Brazil Truck Market Trends

Material for discussion

September 2025

MIROW & CO.

In the coming years, alternative powertrains, Chinese competition, technology upgrades and new ownership models are set to reshape Brazil's truck market

1

Emergence of alternative powertrain technologies

Natural gas and biomethane, electric, hybrids, B100 and hydrogen

2

Rising competitive pressure from Chinese OEMs

Chinese competition

3

Technology upgrades and autonomous driving

AI-driven fleet management and autonomous systems

4

Evolution of truck ownership models

Leasing, rental and Truck-as-a-Service

Source: Mirow & Co.

In the coming years, alternative powertrains, Chinese competition, technology upgrades and new ownership models are set to reshape Brazil's truck market

1

Emergence of alternative powertrain technologies

Natural gas and biomethane, electric, hybrids, B100 and hydrogen

2

Rising competitive pressure from Chinese OEMs

Chinese competition

3

Technology upgrades and autonomous driving

AI-driven fleet management and autonomous systems

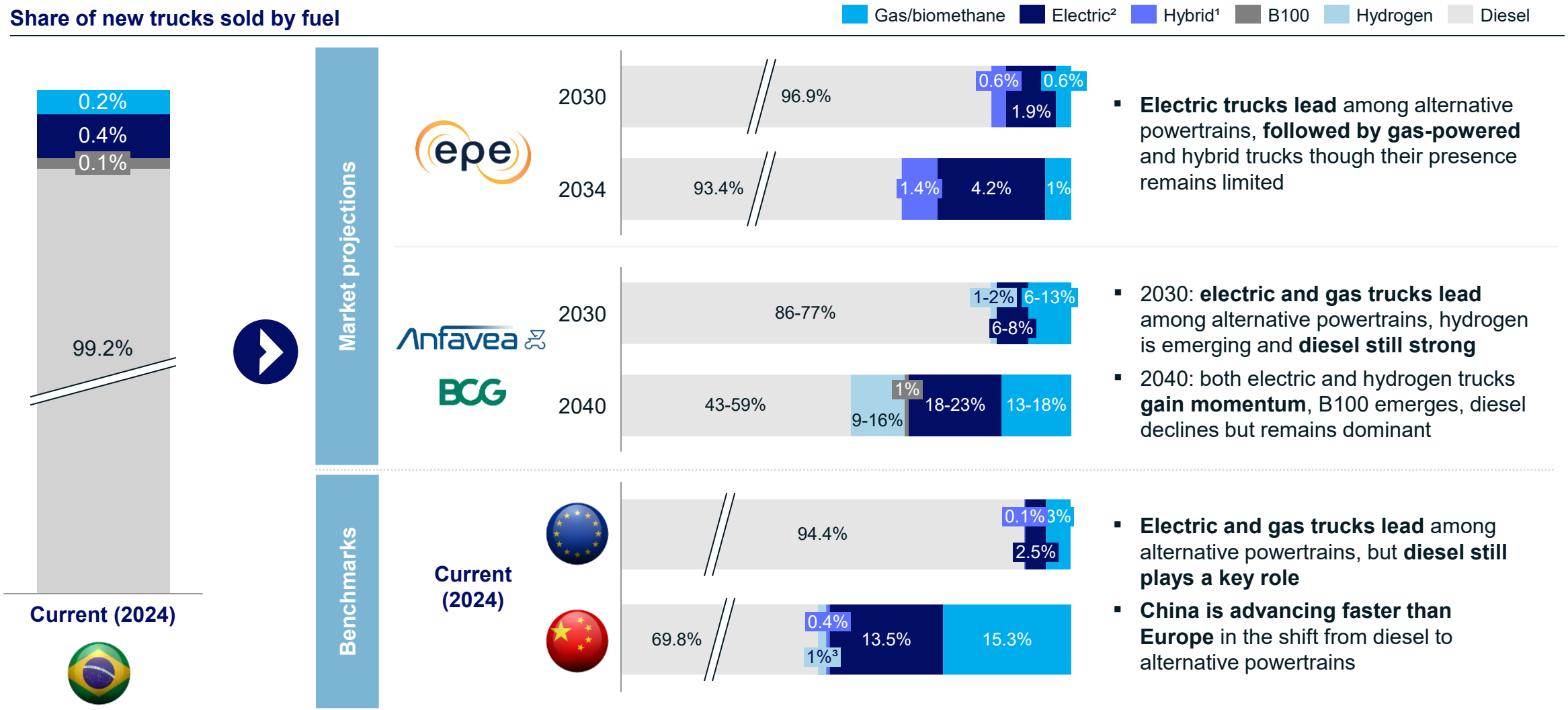
4

Evolution of truck ownership models

Leasing, rental and Truck-as-a-Service

Projections and benchmarks show that Brazil's truck fleets are likely to shift from diesel to alternative fuels – diesel remains relevant, while gas and electric expand

Share of new trucks sold by fuel



- **Electric trucks lead** among alternative powertrains, **followed by gas-powered** and hybrid trucks though their presence remains limited

- 2030: **electric and gas trucks lead** among alternative powertrains, hydrogen is emerging and **diesel still strong**
- 2040: both electric and hydrogen trucks **gain momentum**, B100 emerges, diesel declines but remains dominant

- **Electric and gas trucks lead** among alternative powertrains, but **diesel still plays a key role**
- **China is advancing faster than Europe** in the shift from diesel to alternative powertrains

1. Hybrid includes plug-in (PHEV) and self charging vehicles (HEV); 2. Battery Electric Vehicle (BEV); 3. Fuel Cell Electric Vehicle (FCEV)
Source: PDE 2034 (EPE), ANFAVEA, ICCT (Race to zero), European Alternative Fuels Observatory, BCG-Anfavea Study (2024), Mirow & Co.

Brazil's slower progress stems from its sole reliance on incentives, unlike Europe and China, which also use regulation and subsidies to accelerate infrastructure, reduce costs, and boost technology adoption

	Brazil	Europe	China
Regulation & subsidies	▪ **R&D incentives and tax benefits** to promote industrial investment and local innovation for clean fuels **– no imposition of targets/ obligations** on OEMs	▪ **Targets for gradual reduction of emissions in new trucks,** low emission zones in major cities and some countries provide **subsidies for purchase** of electric trucks[1]	▪ **Ambitious target** for new energy vehicle (NEV) **sales of OEMs, tax exemptions and subsidies** for electric and gas trucks, restricted urban access for diesel trucks in many cities
Infrastructure	▪ **Only a fraction of 2,300+ public DC** fast charging stations suitable for electric trucks ▪ **Only a fraction of 1,700+ CNG** refueling stations equipped to serve trucks	▪ **100,000+ DC fast charging stations – AFIR**[2] requires truck **charges every 60km** on core EU road network by 2030 ▪ **4,500+ CNG/LNG refueling stations**	▪ **Over 1 million DC charging points** for electric trucks in logistics corridors ▪ **9,000+ CNG/LNG refueling stations,** along logistics corridors connecting industrial zones, mining areas and ports
TCO	▪ Alternative fuel trucks have a **lower cost per km** than diesel, but **higher acquisition** cost	▪ **Reduced acquisition cost compared to Brazil,** given local OEMs producing electric and gas trucks	▪ **Reduced acquisition truck cost compared to Brazil,** given local OEMs producing electric and gas trucks and **local battery production** ▪ Also, reduction of industrial **night-time electricity tariffs**

1. Examples: Germany covers up to 80% of the electric truck cost gap vs. diesel and France offers up to €50,000 per vehicle 2. Alternative Fuels Infrastructure Regulation
Source: IEA, ICCT, TENtec Information System, ABEGÁS, ABVE, press clippings, Mirow & Co

The Brazilian government is encouraging transport decarbonization through R&D incentives, regulatory guidelines, and financing programs that apply to various alternative fuels

NON-EXAUSTIVE

Regulatory guidelines and fiscal upside

MOVER Program
2024-2028

Successor to Rota 2030, designed to pull OEM investment into cleaner power-trains and reduce vehicle emissions

- Reserves **BRL 19.3 billions in tax credits** for companies that invest at least 0.5% of annual revenue in **R&D or local production** of low-emission vehicles, including heavy trucks
- Introduces **mandatory efficiency targets** (12% tank-to-wheel energy-efficiency improvement by 2027[1]) that foster faster deployment of new technologies
- Sets a **50% well-to-wheel CO_2-reduction goal** by 2030[2], reinforcing the shift to low-carbon fuels and zero-emission drivetrains

Fuel of the Future Law
Oct 2024

Sets Brazil's new *low-carbon-fuel playbook* for road transport

- The law establishes **progressive levels of biodiesel blend** until 2030, creates a renewable-diesel (HVO) quota and launches a **biomethane-blending** program, while also establishing rules for other advanced fuels and carbon-capture projects
- These **clear, long-term fuel regulations** are intended to boost alternative fuel adoption and technology development

Low-cost sustainable financing

BNDES Climate-Fund/Finame
2025

Provides dedicated, below-market financing for buying or converting heavy vehicles to low-carbon power-trains

- National Climate Fund, administered by BNDES, feeds a dedicated Finame "Low-Carbon" credit window that together provide roughly **BRL 11.2 billion in financing** for green investments, including the acquisition of low-emission heavy vehicles
- Loans are offered at about 6.5% per year plus a 1.3% BNDES fee, and include grace periods of up to five years

1. Law 14.902/2024 + Decreet 12.435/2025 require OEMs to hit phased targets, starting in 2026 and targets compared to vehicles manufactured in 2022; 2. Compared to 2011 levels
Source: EPE, MME, Gov.br, Mirow & Co.

Existing laws, without expiration dates or incentive caps, also promote R&D, innovation, and infrastructure investments, with potential application to alternative fuels

NON-EXAUSTIVE

	"Lei do Bem" (Law 11.196/2005)	**Innovation Law**/ Decree 9.283/2018	**REIDI**[1] (Law 11.488/2007)
Purpose	▪ Encourages **private investment** in technological **R&D and innovation** in Brazil through **tax incentives**	▪ Facilitates and encourages R&D and innovation, fostering **collaboration** between **companies, universities, and scientific and technological institutions**	▪ Encourages **private investment in infrastructure** by lowering the tax burden on capital-intensive projects
Incentives	▪ Allows deduction of up to 100% of R&D and innovation expenses from Corporate Income Tax (IRPJ) and Social Contribution on Net Profit (CSLL) ▪ Up to 100% reduction of IPI (Excise Tax) on purchase of equipment used for research ▪ Accelerated depreciation and amortization of assets dedicated to innovation ▪ Withholding Income Tax (IRRF) exemption on remittances for patent registration	▪ Enables shared use of public laboratories ▪ Streamlines technology transfer ▪ Ensures compensation for public-sector inventors ▪ Allows flexible resource management in innovation projects ▪ Provides a secure legal framework for partnerships.	▪ Suspension of PIS/COFINS taxes on goods and services purchased or imported for the implementation of infrastructure projects in sectors such as energy, transportation, and logistics ▪ The benefit applies to machinery, equipment, construction materials, as well as engineering, assembly, and installation services
Need for prior approval	✗	✗ only depends on formalizing the partnership	✓ project must be approved by the relevant ministry.
Limitations	▪ Only applicable to companies under the Actual Profit tax regime, with tax compliance and Corporate Income Tax (IRPJ) payable	▪ Company partners with university to convert fleet to natural gas	▪ Valid only for new or expansion projects, excluding maintenance activities and existing operations
Application examples	▪ Development of hybrid engines, biomethane purification processes and LNG tanks for trucks	▪ Logistics carrier partnering with a technology institute to develop a retrofit system converting diesel trucks to LNG	▪ Biofuel plants and LNG/biomethane networks

1. Regime Especial de Incentivos para o Desenvolvimento da Infraestrutura (REIDI) Source: Mirow & Co.

Brazil's limited refining capacity requires importing ~30% of diesel, 60% of which comes from Russia, creating exposure to price volatility, currency risk and geopolitical instability

Brazil is self-sufficient in oil production but lacks refining capacity, relying on diesel imports…

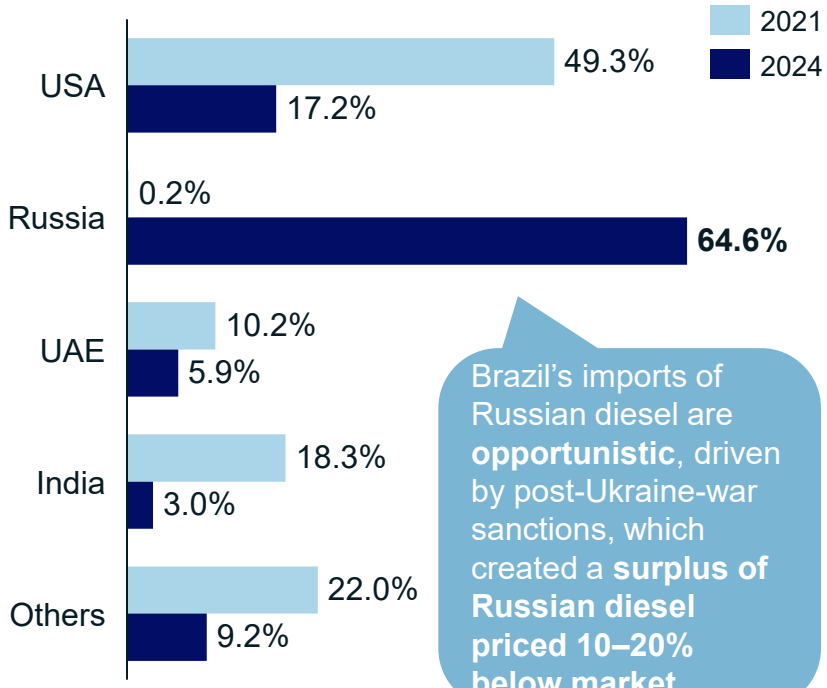
Brazil's large pre-salt reserves make it self-sufficient in crude oil production

However, domestic refining capacity is insufficient to process all extracted crude, particularly the heavier grades from the pre-salt, or to fully meet diesel demand

Consequently, around 30% of the diesel consumed in Brazil is currently imported

Even with higher domestic diesel output, the country would still need to import specific grades of diesel for blending to ensure fuel quality

…Russia leads diesel exports to Brazil, followed by the United States



Brazil's imports of Russian diesel are **opportunistic**, driven by post-Ukraine-war sanctions, which created a **surplus of Russian diesel priced 10–20% below market**

Russian diesel accounts for 18% of Brazil's consumption

Brazil's **dependence on imports** exposes it to global **price volatility**, **currency risks**, and **geopolitical instability**

EPE projects Brazil's oil production to grow by over 50% by 2031, while refining volumes are expected to rise by only about 10%

Source: EPE (Empresa de Pesquisa Energética), MDIC (Ministério do Desenvolvimento, Indústria, Comércio e Serviços), BBC, CNN Brasil, Mirow & Co.

Decarbonization push and diesel constraints can accelerate the shift to alternative fuels in trucking

Key alternatives to diesel in trucks

B Electric trucks

A Gas/biomethane trucks

C Biodiesel

Significant potential in Brazil

Source: Mirow & Co.

Increased adoption of gas-powered trucks will depend on refueling infrastructure, competitive TCO and solid technical support

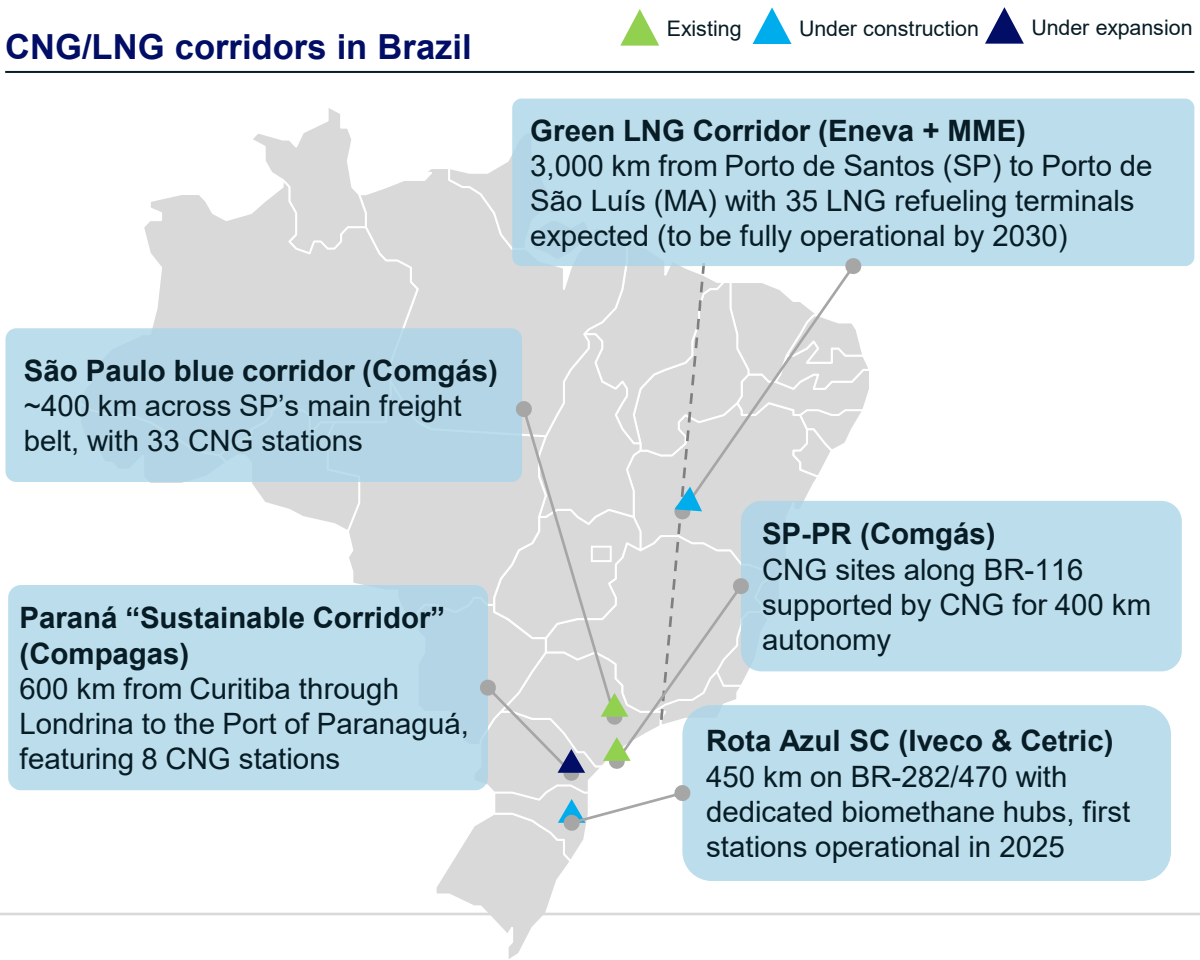
	What is necessary	Actual scenario	Perspective
Refueling Infrastructure	▪ **Reliable, high-flow CNG/LNG refueling stations** every 300-400 km are critical to keep long-haul fleets moving without costly detours ▪ **"Blue corridor" coverage, simplified regulations, and public-private capex sharing to de-risk investments** are critical for infrastructure build-out	▪ **Brazil has ~120 high-flow CNG refueling stations** (202% growth over 2023), but they are still concentrated in the southern and southeastern regions – new investments are ongoing to expand capacity ▪ The **first LNG "green corridor" is under construction** aiming to connect the southeastern and northeastern regions	
TCO vs. diesel-powered trucks	▪ **Higher acquisition price must be offset** by fuel and maintenance savings, targeting a two-to-four-year TCO breakeven ▪ **Resale value of gas vehicles should converge with that of diesel assets,** supported by OEM programs that foster a liquid secondary market and facilitate fleet financing	▪ Gas-powered truck has **acquisition cost up to 30% above** diesel versions for available models ▪ **Price of gas/biomethane is already competitive** (diesel 20-22 USD/MMBtu vs. natural gas 11-13 USD/MMBtu) – biomethane price usually lies 15-20% above natural gas	
Gas truck portfolio and technical support	▪ Gas-powered trucks portfolio must combine **competitive horsepower, solid driving autonomy, and nationwide service coverage** to secure diesel-level uptime, scale OEM volumes, boost parts availability, and reinforce fleet-manager confidence	▪ **Less than 1% of the registered trucks in 2025 are gas-powered** ▪ Despite the growing pool of gas-powered trucks on the market, **only Scania and Iveco currently sell them in Brazil**, while Volkswagen's model remains in testing ▪ Scania models have **driving autonomy up to 900 km** (fueled by CNG) and 1,200 km (fueled by LNG)	

Source: Centro Brasileiro de Infraestrutura, Scania, Iveco, ANP, Abegás, Estradão, IEA, Mirow & Co.

Fuel-of-the-Future law, along with CNG/LNG blue corridors, are levers already in place to accelerate the growth of Brazil's gas-powered truck fleet

New and expanding CNG/LNG corridors will give trucks seamless fueling across Brazil's key freight routes

CNG/LNG corridors in Brazil



The forthcoming biomethane-blend mandate (Fuel-of-the-Future law) will inject renewable gas into the network, driving wider adoption of this low-carbon fuel in road transport

Blend target	From 2026, **all pipeline gas must contain a biomethane share** that delivers at least 1% emissions reduction, rising to up to 10%
Timeline	Exact interim targets and **ramp-up schedule will be set by the CNPE** (National Energy Policy Council)
Traceability	A **new Biomethane Guarantee of Origin Certificate (CGOB) will certify** the renewable content and ensure compliance
Purpose	**Lower GHG emissions** across industry, power and, critically, the expanding CNG/LNG trucking network

Source: Abegás, Comgás, Exame, Compagas, MME, Iveco, Mirow & Co.

Natural gas supply in Brazil is expected to grow in the coming years, driven by increased domestic production and imports from Bolivia, Argentina, and LNG shipments

Multiple drivers are expected to unlock Brazil's natural gas supply in the coming years

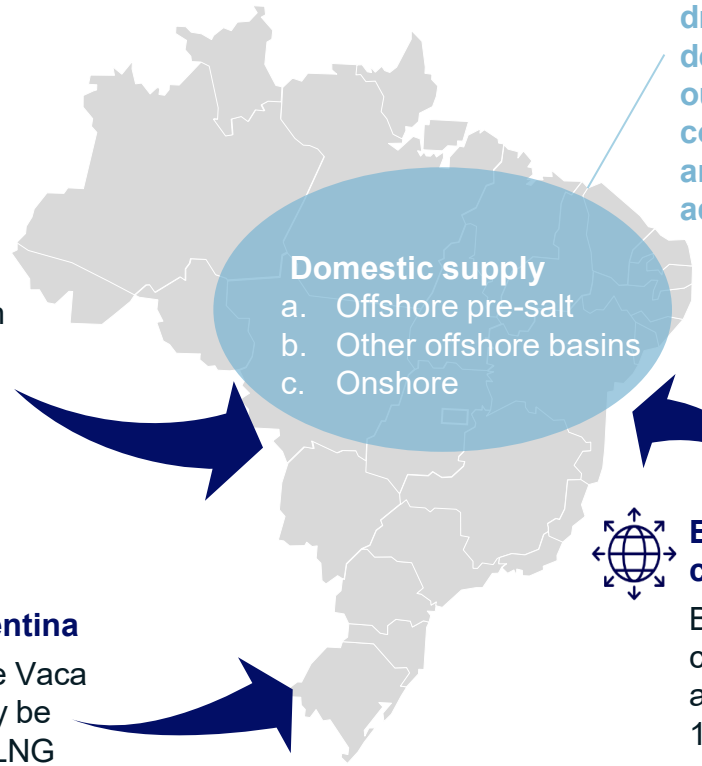
Infrastructure projects to expand domestic production outflow capacity: in 2023, Brazil produced 148 MMm³/day, of which 31% was supplied to the market

Increased imports from Bolivia, should the country succeed in developing newly discovered fields

Expansion of LNG regasification capacity, expected to reach 147 MMm³/day with projects currently under construction

Start of imports from Argentina, which holds sufficient gas reserves to become a major exporter

Main sources of natural gas supply in Brazil



Brazil is projected to more than double its net natural gas production by 2032, driven mainly by pre-salt developments, with new outflow routes under construction or planned, and the start-up of additional fields

Imports from Bolivia

With new discoveries, the country's production is expected to grow again and could supply up to 33 MMm³/day of gas (Gasbol's capacity)

Connection with Argentina

The vast potential of the Vaca Muerta field could finally be unlocked, including an LNG export project

Expansion of LNG import capacity

Brazil's regasification capacity is 97 MMm³/day and is expected to reach 147 MMm³/day upon completion of projects currently under construction

Source: Mirow & Co.

Market deregulation, although slower than expected, has allowed new players to enter the market, initiating the diversification of supply sources

The opening of Brazil's natural gas market, driven by Petrobras' 2019 Termination Commitment Agreement[1] and the 2021 New Gas Law, has made progress in recent years…

- The **number of active shippers** in the transportation system increased from 5 in 2021 to 28 in 2023
- **Commercialization contracts** rose from 166 to 458, 66% of which do not involve Petrobras
- **The greatest market opening so far has been in the Northeast**, where 71% of contracted volumes come from private suppliers – more competitive prices generated BRL 2 billion in savings for consumers between 2022 and 2023
- **Companies have entered the natural gas market** (e.g., Grupo J&F) **or expanded their participation** in the sector (e.g., Shell, Compass, and Equinor)
- **Major consumers, have migrated to the free market**

… and there is still considerable room for progress, driven by regulatory improvements currently under discussion

- The **main provisions under discussion** at ANP for regulation include:
  - Pricing rules
  - Guaranteed access to infrastructure
  - Unbundling of companies across the value chain
  - Entry-exit model
- The **main challenges to advancing regulation** are conflicts between federal, state, and municipal legislation, as well as jurisdictional disputes between ANP and state agencies

1. "Termo de Compromisso de Cessação", signed with CADE, through which Petrobras committed to a series of divestments aimed at promoting the opening of Brazil's natural gas market
Source: press clippings, Mirow & Co.

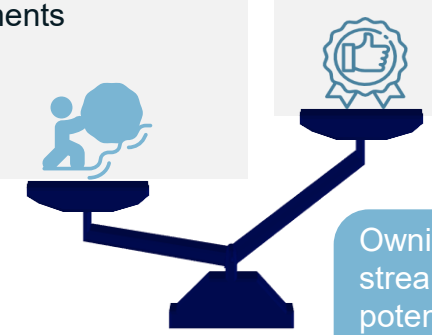
In Brazil, biogas has significant growth potential, despite current market challenges – biomethane could account for up to 30% of the country's natural gas demand by 2030

Despite some challenges, biogas in Brazil…

- More **complex logistics** due to the gaseous nature of the product
- Lack of market incentives limits off-takers interest – **carbon price** estimated at 50 $/t for breakeven with natural gas
- **High CAPEX** requirements

…holds strong potential for market growth

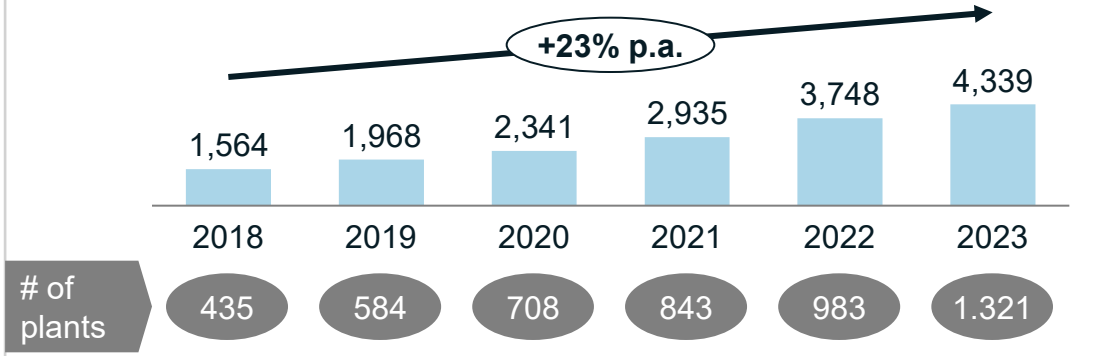
- Significant production potential in Brazil
  - Wide diversity of **biomass sources** from the agroforestry sectors
  - **Could supply up to 30% of national gas demand**
- Proven and well-established technology



Owning the waste stream holds strong potential in a highly competitive environment

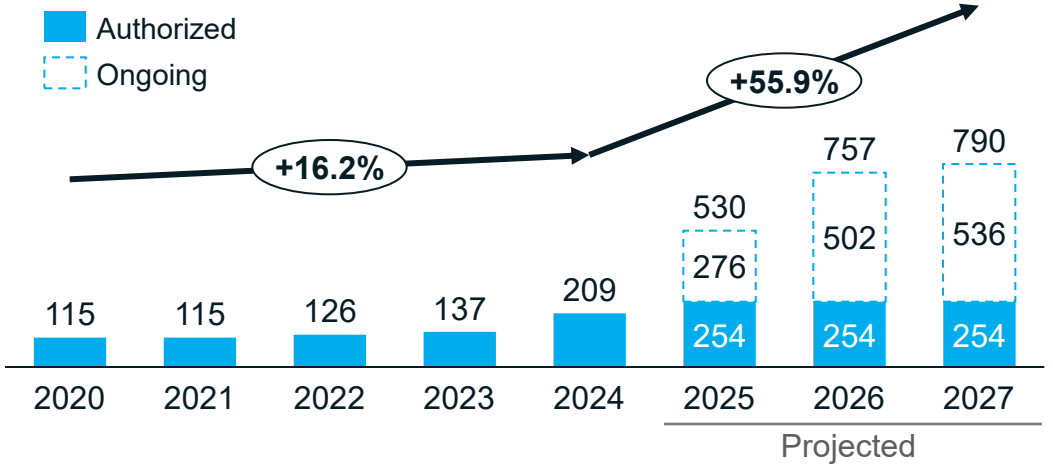
Biogas production capacity in Brazil

MM Nm³/year[1]



Growth of biomethane production capacity by status at ANP

MM Nm³/year



- Expanding biogas purification capacity could increase biomethane's share of Brazil's natural gas supply to 25–30% by 2030
- Market-ready biomethane production capacity reached 209 MM Nm³/year in 2024 and based on ongoing ANP approvals, is expected to jump to around 790 million Nm³/year by 2027

1. Nm³ = normal cubic meter, which represents the volume of gas in m³ under standard temperature and pressure conditions

Source: ANP, EPE, Cibiogás, *clippings*, Mirow & Co.

Electric trucks are gaining momentum in light and urban segments, but infrastructure, range and recharging times are challenges to a wider adoption in Brazil, especially for long-haul

Urban-centric payloads tip the scale toward BEVs

Light and medium trucks run short, depot-based routes **where a 200-km battery is sufficient** and adds <5% weight penalty, while city incentives (IPVA/road-restrictions exemptions, low-emission zones) push total cost of ownership **(TCO) below diesel within 3-5 years**

Main obstacles for widespread adoption of electric trucks

Charging infrastructure

Fast-charging infrastructure for electric trucks **is still limited**, particularly in rural areas and along highways, **restricting long-haul operations** of heavy-duty electric trucks

Range and recharging time

Electric trucks currently offer **limited range**, covering only **100 to 200 km** per charge, many face speed limits and most require **more than 1 hour to fully recharge,** even with the fastest systems

Initial cost

Although electric trucks offer **lower operating costs** over time, their upfront **price** (2-3 times higher vs. diesel trucks) **remains a major barrier**, especially for small and medium-sized enterprises

Weight

Electric trucks are **typically heavier** than their diesel counterparts due to the weight of batteries, which, depending on the model, can **reduce payload capacity** by up to 20%

What would be necessary

Infrastructure expansion

Brazil is promoting public-private partnerships to accelerate the development and expansion of charging infrastructure

Technological advancement

Battery technology is constantly evolving to enhance energy density, extend driving ranges, reduce charging times and lower production costs

Source: Valor Econômico, *press clippings*, Mirow & Co.

Structural barriers hinder electric truck adoption in Brazil, demanding major investment in highway charging infrastructure and power grid upgrades

Scaling up high-power truck chargers[1] will require stronger energy infrastructure and significant upgrades to Brazil's highway grid

Brazil's highways often lack the grid capacity, such as nearby medium/high-voltage lines, needed to enable large-scale truck charging

Therefore, **significant investments** would be required to:

- Reinforce transmission and distribution **lines**
- Build or expand **substations** near highways
- Manage **peak demand** (e.g., simultaneous charging of multiple trucks)

These investments are **complex**, as they **require approval** from the power distribution company (ANEEL REN 1,000/2021) and can take **6 to 24 months to implement**, depending on the scope of the project

The challenge of expanding charging infrastructure for electric vehicles is viewed as more complex than developing natural gas refueling networks

- **Gas and biomethane can be distributed through existing pipelines** (as in the states of SP, RJ, PR, SC and RS) or **tanker trucks**, enabling refueling stations along logistics corridors without major infrastructure projects
- Gas/biomethane refueling stations can be deployed within **3–6 months**, operate similarly to diesel stations, and **enable fast refueling within minutes**

1. > 350kW

Source: Mirow & Co.

Large companies are leading electrification in urban and high-utilization segments, where TCO delivers the greatest advantage

Easier segments to electrify

Harder segments to electrify

Segments	Success/ challenge factors	Application examples
Last-mile/ E-commerce	Short routes, depot charging and predictable operations	▪ **Mercado Livre** (+100 electric vans/light trucks), **DHL Express** ▪ **Amazon** (US/Europe), **UPS** (US)
Urban distribution (consumer goods, beverages, food)	Distribution centers close to points of sale and intensive usage	**Ambev** (+200 electric trucks), **JBS** (refrigerated trucks) **Coca-Cola** (NL), **PepsiCo** (US)
Middle-mile/ Inter-DC	Predictable, repetitive and medium-distance routes, depot charging	**Henkel** 30-ton electric truck for transport between the plant the DC **Amazon** (Germany/UK), **DHL** (Sweden)
Corporate fleets/ Urban services	Fixed routes, overnight charging, services in areas with pollution/ noise restrictions	**Enel/CPFL** (electric service vehicles), electric **garbage** collection trucks Electric garbage trucks (LA, US)
Long-haul/ Interstate freight	Insufficient range, lack of charging hubs, downtime incompatible with diesel	▪ PepsiCo and Walmart (US) using electric truck on 400–800 km routes, but only in dedicated charging corridors
Heavy-duty trucks (mining, construction, agribusiness)	Massive batteries reduce payload, limited range, heavy infrastructure requirements	▪ Sweden: 74-ton electric truck piloted in underground mining (Volvo) ▪ China: 60-90 ton trucks in coal mines, limited to short routes with on-site charging
Remote regions (e.g., Amazon and Midwest)	Weak grid and long distances	

Demand for electric trucks is driven by large companies with decarbonization targets willing to absorb higher upfront costs as a strategic investment in brand, sustainability, and future TCO reduction – charging infrastructure is usually built in-house at distribution centers or depots

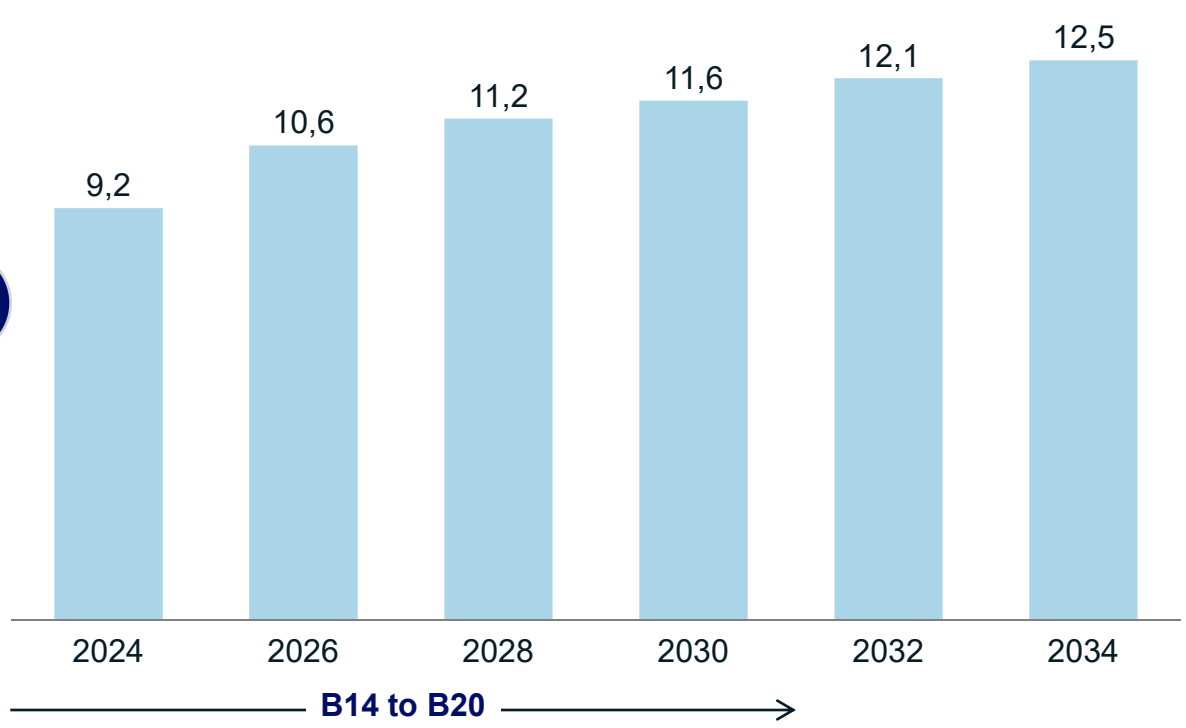
Source: Mirow & Co.

Alongside electrification and gas, Brazil is betting on biofuels for road freight transport - new regulations will raise biodiesel blends, requiring OEMs and fleets to adapt

Regulations are a key propeller of biodiesel demand in Brazil

- **PNPB** (National Biodiesel Production & Use Program) **locks in demand, moving the diesel blend from B14 today to B20 by 2030** under CNPE Resolution 14/2023
- The **Fuel of the Future Law** removes previous statutory ceiling, allowing the CNPE to **raise the blend up to B25 from 2031 onward**
- Together, these measures provide both a **guaranteed market pull and the regulatory headroom** for continued biodiesel growth

Biodiesel demand by year
Billions of liters



Over the last five years, installed production capacity has climbed from 2,7MM m³ per day to 4,2MM m³ per day – a 54% increase

Implications

- **OEMs will need to adapt their product to comply with new blends:**
  - **Hardware refresh:** specific parts are being refreshed (e.g., rubber hoses and seals) to biodiesel resistant parts to guarantee durability at B20-B25
  - **Service-book update:** maintenance schedules and component changes are being revised to guide dealers and customers (e.g., add an early fuel-filter change and link warranty to fuel that meets ANP/ASTM specs)
  - **Future-proof power-train R&D:** OEMs are investing now to certify high-blend solutions (e.g., B100)
- **As for fleet operators, maintenance cost could rise by up to 7%**, mainly from filter changes twice as often, also, **pre-Euro V trucks may need retrofit kits** (hoses, seals, high-capacity filters) to operate reliably on B20+ blends

Note: the "Bx" designation specifies the biodiesel share in a diesel blend (e.g., B14 contains 14% biodiesel and 86% petroleum diesel)
Source: Associação Nacional do Transporte de Cargas e Logística, ANP, Cummins, EPE, MME, Mirow & Co.

Biodiesel incentives are enabling niche heavy-haul solutions – Volvo and Scania, in partnership with leading agribusiness fleets, are piloting B100-ready trucks

NON-EXAUSTIVE

B100 is a low-carbon pathway for fleets with reliable biodiesel – pilots under 'experimental' or 'specific' ANT permits are under way

Vehicle adaptations

- **Running on B100 requires specific engine modifications,** the base is the same, while seals and elastomers are upgraded, injection mapping is retuned, and filtration/storage specs are tightened
- Volvo estimates that **large-scale production is viable** with about BRL 20k extra per unit to manufacture the B100 ready FH model
- **B100-ready truck stays blend-flexible**, operating on any mix up to and including 100% fossil diesel

Main challenges

- Bottlenecks are upstream, centered on **fuel quality** (premium biodiesel is required and tested by OEM to provide full warranty), **dedicated logistics** and **biodiesel scale economics**
  - **Average ex-plant[1] fuel prices in 2025** still put neat **biodiesel (B100) about 45-50% costlier than S-10 diesel** (B100: BRL 5.29-6.14 per liter vs. Diesel S-10: BRL 3.63-4.1 per liter)

Commercial application

- Since B100 cost is higher than conventional diesel, **target customers are primarily captive agricultural fleets** that control their own fuel supply – even with a chassis premium of ~4-8%, B100 cost-per-kilometer can beat diesel in some cases

Main use cases

Scania Super 500 R B100

AMAGGI Agro

Largest B100 truck fleet in Latin America, order of 100 units 6×4 tractors running 100% **biodiesel on soy-bean supply routes**

Volvo FH B100 Flex

IBOR Transportes

First batch of 10 units powered by biodiesel made from **recycled cooking oil** – operates on multi-state long-haul lanes (MG-SP-RJ-ES)

1. Ex-plant price: amount charged at the plant gate – before any freight, distributor/retailer mark-ups, or state taxes (ICMS) are added

Source: Estradão, Scania & Volvo websites, ANP, Mirow & Co.

Other biodiesel-like fuels are emerging – BeVant is a direct diesel substitute but still needs to scale up to compete in the market

Be8 has launched BeVant with pilot-scale production, positioning it as a drop-in alternative to fossil diesel but not yet at commercial scale

What is it?

- Ultra-pure, double-distilled biodiesel, delivering higher stability and lower impurities compared to traditional biodiesel
- Can replace fossil diesel up to 100% with no engine adaptation (“drop-in”)
- Provides higher natural lubrication and improved performance in low temperatures

Opportunities

- Up to 50–99% lower GHG emissions vs. fossil diesel across lifecycle
- Cost-competitive vs. fossil diesel, with higher energy efficiency
- Already attracting major early adopters that are testing the new fuel in partnership with Be8 (Gerdau, Ambipar, Randon, Congonhas Airport)
- Produced from vegetable oil and animal fat, leveraging established supply chains

Challenges

- Limited scale today (pilot production, not yet relevant to national diesel demand)
- No clear ANP regulatory framework to increase its usage
- Exposed to commodity price volatility (soy, animal fat) and logistics constraints
- Faces strong competition from other low-carbon fuels (HVO/renewable diesel, biomethane, electrification)

Source: Be8, Mirow & Co.

In the coming years, alternative powertrains, Chinese competition, technology upgrades and new ownership models are set to reshape Brazil's truck market

1

Emergence of alternative powertrain technologies

Natural gas and biomethane, electric, hybrids, B100 and hydrogen

2

Rising competitive pressure from Chinese OEMs

Chinese competition

3

Technology upgrades and autonomous driving

AI-driven fleet management and autonomous systems

4

Evolution of truck ownership models

Leasing, rental and Truck-as-a-Service

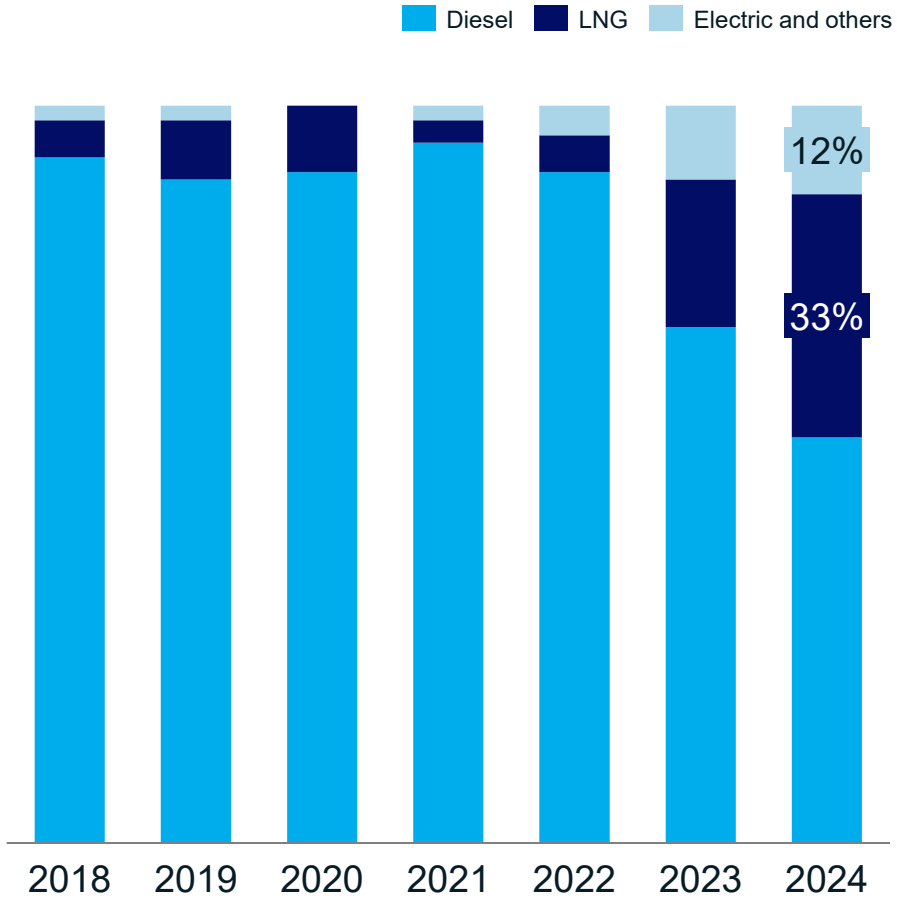
China has been investing heavily in replacing its diesel truck fleet by alternative options – LNG-powered units made up 33% of all heavy-duty trucks in 2024

Market prices of LNG and diesel in China[1]

USD/MMBtu

Sales of heavy-duty trucks in China by fuel type[2]

% of total sales proxy

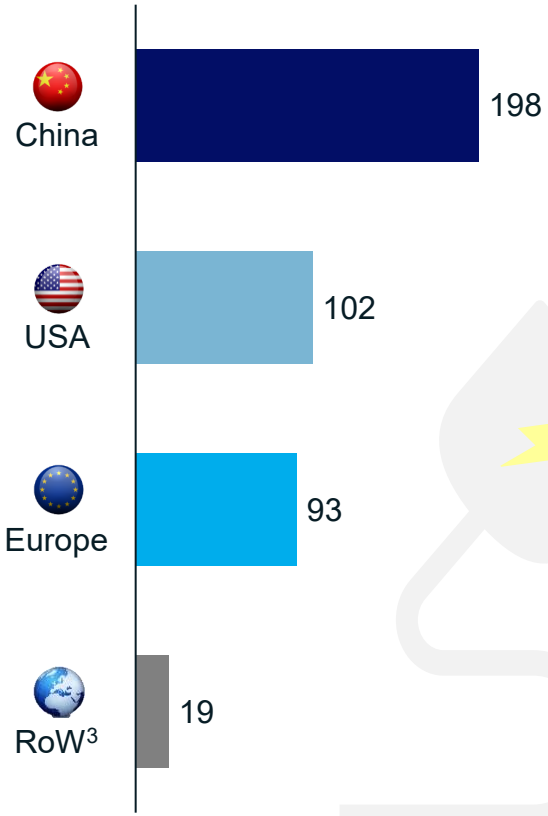


- China sold 178k LNG heavy-duty trucks in 2024, up 17%year-over-year**, LNG captured 33% of the heavy-duty market, with sales tightly tracking the LNG-to-diesel price spread**
- **Sales remain price-sensitive** and electric heavy-duty vehicles already reached nearly 20% of Q1-2025 HDV[3] sales, signaling **LNG's role as a medium-term bridge fuel**
- **Gas supply mix** in 2024 (estimate):
  - Domestic production 68 %
  - Seaborne LNG 25 %
  - Russia 7 %

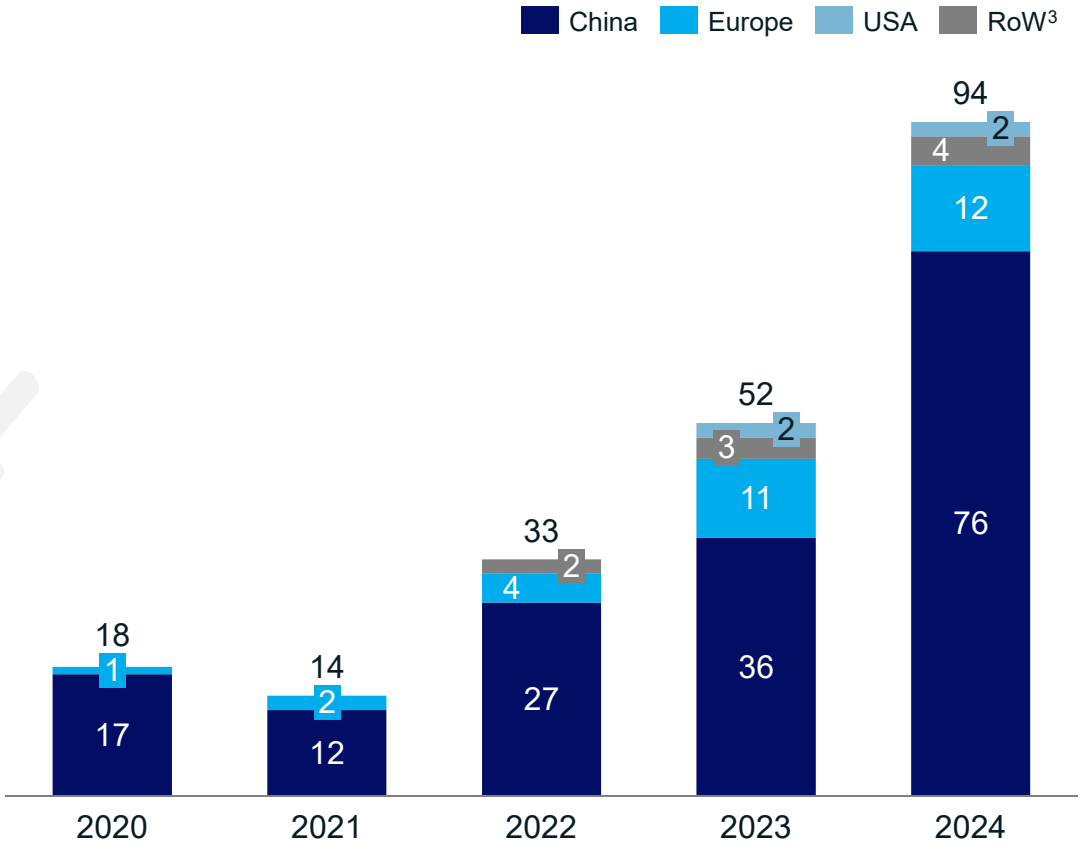
1.Exchange rate assumed: 0.14 Rmb/USD; 2. Truck class: ≥ 14-ton GVW; 3. Heavy-duty vehicles
Sources: Financial Times, Wind, CV World, ICCT (Race to zero), IEEFA, Mirow & Co.

Chinese truck makers have become the leading global catalysts, especially in e-mobility, leading technology and global market presence

Electric truck vehicle model[1] availability in 2024 by region[2]
Number of electric models available



Electric truck sales share by region
Thousands of units



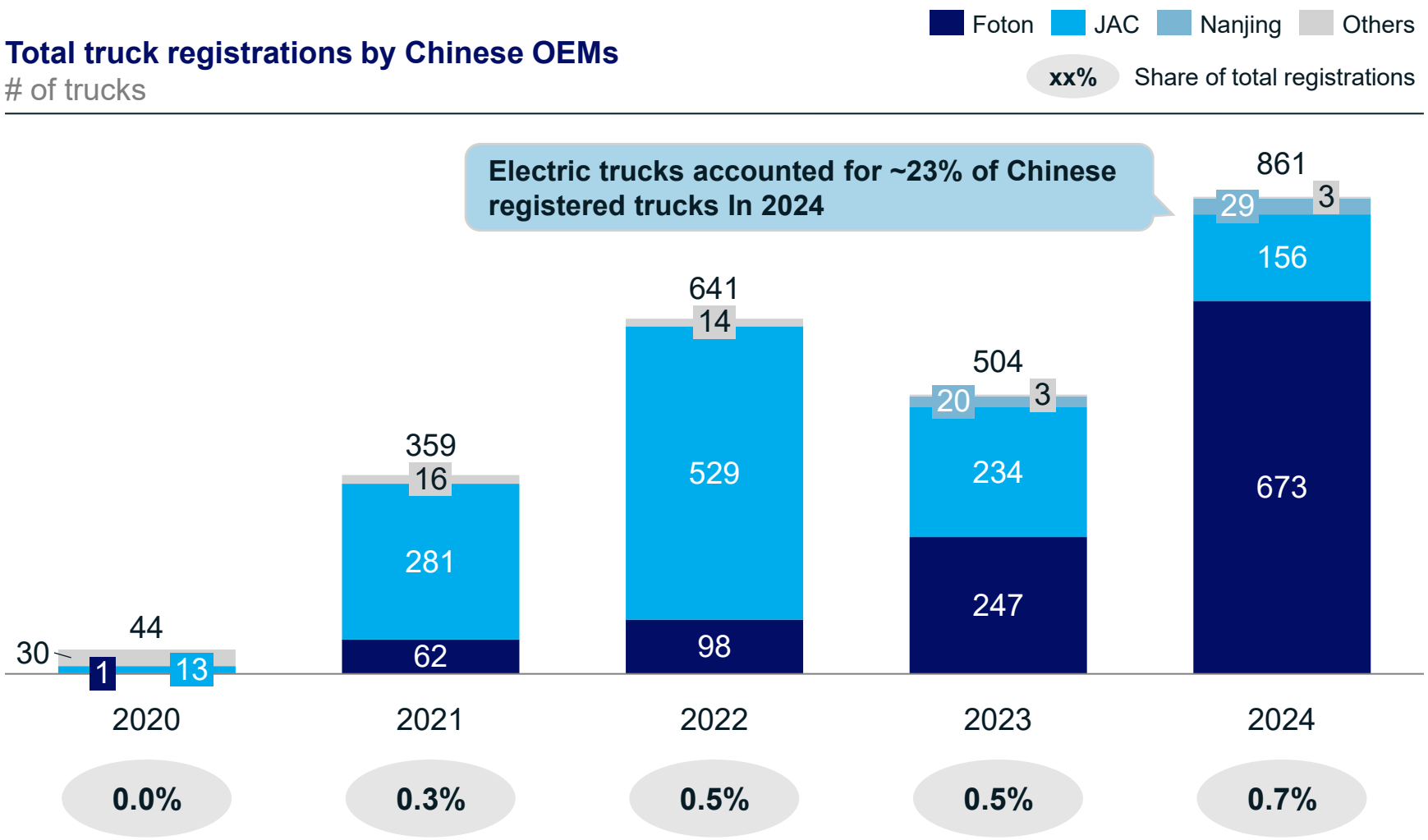
- **Policy-driven scale advantage**: China's mix of scrappage incentives, stricter 2023 emission standards and industrial decarbonization goals propelled electric-truck sales to more than 80% of global volumes in 2024, more than doubling year over year
- **Cost leadership through battery economics:** a 30% drop in battery-pack prices since 2020 has enabled Chinese OEMs to launch heavy BEVs with 600 km range while narrowing the diesel cost gap to unprecedented levels
- **Global rollout of a mature portfolio:** with a new catalogue of 450+ electric heavy-duty models, players such as BYD, Foton and JAC are now localizing production in Brazil, Argentina and Southeast Asia, exporting China's e-mobility playbook worldwide

1. Includes medium-duty (3,5-15t), heavy-duty (>15t) and specialized trucks (garbage/refuse trucks, concrete mixers, and other specialized mobile commercial trucks); 2.By original equipment manufacturer headquarters; 3. Rest of the world Source: IEA, Mirow & Co.

In Brazil, Chinese entrants still hold less than 1% of the truck market, currently led by JAC and Foton

Total truck registrations by Chinese OEMs

of trucks



Comments

- Beyond JAC, Foton, and Nanjing, at least **seven other Chinese brands[1] filed Brazilian truck registrations between 2020-24,** yet most stayed in pilot batches
- **Although most truck registrations in 2024 were electric**, Foton's recent growth has been driven by its diesel Aumark lineup
- Even after a jump in Chinese registrations since 2020, **their combined share remains below 1% of Brazil's truck market**

1. BYD , JBC, JMC, CAMC, Dongfeng, Shacman, Sinotruk

Source: Fenabrave reports, Mirow & Co.

Chinese OEMs can follow three strategic pathways into the Brazilian truck market - commitment is likely to increase only incrementally and if risk is offset by incentives

Level of commitment/risk

	Asset-Light Import (CBU)	SKD/CKD assembly (partnership or standalone)	Greenfield Plant
Description	**Ship fully-built trucks straight from China**, rely on an importer/distributor to test demand with almost no local investment	**Bring the truck in kits, build them together inside a plant** (partner's or own owned) to reduce taxes, earn the "made in Brazil" label and tap the partner's dealer network	**Commit to a full factory**, localization targets and a supplier park – highest CAPEX but unlocks deep tax incentives, volume scale and brand credibility
Speed to market	Phased	1-2 years	Slow (2+ years)
CAPEX	Low (reversible)	Medium (shared)	High (irreversible)
Strategic reasoning	Test demand, brand visibility with minimal exposure	Tax relief, local badge, leverages partner's network	Full cost control, meets local-content rules, credibility

Source: Mirow & Co.

JAC leads Brazil's e-truck market through asset-light entry – XCMG builds on local presence and Higer leverages a partnership to prepare for SKD production

NON-EXAUSTIVE

Asset-Light Import (CBU)

CKD assembly

Company	Current strategy & scale	Truck portfolio (Brazil)	Outlook
JAC MOTORS	▪ **Present in Brazil since 2011** through local partner Grupo SHC, the brand has **refocused its local operation on commercial EVs** as its strategic niche since the early 2020 ▪ **Chinese player with the most units registered historically** in Brazil (~1,200 since 2020)	▪ **Battery-electric urban trucks** (e.g., iEV1200T (7.5t), E-JT 9.5t, 12.5t, 18.0t trucks) – mainly focus on light segment	▪ **JAC aims to lead Brazil's electric commercial-vehicle segment**, concentrating its line-up on **urban-centric trucks and vans** ▪ The company is also evaluating the **homologation of medium-duty diesel trucks in Brazil**
XCMG	▪ The Chinese construction equipment giant, has **leveraged its Brazilian presence**[1] to enter the truck market with **imported electric trucks** ▪ XCMG is currently **testing market adherence**, in 2023 it **introduced Brazil's first fully electric tractor-truck**, importing an initial batch of 200 units. Since then, it has **broadened its line-up with new light and medium-duty models**	▪ **The company is currently focused on battery-electric trucks** (e.g., E3-10T, E7 18T, E7-29T, E7-49T, E7-80T)	▪ XCMG plans to start **local assembly in Pouso Alegre (MG) by 2025-26,** transitioning **from CBU import to SKD/CKD assembly**, sourcing chassis and cabin locally while importing battery systems ▪ The brand also aims to **expand its dealer network** and has recently **showcased a gas-truck tractor** (P9-560G) to gauge buyer interest – XCMG already sells **gas and hydrogen-powered models** in other markets
HIGER	▪ **Joint venture TEVX Higer** announced at Fenatran 2024, **first batch of CBU demo fleet in 2025** ▪ **Company will use TEVX's existing bus-sales network for pilot fleets** – no ANFAVEA registrations yet	▪ **Battery-electric 4x2 tractor-truck** (40 t) ▪ **Light trucks** in 3.5t and 5t classes for last-mile logistics	▪ **Homologation of its tractor-trucks targeted for Q4-2025** – plan is to shift to **SKD/CKD assembly inside TEVX's bus plant** once volumes hit ~500 units/year ▪ Parent company already sells **hydrogen and larger electric trucks in China**

1. A machinery plant in Pouso Alegre (MG)

Source: Fenatran, AutoData, Automotive Business, OEMs websites, ANFAVEA, Estradão, Valor Econômico, China Truck News, China Daily, Mirow & Co.

Foton scales up through local JV with Agrale, standing out in the light diesel segment unlike its compatriots – BYD bets big on Brazil with a greenfield plant and a focus on urban e-trucks

NON-EXAUSTIVE

CKD assembly

Greenfield plant

Company	Current strategy & scale	Truck portfolio (Brazil)	Outlook
FOTON	▪ Foton began with low-volume CBU imports in 2010 and, **in Apr-2025, opened Brazil's first Chinese-owned truck line – a CKD operation in partnership with Agrale in Caxias do Sul** (~5,000-unit annual capacity) ▪ ~1,100 Foton trucks have been registered since 2020, making it **the country's second-largest Chinese brand by registrations volume**	▪ **Diesel trucks from light to semi-heavy** (e.g., Aumark 3,5-11,5t, Auman 16t) and an **electric light-duty model** (iBlue 6t)	▪ Foton targets **10% of the Brazilian truck market within five years** and **does not discard the possibility to open a factory in Brazil by 2028** which could also serve as an export base for South America
BYD	▪ **BYD has begun testing the market with imported light and medium-duty e-trucks** – still negligible in registration counts ▪ **The company is building a complex in Camaçari (BA)** – BRL 3 billion will be invested with lines for e-truck/bus chassis, batteries and capacity to manufacture up to 150,000 vehicles (including passenger cars) per year	▪ The manufacturer recently introduced the BYD eT5 model, a 100% **electric light truck**, in Brazil – the vehicle is intended for **short-distance urban transportation**	▪ **BYD's Camaçari complex is now in commissioning** and will begin with SKD assembly before reaching full manufacturing by 2026 – **truck chassis will be built on-site,** with batteries and power-train components progressively localized for Brazil and export markets ▪ **While focused on light/medium urban e-trucks**, BYD has recently showcased the 21t eT18 for zero-emission power-line work, signaling versatility to enter specialized segments

Source: Fenatran, AutoData, Automotive Business, OEMs websites, ANFAVEA, Estradão, Valor Econômico, China Truck News, China Daily, Mirow & Co.

With technologically advanced Chinese entrants imminent, established OEMs need to react rapidly to safeguard market share

Factors facilitating Chinese truck OEM entry into Brazil

Overcapacity converted into export growth

- Chinese MHCV[1] plants **can build roughly 4.7 million units per year, yet output was only 1.1 million** in 2023
- To keep factories running, **manufacturers more than doubled exports of trucks over five tons**, from 192k units in 2021 to 378k in 2023, so overseas sales exceeded 30% of total production

Cost efficiency at scale

- **Chinese manufacturers benefit from relatively lower production costs** – from labor to supplier networks – and **high productivity** (e.g., China-made LFP[2] battery cells plunged 51% to USD 53/kWh by July 2024, less than half the global pack average of USD 115/kWh)

Technology leadership

- **Rapid progress in batteries, power electronics, and vehicle software gives Chinese OEMs a clear value-for-money edge** – high-tech features delivered at competitive prices (especially in e-models) have **elevated global perceptions of Chinese trucks**

State policy support

- **China's industrial policies and government support bolster its vehicle manufacturers**, providing subsidies and research support that helped companies like BYD, SAIC, and others grow rapidly

+

Regulatory and fiscal tailwinds

- **Zero import duty on EVs from 2015 to 2023 and reduced CKD/SKD tariffs lowered entry barriers**, and federal/state incentives continue to attract Chinese investment – with **import tariffs on EVs climbing to 35% by 2026** Chinese OEMs will seek **local assembly or partnerships to stay price-competitive**

What to expect?

Accelerated competition in urban light/medium segments and zero-emission niches as Chinese players leverage cost-tech advantages

Movements of incumbents to defend with **localized EV offerings**, **stronger TCO** analytics, **agile pricing** and focus on **quality of aftersales/services**

Strategic partnerships – **either with Chinese OEMs or local suppliers** – can turn disruption into opportunity, securing cost advantages and technology transfer ahead of the next tariff wave

1. Medium- and heavy-commercial-Vehicle; 2. Lithium-iron-phosphate
Source: S&P Global, China Customs, Bloomberg, Reuters, Dana, CSIS, Estradão, Mirow & Co.

In the coming years, alternative powertrains, Chinese competition, technology upgrades and new ownership models are set to reshape Brazil's truck market

1

Emergence of alternative powertrain technologies

Natural gas and biomethane, electric, hybrids, B100 and hydrogen

2

Rising competitive pressure from Chinese OEMs

Chinese competition

3

Technology upgrades and autonomous driving

AI-driven fleet management and autonomous systems

4

Evolution of truck ownership models

Leasing, rental and Truck-as-a-Service

Technological innovations are changing the way we build and drive trucks

NON-EXAUSTIVE

Active Safety Systems (ADAS)
Sensor fusion (radar, LiDAR, cameras) feeds an on-board AI that keeps the truck in its lane, brakes to avoid collisions and increase safety.

Connected Data & Remote Software Updates
Antenna streams (5G/V2X) real-time vehicle data to the cloud. Encrypted APIs provide data to fleet owners, insurers, and third-party apps, while over-the-air updates add new features without workshop visits.

Energy & Efficiency Enablers
Machine-learning controls adjust aerodynamics, cooling, and regenerative braking on the fly, cutting fuel or battery use and helping the truck hit tightening CO_2 and zero-emission targets.

Incremental

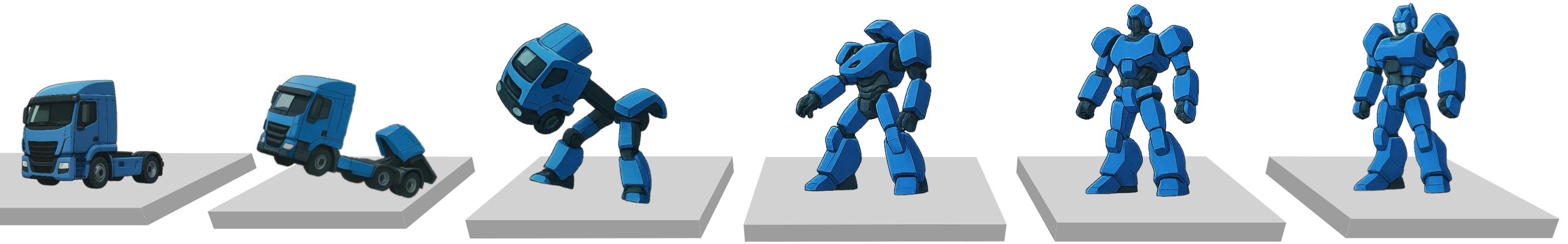
Disruptive

Autonomous driving
AI-powered systems are evolving from assisted driving (Level 0-2) to increased autonomy (Level 3–5), enabling trucks to operate without human driver in predefined routes or even general conditions in the future.

Predictive Health & Powertrain
Edge processors listen to vibration and temperature data from key components, predict wear before breakdowns, and trigger maintenance only when truly needed – prolonging engine, gearbox, and axle/e-axle life

Source: Ness, SAE International, Automotive Fleet, Mirow & Co.

Truck autonomy evolves from assistive tech to disruptive automation – Levels 0–2 bring incremental safety gains, while Levels 3–5 demand advanced technology



Level 0

No active driving assistance, the system may provide warnings, but **the driver performs all tasks**

Level 1

A single system (like adaptive cruise control or lane centering) assists the driver – driver must remain **fully engaged**

Level 2

The vehicle can control steering and acceleration/ deceleration simultaneously, under supervision – still **requires constant driver monitoring** and intervention at any time

Level 3

The vehicle drives itself under specific conditions (e.g., highway traffic jams) – **driver** can disengage from driving tasks but **must be ready to take over when prompted**

Level 4

The **system drives the vehicle without human input in predefined areas** or scenarios (e.g., autonomous delivery routes, mining operation) – **no driver intervention required within those zones**

Level 5

The vehicle can operate autonomously anywhere, anytime, with **no driver required**

Levels 0 to 2 represent incremental improvements in safety and comfort, commonly referred to as ADAS (Advanced Driver Assistance Systems)

Levels 3 to 5 mark a disruptive shift, requiring new business models, regulations, and infrastructure adaptation

Source: SAE International, Mirow & Co.

Incremental features remain in early adoption but are expected to gain traction through 2030, paving the way for fully autonomous trucks next decade

NON-EXAUSTIVE

Incremental technologies	Brazil maturity (2024-2025)	Brazil outlook (2030)
Active Safety Systems (ADAS)	▪ **ADAS are still starting to be applied** – new CONTRAN regulations will make Automatic Emergency Braking (AEB) and Lane-Departure Warning (LDW) mandatory on all new heavy trucks from 2025 onward	▪ **ADAS becomes standard** on every new heavy truck sold in Brazil by 2027, following CONTRAN regulation
Predictive Health & Powertrain	▪ **Predictive maintenance still gaining importance,** roughly 24k Scania trucks in Brazil already run on "flexible maintenance" plans that use real-time data to schedule service – fleet owners report maintenance costs down by ~25%	▪ **Almost all trucks** leave the factory **with connected predictive-maintenance capability by 2030** (>80% of rolling fleet connected) – service is offered as standard, not premium ▪ **AI health monitoring expands** beyond engines and gearboxes to cover **battery packs and e-axles as e-truck sales grow**
Connected Data & Remote Software Updates	▪ **Mixed connectivity landscape** where large fleets deploy full telematics suites with rich data analytics, while many small operators still rely on basic GPS tracking only ▪ **Over-the-air (OTA) software updates are starting to be released by Volvo**	▪ **Euro-6e / Euro VII electronic architectures** with built-in remote-update functions reach Brazilian assembly lines from 2026 onward ▪ **Over-the-air (OTA) engine and ADAS remotely software updates will be more frequently** delivered in **2026-27** ▪ **Near-universal connectivity** on new trucks by 2030, driven by remote-tachograph and cybersecurity regulations
Intelligent Energy & Efficiency Systems	▪ **Driver-coaching systems (eco-scorecards) are widespread** and deliver roughly a 10% fuel saving ▪ **Machine-learning aerodynamics and thermal-management are not yet offered locally** ▪ **Predictive cruise control is available on imported** Mercedes-Benz Actros and Volvo FH models, but only a limited number of fleets have activated the function	▪ **Predictive cruise control** becomes a standard option on locally built Euro-6e trucks by **2027** ▪ **AI-driven active aerodynamics and thermal control** debut on premium imported trucks from 2028 onward ▪ **Eco-route planning plus regenerative-braking optimization** rolls out to 3,000+ urban e-trucks (12-15 % energy savings)

Source: OEMs website, CCR, NACFE, "The business case for autonomous truck fleets", Movex, Globe News Wire, Trucks News, Estadão, Mirow & Co.

Achieving full autonomy on open roads remains a long journey requiring infrastructure transformation, specific regulations and new business models

Open road L4/L5 enablers	Brazilian reality	Implication	Global context (benchmark)
Infrastructure transformation	**Brazil's road network shows high variability in pavement quality, signage, and connectivity** – many key logistics routes still lack reliable 4G/5G coverage, horizontal road markings, or digital infrastructure	**Brazil would need to upgrade priority freight corridors, investing in physical and digital infrastructure** to meet the demands of autonomous systems	**Leading players deploy autonomous trucks along high-quality corridors** (e.g., Dallas-Houston) equipped with HD maps, reliable road markings, wireless connectivity (V2X), and automated depots
Specific regulations	**Brazil currently lacks a regulatory framework for Level 4 or 5 autonomy** – existing legislation assumes a human driver and does not define legal responsibility for autonomous operation	**Progress depends on federal regulatory advances**, including updates to the Traffic Code, liability rules, certification procedures, and public road-testing protocols	In the U.S., states like Texas and Arizona have already **authorized fully driverless commercial operations, supported by evolving legal frameworks** for liability, testing, and safety assurance
New business models	**Brazil faces tight freight margins and lower predictability of asset return**, these factors hinder the cost justification for autonomous fleets, given the **high upfront investment and long payback cycle**	**Business models would need to shift to maximize vehicle utilization** (e.g., night operations) and **reduce capital risk** through new service models (e.g., truck-as-a-service)	**Autonomous trucking abroad is built around fleet-based models** focused on asset utilization and logistics integration, enabling **continuous operation and centralized control**

Aurora (U.S.) leads global autonomy race with the most advanced and scalable L4 trucking deployment to date

- March/25 safety report proves readiness
- Over 20k autonomous miles completed (Dallas-Houston) since May/25 – no human in the cab
- Night driving enabled by superior lidar (450m range, 11s faster than humans)
- Weather resilience via atmospheric sensing – rain certification in progress
- Scalable, asset-light network with major fleet partners – expansion to hundreds of trucks by 2026

Source: Houston Chronicle, TechCrunch, Reuters, Aurora, Mirow & Co.

In Brazil, closed-site pilots already prove L4 autonomy at scale – mines, factories and sugar-cane fields show preparation for autonomy in predefined areas

NON-EXAUSTIVE

Level-4 autonomy is already a reality for closed field: the truck drives itself end-to-end on pre-mapped routes without driver input – a human is onboard or remote to step in if something unusual occurs outside the predefined conditions

Vale

More than 20 autonomous mining trucks in Brucutu and Carajás mines

Ypê / Mercedes-Benz

Mercedes Atego 1730 operating driverless inside factory logistics loop

Grunner / Mercedes-Benz

~640 autonomous harvest trucks (Axor) in sugar-cane Fields – largest L4 agri-fleet globally

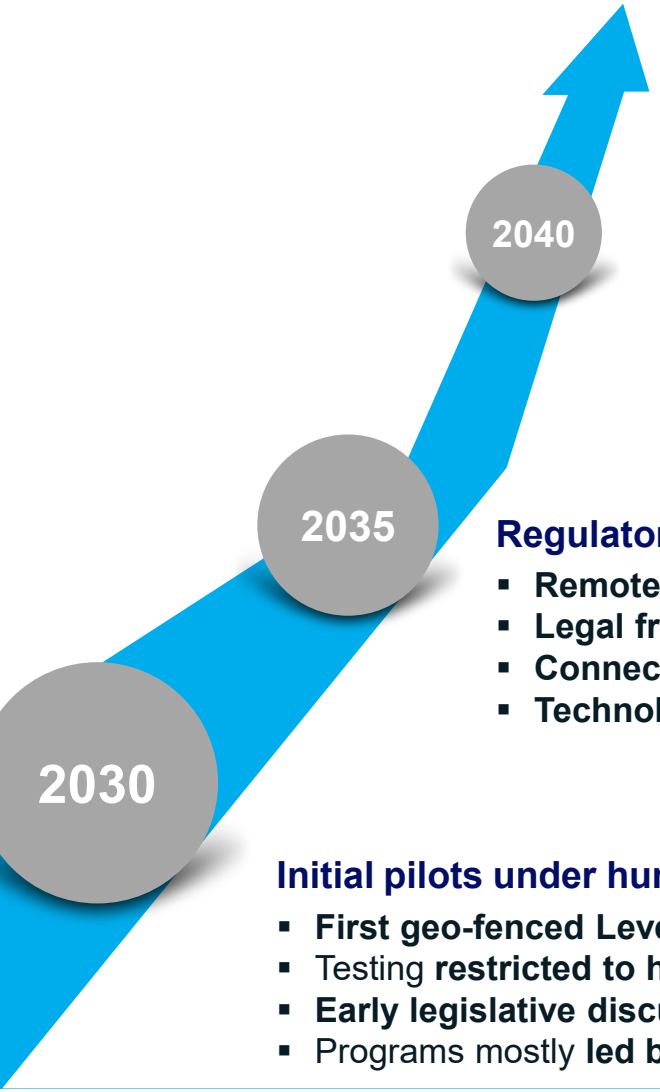
In Brazil, through 2030, most technological advances will be incremental and focused on closed-field operations

Source: Vale, Grunner, MBBras, Mirow & Co.

Human-supervised L4 pilots may begin on public roads by 2030 – full L5 autonomy is unlikely to materialize before 2040

FOR DISCUSSION

Potential roadmap for autonomous truck adoption in Brazil – subject to legal, technical, and market readiness



Driverless operations on certified public routes

- **Full driverless Level-4 deployment along select public corridors** with certified digital and physical infrastructure
- **Nighttime autonomous operations** become common, significantly increasing vehicle utilization
- Regional adoption accelerates, though **national coverage remains uneven due to infrastructure gaps**
- New business models such as **truck-as-a-service scale** across the market
- **Public-private partnerships start supporting broader deployment** beyond top-tier fleets

Regulatory progress and expansion in controlled environments

- **Remote-supervised autonomous operations approved for specific** and controlled logistics routes (e.g., ports, private hubs)
- **Legal framework matures**, with definitions for liability, insurance, and commercial licensing
- **Connectivity and precision mapping** become enabling factors and will be more structured
- **Technology penetration remains limited to large fleet operators** with access to capital and infrastructure

Initial pilots under human supervision

- **First geo-fenced Level-4 highway pilots** (e.g., Campinas–Santos) operated with a safety driver onboard
- Testing **restricted to high-quality road segments**, **low-traffic periods**, and **favorable weather** conditions
- **Early legislative discussions** on autonomous vehicle liability and road-testing protocols begin
- Programs mostly **led by multinational OEMs and large logistics players**

Source: Mirow & Co.

In the coming years, alternative powertrains, Chinese competition, technology upgrades and new ownership models are set to reshape Brazil's truck market

1

Emergence of alternative powertrain technologies

Natural gas and biomethane, electric, hybrids, B100 and hydrogen

2

Rising competitive pressure from Chinese OEMs

Chinese competition

3

Technology upgrades and autonomous driving

AI-driven fleet management and autonomous systems

4

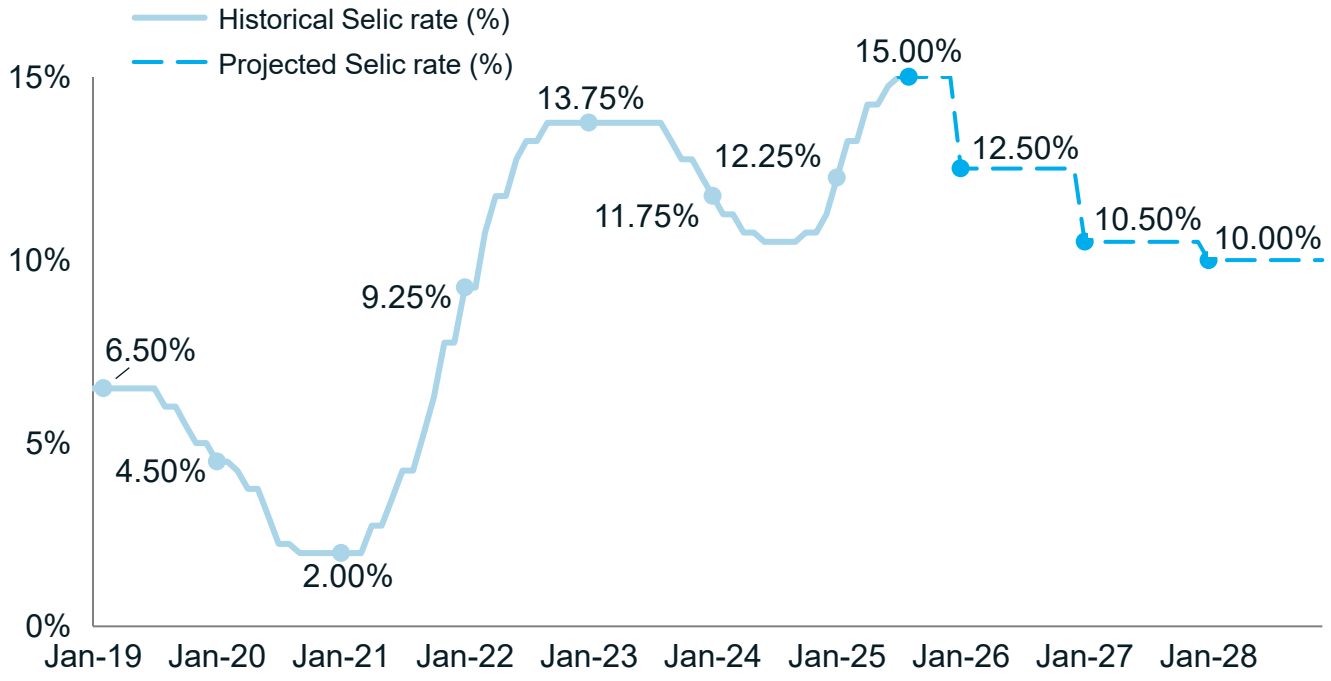
Evolution of truck ownership models

Leasing, rental and Truck-as-a-Service

With high interest rates and substantial investments to modernize the fleet, leasing and rental solutions become increasingly attractive and truck rental companies are scaling up their fleet

Brazilian benchmark interest rate (Selic rate)

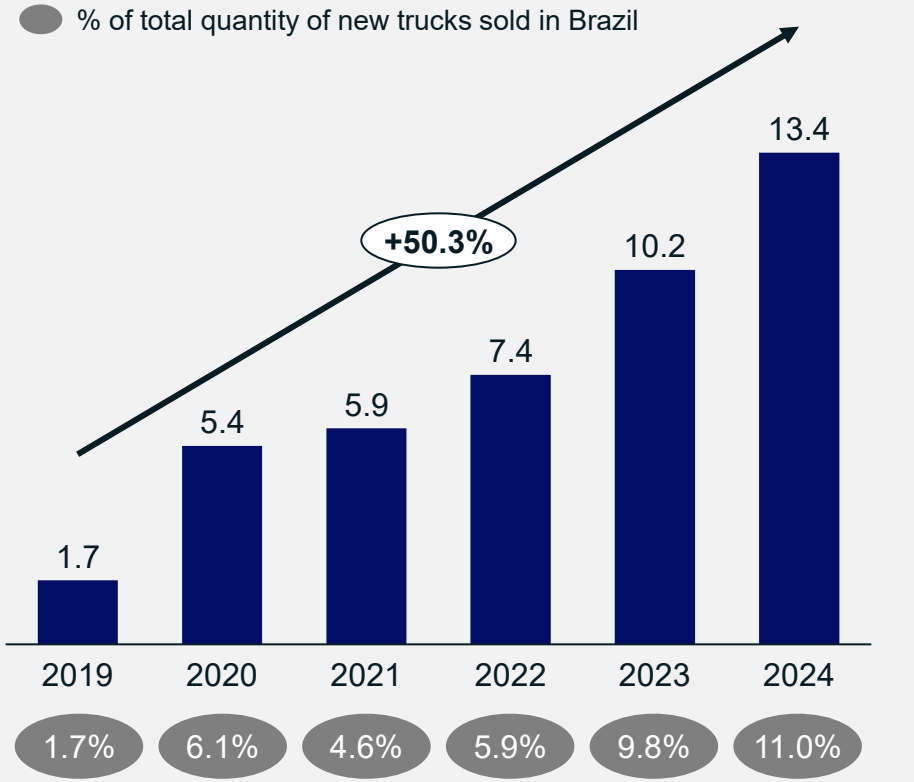
%



- The Brazilian **truck market is sensitive to interest rate fluctuations**, with elevated rates driving up borrowing costs and discouraging direct purchases
- In this context, **leasing and rental solutions become increasingly attractive,** particularly for short-term needs, offering a more flexible and cost-efficient alternative

New trucks sold for truck rental companies

Thousands of truck registrations



Large rental companies have access to cheaper capital than individual borrowers and benefit from scale, securing discounts on vehicle purchases

Source: Banco Central do Brasil (BCB), Associação Brasileira das Locadoras de Automóveis (ABLA), Mirow & Co.

Truck rental and leasing are the most prevalent in Brazil – OEMs are active in both, competing with banks in leasing and with rental companies in the rental segment

NON-EXAUSTIVE

	Truck leasing	Truck rental
Description	▪ Lease agreement **with a purchase option at the end** – considered a form of financing ▪ Typically, **does not include maintenance** or fleet management ▪ **Requires upfront payment**, fixed term, and residual value definition ▪ Recorded as a **liability** on the company's balance sheet	▪ Fixed-term rental contract, with **no purchase expectation** at the end ▪ **Maintenance**, documentation, **insurance** and roadside assistance are **typically included** ▪ **Allows for fleet renewal**, volume adjustment, lower capital immobilization ▪ Rental terms usually vary between **24-60** months
Main players	▪ **OEMs financial services companies:** Mercedes-Benz Bank, Volkswagen Financial Services, Scania Bank, Volvo Financial Services, PACCAR Financial (DAF), IVECO Capital ▪ **Large banks:** Bradesco, Santander ▪ **Others**: Rodobens	▪ **VAMOS**: market leader with the largest fleet, offering multi-brand truck rentals nationwide ▪ **OEMs**: Scania, Volvo, Volkswagen, Mercedes, Iveco ▪ **Rental companies**: Localiza and Unidas (usually offer minimum terms of less than 24 months) ▪ **Others**: Addiante, No Carbon (100% electric fleet), etc.

Source: companies websites, Mirow & Co.

As ownership models evolve in Brazil, Truck-as-a-Service will drive growth and differentiation – but success requires disciplined capital allocation and strong service ecosystem

Truck-as-a-Service (TaaS) turns the truck into a **full-service solution…**

- **CapEx to OpEx**: Transparent, predictable monthly costs reduce ownership risk
- **Flexibility**: Pay-per-use or fixed contracts (e.g., per km, ton) with shorter terms and option to switch vehicles
- **Convenience**: Bundled services beyond insurance, repair, and maintenance – including tires, uptime guarantees, and energy solutions
- **Operational insights**: Predictive maintenance, TCO tracking, and emissions monitoring
- **Digital-first**: Fully digital customer journey with real-time fleet data, telematics, and dynamic routing
- **Infrastructure enablement**: Consulting plus access to charging/refueling networks and depot electrification
- **Faster deployment**: Vehicles delivered within weeks, not months

…but, while it offers strategic benefits, its success will ultimately depend on companies' ability to overcome execution challenges

Strategic benefits

- **Recurring revenue streams** replace one-time sales, creating stable, long-term income for companies
- **TaaS provides continuous operational insights and upsell opportunities,** deepening customer integration as providers manage uptime and maintenance
- **Companies can boost customer loyalty and differentiation**, given its proximity to the customer while providing TaaS

Execution challenges

- **TaaS model is capital-intensive** – companies hold trucks on their balance sheet, tying up capital and increasing debt
- **Providers bear residual value risk** (uncertain resale values of fleet assets) and must master leasing, risk modeling, and asset management capabilities
- **Building a robust service ecosystem is difficult –** companies need mature maintenance networks, digital platforms, and partner integrations

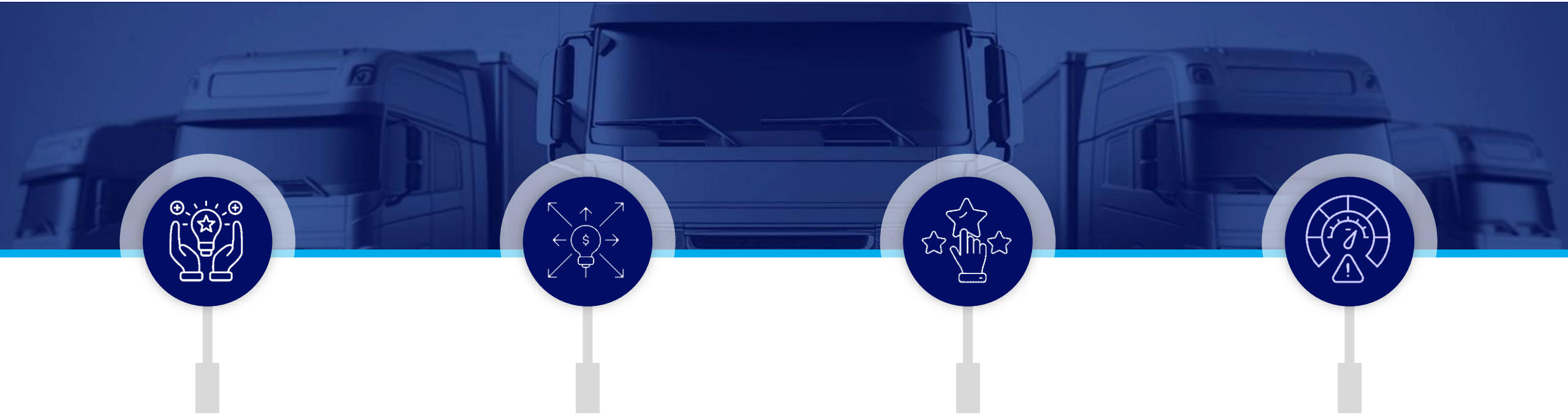
Source: Mirow & Co.

Use cases are accelerating globally, driving adoption of alternative fuels and new technologies

	WattEV	kodiak	EVolution Mobility
Context	California-based startup **pioneering the TaaS model for heavy-duty electric trucks**	**Autonomous trucking company integrating self-driving technology** into freight operations	Brazilian company enabling fleet electrification with a **turnkey, end-to-end solution**
Offer	Provides trucks on a **per-mile or per-route fee** including vehicle, charging, and maintenance – the company is also building a **dedicated network of megawatt charging depots** to support long-haul freight	Provides **autonomous long-haul capacity as a service**, where fleet operators or shippers pay for transport powered by Kodiak's self-driving trucks – key differentiators include **safety redundancy systems, rapid sensor calibration, and operational partnerships** with large logistics firms	Full-service rental model that covering **EV trucks, charging infrastructure, renewable energy sourcing, maintenance, digital fleet tools, and operational support**
Ambition	Scale to **12,000 electric trucks by 2030** and establish one of the largest EV truck charging networks in North America	Enable **24/7 autonomous freight corridors**, lowering operating costs and improving safety, while positioning autonomy as a central layer of the TaaS ecosystem	Become the **regional reference in fleet decarbonization**, helping logistics companies transition to sustainable operations with **cost-efficient electrification pathways**

Source: EV Magazine, Evolution Mobility, Kodiak, Convoy, WattEV, Mirow & Co.

The Brazilian truck market is evolving – capturing value will require a balanced portfolio and leadership will depend on navigating risks with strategic clarity



Robust trends

- Urban and last-mile electrification
- Intensifying Chinese competition in specific niches (electric and gas trucks)
- AI features enhancing TCO

Opportunistic trends

- B100 adoption in agribusiness

Emerging trends

- Gas-powered heavy-duty trucks
- Mandatory telematics as a data capturing tool for OEMs

High-risk bets

- Electrification of heavy-duty trucks
- Autonomous truck driving
- TaaS accelerating the adoption of new fuels and technologies

Source: Mirow & Co.

MIROW & CO.