FROST & SULLIVAN

Mixed-Energy Fleets Optimize Operations and Electrification

FROST & SULLIVAN WHITEPAPER

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Introduction

The momentum towards sustainability across businesses worldwide is reflected in commercial fleets' integration of electric vehicles (EVs) into traditional internal combustion engine (ICEs) fleets. Transitioning from ICEs to EVs is the planning stages—if not already underway—for many fleets, according to recent Frost & Sullivan research. In 2024, Frost & Sullivan interviewed over 500 companies with mixed-EV/ICE fleets across Europe, the US, Australia, and New Zealand about their journey toward electrification. The research showed that the optimal approach to transition to an EV fleet requires weighing capital expenditure planning, charging capabilities, new route optimization, and employee training. Despite these complications, 80% of the organizations interviewed indicated that they planned for at least a quarter of their fleets to be comprised of EVs by 2030.

Pacing the mixed fleet transition

Growing the proportion of EVs in a fleet can introduce a complex interplay of financial considerations, operational intricacies, and strategic planning. One of the most critical aspects of navigating the EV transition is determining the right cadence of mixing EVs into the ICE pool.

Transitioning to an all-EV fleet will take time, resources, and infrastructure-building. Operating a mixed-energy fleet of ICE vehicles and EVs may be the norm for many businesses and government fleets for the foreseeable future.

In the research, potential impediments expressed by fleet managers were that they expect to face upfront vehicle and charging station costs and charging infrastructure installation challenges. Integration planning would be required for longer downtimes for charging and mitigating the lack of public charging infrastructure for longer delivery routes. Fleet operators will need to balance factors such as the residual value of the existing fleet, how to integrate EV charging into existing payment methodology and tracking, and new logistical and routing demands that surface when managing a mixed-energy fleet.

New Investment vs. Residual Value

As purchase and operational costs were the two leading concerns for EV integration, businesses with a commercial fleet must consider the residual value and usable lifespan of existing ICE vehicles to maximize returns on the capital already spent. Commercial vehicles represent major investments designed for years of service. Extending operations to get the most out of these assets may dissuade fleet operators from retiring ICE vehicles quickly. While EV operation and maintenance savings can mitigate a higher capital expenditure, the upfront cost means many businesses and government fleet managers must take a gradual, measured transition approach across multiple budget cycles rather than invest in wholesale fleet replacement.

> Advanced business intelligence tools can help organizations mitigate risk through informed electrification decisions. "Prior to procuring EVs or charging infrastructure, the right planning must be done to ensure smooth financial and operational integration and scaling," says Chargetrip's van Dijk. "This can be done best by first understanding charge demand—how much energy is required, where and when—to operate, then procuring charge supply (battery capacity and charge infrastructure) to match."

Calculating if and how to ensure EVs provide a lower TCO than ICE vehicles can help accelerate the transition, especially if the existing fleet is aging and facing upcoming—and costly—maintenance. While pricing will vary, the cost of charging an EV is often less than the equivalent fuel costs to drive the same distance. Energy prices may fluctuate, but electricity costs are generally more stable than the price volatility typical of traditional fuels. Utilizing onsite renewable energy generation, such as solar power at charging stations, can further minimize exposure to utility rate volatility for EV fleets.

By projecting energy requirements based on routes and operations, businesses can calculate the ideal array of EV models, plan out their charging infrastructure, and

procure the appropriate battery capacity. Leveraging such tools allows a financially prudent, stepwise transition to a mixed-energy fleet while ensuring operational readiness as electrification scales up over time.

Business intelligence technologies like simulation are critical to enabling data-driven investment decisions for electrification. Prior to procuring EVs or charging infrastructure, the right planning must be done to ensure smooth financial and operational integration and scaling.

Charging requires planning but brings benefits

Survey respondents raised concerns about long downtimes during recharging and the lack of robust charging infrastructure. To help address these concerns, a notable 78% of respondents stated their organizations had onsite charging, and 69% said they valued the convenience and control of owning charging hubs. However, the high cost of installation was the leading challenge with owning hubs, noted by just over half (51%) of respondents.

Businesses often employ more than one charging system, with 62% of organizations also using public charging and 23% with drivers charging at home. As many respondents utilize various charging options, flexibility will be key for optimizing operations, minimizing downtime, and gaining insight into costs and billing.

The development of new solutions, such as centralized payment systems, helps fleets manage multiple scenarios. Advanced payment systems help streamline billing across charging networks and utilities, synchronize fuel payments and electric charging, and give drivers a single, simple option for reimbursement whether they charge at home or on the road.

By taking a holistic view of charging demands and opportunities, businesses gain full control over EV charging management. Rather than an impediment, charging becomes an optimized facet of electrified operations with the real potential to reduce fleet operating costs.

New routing and logistical considerations

Once fleets start integrating EVs alongside their ICE counterparts, a range of new logistical challenges emerge in maximizing the performance and efficiency of a mixed-energy fleet. Difficulty planning and optimizing routes was the leading challenge businesses expressed about EV integration.

While ICE vehicles offer straightforward route planning based on tank range and extensive fueling networks, EVs require more strategic deployments, as effective route planning depends on multiple factors. "This means using routing algorithms that effectively factor in properties like weather, road surface, elevation, speed, and others that inform energy consumption," says van Dijk. Factors can also include battery capacity, driving efficiency, vehicle payloads, and availability of charging stations when it comes to determining the most efficient use cases for electric models.

> Having a deep understanding of the business' needs is an important reference point for assessing EV replacement of ICEs, which may not yet be applicable to all circumstances. Gaining a thorough understanding of operational needs increases the likelihood of successful EV integration where suitable.

Trip assignments must be carefully coordinated across diverse vehicle types with vastly different operating constraints. Precise routing accounting for these variables can help maintain consistent operations and optimize efficiencies, such as targeting the optimal time to charge a vehicle based on battery status and selecting the most cost-effective time and place to charge.

Without careful planning and execution, the differing routing needs of electric versus ICE models can undercut overall fleet productivity. Some advanced payment solutions now provide tools and insights that support route planning, helping turn a potential challenge into a competitive advantage over fleets using more manual planning systems.

Navigating complex energy sourcing and payments

Beyond route and charging infrastructure optimization, fleet electrification requires developing new strategies around energy procurement, billing, and payments, as compared to simply fueling at the pump. Innovators such as ev.energy are specializing in EV charge optimization, offering solutions to reduce charging costs and incorporate more sustainable and efficient processes. “ev.energy uses live and forecasted cost, carbon, and grid constraint signals to make charging cheaper, greener, and simpler,” says Nick Woolley, founder and CEO of ev.energy. Along with helping fleet managers reduce charging costs, “ev.energy helps electricity grid operators manage the increased EV load and align charging with greener generation,” says Woolley.

Businesses may face challenges with electricity rate structures varying by region and utility, requiring optimization across time-of-use billing, real-time pricing, and demand-based surcharges. “Fleet managers are now being asked to learn a slew of new metrics and to figure out how to align them with their standard operational data,” says Booth of Sawatch Labs. “One example is how EV charging impacts a monthly utility bill in addition to volumetric pricing ($/kWh), which can vary seasonally or by the hour. Fleet managers have to determine how charging will impact their monthly demand charge, something that can be a substantial portion of a monthly utility bill for a commercial entity. This is vastly different from what fleets are used to with liquid fuels,” concludes Booth.

Operating across service areas compounds this with multiple electricity accounts and payment workflows. EV charge optimization solutions can consolidate billing and payments for fleets. Fleet management solutions providers offer such optimization and consolidated payment processes to meet the needs of mixed-energy fleets, reducing costs while assisting grid operators with increased EV load and aligning charging to greener generation.

Smart payment systems streamline fleet transitions

Tackling the various financial, technical, and behavioral changes required to transition fleets from ICE to mixed-energy fleets of ICE, hybrid, and EV can seem daunting. However, new solutions are helping fleets and drivers pay for mobility expenses like fuel, charging, and vehicle maintenance all within one system.

For example, specialized fleet payment solutions such as fleet cards can provide a centralized platform for funding and tracking both ICE fuel purchases and EV charging. These cards authorize fuel transactions and consolidate costs into centralized billing and reporting systems. Key benefits include an improved driver experience, moving them (and their fleet managers) away from managing receipts and expense reports. Providing managers with data-driven visibility into overall fuel and charging expenditures is another significant benefit. For businesses and government entities with commercial vehicles, consolidated payment solutions provide vital capabilities:

Streamlined authentication and access control: Fleet cards encoded with unique identifiers let drivers efficiently authorize and activate EV charging sessions via RFID or mobile apps across fragmented charging networks, both public and private facilities, providing a seamless charging experience anywhere vehicles operate.

Detailed transaction data: Real-time tracking of all charging sessions delivers robust analytics around energy consumption metrics. This aids in proactive renewable energy procurement, optimized vehicle deployments based on range needs, and right-sized site charging infrastructure over time.

Consolidated utility billing: Processing numerous charging-related utility bills across complex rate structures consumes considerable back-office resources. Intelligent payment platforms streamline all procurement into integrated invoicing.

Intelligent payment platforms streamline all procurement into a single system for invoicing, auditing, and accounts payable workflows, reducing administrative overhead.

For drivers, adopting smart fleet payment tools for fueling and charging brings key advantages as well. Embedded payment credentials in fleet cards or mobile apps provide a simple, consistent way for operators to initiate and pay for fuel and charging without juggling multiple accounts, subscriptions, or payment methods across different networks. Fleet cards also aid in accurate expense tracking and submissions. Payment data is automatically captured for every fill-up and charging session, removing the headache of manually recording receipts or other documentation. This seamlessly integrates fueling and charging costs into overall fleet expense management.

The multi-year journey to fleet electrification invariably means operating a mixed inventory of both ICE and EV assets. This transition period introduces major complexities around capital planning, vehicle operations, infrastructure, energy sourcing, and payments. Ongoing evaluation and analysis are crucial to determine the cadence and specifics of converting to EVs.

Payment innovations customized for EV operations can help streamline many financial and logistical hurdles. Smart, connected fleet payment ecosystems accelerate electrification by seamlessly funding universal charging access, delivering vital operational analytics, automating complex utility billing workflows, and empowering drivers. As businesses work to achieve emissions reductions, intelligent payment tools will be essential for efficiently managing mobility expenses across their diverse vehicle pools.

The findings from Frost & Sullivan's research highlight the multifaceted journey towards fleet electrification, emphasizing the critical role of advanced planning, strategic investment, and innovative payment solutions in overcoming adoption challenges. As businesses transition to a mix of ICE, hybrid, and EVs, the integration of smart payment systems and comprehensive fleet management tools is pivotal. These solutions streamline financial and operational processes as well as enhance data-driven decision-making, ensuring a smoother transition to when and how—and even if—a business undertakes electrification. Organizations at various stages should consider these insights to optimize fleet operations, reduce costs, and align with sustainability goals, positioning themselves competitively for the future of transportation.

For more in-depth insights and analysis, download the full white paper here.

About the survey

Frost & Sullivan interviewed 503 decision-makers at businesses with mixed EV and ICE fleets in 2024. The regional split for these interviews was as follows: France, 65 respondents; Germany, 60 respondents; Italy, 65 respondents; UK, 61 respondents; Benelux, 22 respondents; United States, 105 respondents; Australia, 60 respondents; New Zealand, 60. Fleet size definitions and corresponding respondents were: Very small fleets 2-4 vehicles, 101 respondents; small fleets 5-49 vehicles, 114 respondents; medium fleets 50-99 vehicles, 116 respondents; large fleets 100-499 vehicles, 115; very large fleets, 500 vehicles or more, 57 respondents.

Data referenced in this paper is based on the Frost & Sullivan survey unless otherwise stated and does not claim to represent the entire fleet user population. Percentages may not always total 100% due to rounding. The interpretations and conclusions drawn are those of the authors representing Frost & Sullivan and do not necessarily reflect the views of WEX, the respondents of the survey, or their organizations.

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