



EV:

**Everything
you need to
know for your
commercial
vehicle fleet**



wex™

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Introduction

As of Q3 2024, the United States had nearly 192,000 public electric vehicle (EV) charging ports, making it easier for businesses to integrate EVs into their fleets. With global EV sales surpassing 10 million in 2023 and innovations accelerating, businesses must navigate the transition from traditional vehicles to electric ones.

This eBook explores the evolution of EVs, their benefits, challenges, and a roadmap for fleet electrification, helping businesses make informed decisions.



The evolution of electric vehicles

EVs date back to the early 19th century, predating gasoline-powered cars. By 1900, they made up one-third of vehicles on American roads. However, Henry Ford's assembly line made gas-powered cars more affordable, leading to a decline in EV adoption.

The energy crises of the 1970s renewed interest in EVs, but technological limitations persisted. The early 2000s saw an EV renaissance with lithium-ion battery advancements and Tesla's mainstream introduction of long-range EVs. Today, government policies and industry innovations continue to drive EV adoption worldwide.



Different types of EVs and how they work

Types of EVs:



Battery Electric Vehicles (BEVs):

Fully electric, no gas engine, zero emissions.



Hybrid Electric Vehicles (HEVs):

Use a small electric motor to assist a gas-powered engine.



Plug-in Hybrid Electric Vehicles (PHEVs):

Combine a gas engine with a rechargeable battery.

How EVs work:

EVs rely on a battery pack, electric motor, and onboard control systems for energy flow. Key components include:



Battery pack:

Stores and supplies energy.



Regenerative braking:

Captures energy lost during braking.



Charging levels:

Level 1 (standard outlets), Level 2 (public/home charging), DC Fast Charging (80% charge in 30 min).

Benefits of EVs

One of the biggest reasons businesses and individuals are making the switch to electric vehicles is the numerous benefits they offer. From environmental impact to long-term cost savings, EVs are proving to be a transformative force in the transportation industry.

Environmental impact

A major advantage of EVs is their contribution to reducing air pollution and greenhouse gas emissions. Unlike gas-powered vehicles, EVs produce zero tailpipe emissions, meaning they don't release harmful pollutants into the atmosphere. This is crucial in the fight against climate change and for improving air quality, especially in densely populated urban areas. Additionally, when considering the full lifecycle emissions—including manufacturing and electricity generation—EVs still have a significantly lower carbon footprint compared to gasoline vehicles.

Cost savings

While EVs may have a higher upfront cost, they more than make up for it in long-term savings. Maintenance expenses are significantly lower since EVs have fewer moving parts than traditional internal combustion engine vehicles. There's no need for oil changes, and wear and tear on brakes is reduced due to regenerative braking systems. Additionally, fuel costs are lower, especially when drivers can take advantage of off-peak electricity rates. Government incentives, such as tax credits and rebates, further offset the initial purchase price, making EVs an increasingly smart financial choice.



At a Glance

- **Environmental impact:**
Zero tailpipe emissions and lower lifecycle emissions compared to gas vehicles.
- **Cost savings:**
Lower maintenance and fuel costs, potential tax credits.
- **Energy efficiency:** EVs convert up to 77% of electrical energy to power, compared to 20% for gasoline engines.
- **Government incentives:**
Tax credits, rebates, and grants for EV adoption.
- **Improved performance:**
Instant torque, quiet operation, and stability due to low center of gravity.
- **Energy independence:**
Reduces reliance on imported oil.
- **Noise pollution reduction:**
Quieter operation benefits urban environments.

Energy efficiency

EVs are far more efficient than gasoline-powered vehicles. Traditional internal combustion engines only convert about 20% of the fuel's energy into motion, while EVs convert up to 77% of the electrical energy from the grid into usable power. This means more of the energy going into the vehicle is used for actual movement, leading to better performance and less wasted energy. For businesses managing fleets, this efficiency translates into cost savings and improved operational efficiency.

Government incentives

Governments worldwide are pushing for greater EV adoption by offering various financial incentives. These can include federal and state tax credits, rebates, and grants to help offset the cost of purchasing EVs and installing charging infrastructure. Some regions even offer additional perks such as reduced registration fees, access to carpool lanes, and exemptions from certain tolls. These incentives make EVs a compelling option for businesses and consumers alike.

Improved performance

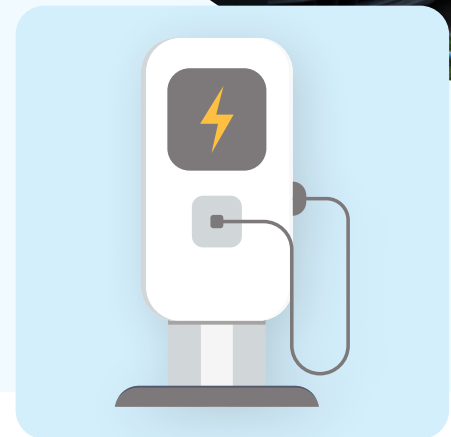
EVs aren't just about sustainability—they offer an impressive driving experience as well. Thanks to instant torque from electric motors, EVs provide rapid acceleration without the lag of traditional transmissions. This smooth and responsive performance makes them enjoyable to drive. Additionally, with their low center of gravity due to battery placement, EVs offer enhanced stability and handling, making them safer and more controlled on the road.

Energy independence

Relying on electricity rather than gasoline or diesel reduces dependence on imported oil. This shift not only strengthens energy security for countries but also helps businesses stabilize operating costs by reducing exposure to fluctuating fuel prices. With more renewable energy sources being integrated into power grids, the sustainability of EVs will only continue to improve.

Noise pollution reduction

EVs are remarkably quiet compared to their gas-powered counterparts. The absence of a combustion engine results in significantly lower noise levels, which is especially beneficial in urban areas where noise pollution is a growing concern. A quieter city environment leads to improved quality of life, especially for those living near busy roads and highways.



Challenges and limitations

As promising as electric vehicles (EVs) are, they still come with challenges that businesses and individuals must navigate. While advancements in technology and infrastructure are addressing these issues, factors such as charging availability, battery costs, and range limitations remain key considerations. Understanding these hurdles can help businesses and consumers make more informed decisions when integrating EVs into their transportation needs. The following are some current challenges to EVs that consumers should be aware of:

- **Range anxiety:**
EVs typically have 200–400 miles of range, which may not suit long-distance travelers.
- **Charging infrastructure:**
Public charging networks are expanding but remain inconsistent.
- **Initial costs:**
Higher upfront purchase prices, though battery prices are declining.
- **Battery recycling and production:**
Environmental concerns regarding lithium and cobalt mining.
- **Charging time:**
Can take several hours unless using a DC fast charger.
- **Grid capacity:**
Increased EV adoption may require power grid upgrades.
- **Extreme weather performance:**
Cold temperatures can reduce range.



The future of EVs

The electric vehicle industry is evolving rapidly, with exciting advancements on the horizon that promise to make EVs more efficient, accessible, and integrated into our daily lives. One of the most promising breakthroughs is in battery technology, with solid-state batteries expected to provide higher energy density and significantly faster charging times by 2030. These improvements could alleviate concerns about range and charging speed, making EVs an even more attractive option for consumers and businesses alike.

Another game-changer is the rise of autonomous EVs. Self-driving technology has the potential to transform logistics and transportation, increasing efficiency while reducing labor costs. Companies are investing heavily in autonomous solutions, and as the technology matures, we could see widespread adoption of self-driving EV fleets in the near future.

Beyond just transportation, EVs are also expected to play a bigger role in energy management. With vehicle-to-grid (V2G) integration, EVs could act as mobile energy storage units, returning excess electricity to the grid and helping stabilize power supply during peak demand. This two-way energy flow could be a major step forward in creating a more resilient and sustainable energy infrastructure.

Charging infrastructure is also expanding rapidly, with governments worldwide investing in ultra-fast and wireless charging solutions. The goal is to make charging as convenient as refueling a gas vehicle, reducing downtime and improving the overall EV experience. These developments are particularly important in emerging markets like India, Brazil, and Indonesia, where EV adoption is growing but infrastructure needs significant expansion.

Meanwhile, major corporations are leading the charge in fleet electrification. Companies like Amazon and FedEx are making substantial commitments to replace their delivery fleets with EVs, cutting operational costs and reducing carbon footprints. As more businesses follow suit, commercial EV adoption will play a critical role in driving sustainability across industries.

With these advancements, the future of EVs looks incredibly promising. As technology continues to improve and infrastructure expands, electric vehicles will become more practical, efficient, and widely adopted—transforming the way we move and interact with energy systems.



Battery innovation:

Solid-state batteries may offer higher energy density and faster charging by 2030.



Autonomous EVs:

Self-driving electric vehicles could revolutionize logistics and transport.



Vehicle-to-grid (V2G) integration:

EVs may return energy to the grid, enhancing grid stability.



Charging expansion:

Government investment in ultra-fast and wireless charging.



Emerging markets:

Growing EV adoption in India, Brazil, and Indonesia.



Fleet electrification:

Major companies like Amazon and FedEx are transitioning their delivery fleets.



Choosing the right EV for your business

Selecting the right electric vehicle for your business is not just about going green—it's about making a strategic investment that aligns with your operational needs and financial goals. With a growing number of EV models available, businesses must carefully assess their specific requirements, from daily mileage and payload capacity to charging infrastructure and long-term cost savings. By taking a thoughtful approach, companies can maximize efficiency, reduce expenses, and meet sustainability objectives while ensuring their fleet is prepared for the future. Here are key factors to consider when choosing the right EV for your business.

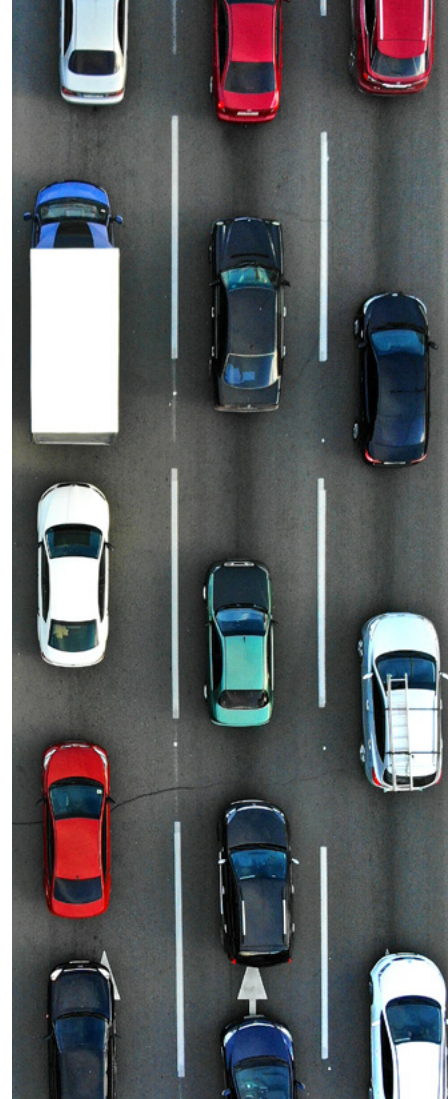
- **Assess operational needs:**
Consider daily mileage, payload, and route type.
- **Evaluate TCO:**
Long-term savings in fuel and maintenance offset higher upfront costs.
- **Charging strategy:**
Decide between on-site Level 2 chargers or reliance on public fast-charging networks.
- **Scalability:**
Select EVs that align with business growth plans.
- **Sustainability goals:**
Demonstrate environmental responsibility while reducing costs.



Tips for transitioning to a mixed-energy fleet

Transitioning to electric vehicles (EVs) is an exciting opportunity for businesses looking to modernize their fleets, cut operational costs, and contribute to sustainability efforts. However, with the wide range of EV options available, making the right choice requires careful planning and evaluation. Businesses must consider factors such as vehicle performance, charging accessibility, and overall cost-effectiveness to ensure their investment delivers long-term benefits. By understanding the key elements of EV selection, companies can make informed decisions that align with their operational demands while staying ahead in an evolving transportation landscape. Here are some thoughts on how to best build your mixed-energy fleet:

- **Phased rollout:**
Start with a pilot program before full adoption.
- **Invest in charging infrastructure:**
Install workplace chargers and explore public options.
- **Use telematics and fleet management tools:**
Monitor EV efficiency and maintenance.
- **Train drivers:**
Educate staff on charging best practices and energy-efficient driving.
- **Monitor TCO:**
Track savings in fuel and maintenance costs.
- **Leverage incentives:**
Take advantage of available grants and tax credits.



Conclusion

EV adoption is a significant transformation in transportation, offering cost savings, sustainability, and improved performance. While challenges exist, businesses can overcome them with strategic planning, technology, and government support.



Additional resources

EV cost calculator

Compare fuel and maintenance savings.

Charging station locators

Find public charging stations easily.

Incentives and grants

Learn about tax credits and financial assistance programs.

To learn more about EV solutions and mixed fleets, visit:



EV: Everything you need to know for your commercial vehicle fleet



EV at-home charging



EV adoption: 4 global trends in transition to mixed-energy fleets



EV FAQs



How to best incorporate EVs into your fleet

Learn more and apply for a fleet card today!

All fleet cards are not the same—compare WEX's fuel and EV charging solutions to find the best fit for your business.

Apply for a fleet card today!

