountable.

## Outlook: Shift the horizon from compliance to competitiveness

Mastering the transition to zero-emission trucks goes beyond compliance with emissions targets; it is also about safeguarding the future competitiveness of the European truck industry. Only the combination and strong cooperation of all three pillars and the respective stakeholders can help to reach both targets simultaneously.

Given the highly complex, pan-European truck industry structure, the transition requires a dedicated and truck-specific approach, since solutions designed for passenger vehicles may not be as effective for the specifics of the truck business model, use cases, and operations. Viable business cases and low TCO are key to convincing fleet operators to adopt a new technology, and to unlock the large-scale investments needed for charging infrastructure. Actions or supporting measures targeting these fundamental economics and operational constraints will likely be the most effective.

The stakes are high, but so are the rewards. A successful transition allows the industry to strengthen its leadership and position itself best for subsequent phases of innovation in software and autonomous driving.

[26] McKinsey Center for Future Mobility: Commercial Vehicle Decarbonization Model (2025 release); estimates do not include any investments required in power grid, renewable electricity supply, or hydrogen supply.
[27] Trans-European Transport Network.

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