



Fleet Electrification

July 9, 2021

Considerations for Fleet Electrification

President Biden's Executive Order of January 27 identifies, "clean and zero-emission vehicles for Federal, State, local, and Tribal government fleets", as part of a larger strategy to tackle the global climate crisis. The order codifies a commitment to electrification that many federal fleet managers have been working towards within their broader fleet optimization efforts.

Zero-emission vehicles (ZEVs) can help bring positive change in the global climate crisis. For fleet managers, it offers not only decarbonization potential through alternative fuel powertrains, but also financial and vehicle operational benefits.

As federal fleet managers prepare to respond to this call to action, there are four key considerations for a successful fleet transformation strategy depicted in **Figure 1**.

Figure 1. Guidehouse ZEV Fleet Transformation Considerations

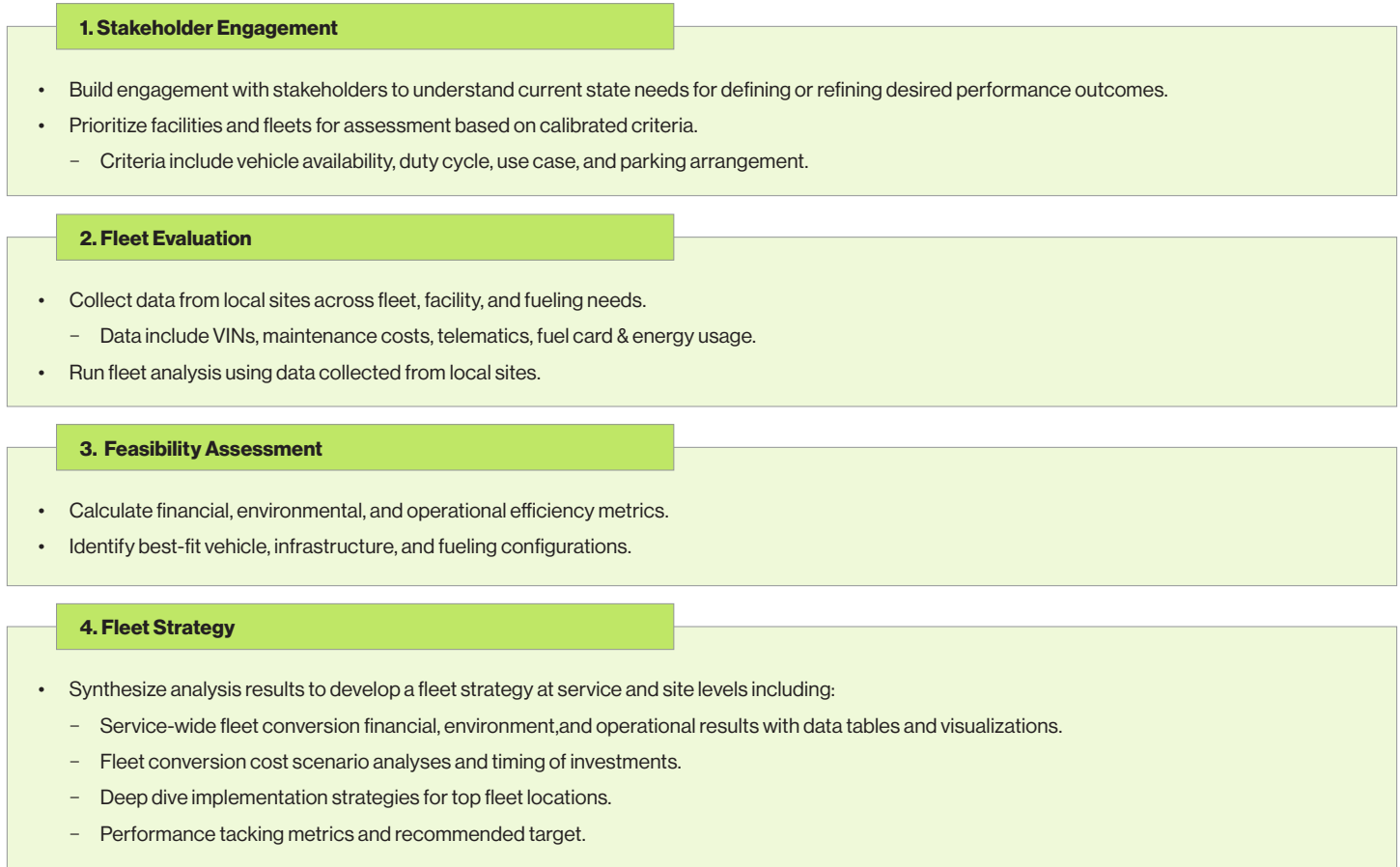
Acquisition	Infrastructure	Interoperability	Change Mgmt
<p>Incorporating ZEVs into active operations requires careful planning due to:</p> <ul style="list-style-type: none"> • Supply chain constraints • Uncompetitive cost structure • Range requirements by vocational use case 	<p>Expanding existing fleet support infrastructure for ZEVs requires knowledge of:</p> <ul style="list-style-type: none"> • Hardware/software configurations • Site energy load and supply • En-route fueling options 	<p>Keys to realizing financial, environmental, and operational benefits of ZEVs lie in unlocking data streams:</p> <ul style="list-style-type: none"> • Telematics data for route optimization • Smart charger data for lowest fueling cost 	<p>Helping employees get on board with ZEVs requires preparing the workforce for</p> <ul style="list-style-type: none"> • ZEV OSHA guidance • Energy supply management • Revised maintenance strategies

Federal fleet managers have an opportunity to lead national and local decarbonization and economic development efforts through fleet procurement decision. This will require a thoughtful and informed strategy.

Guidehouse's planning framework for developing a ZEV Fleet Strategy addresses these opportunities through the steps depicted in **Figure 2**, and serves as an initial framework that can be applied to federal, state and local government installations alike.




A comprehensive strategy accounts for all optimization opportunities and key infrastructure needs, including the electric utility system infrastructure serving the installation and local benefits.

Figure 2. Guidehouse ZEV Strategy Steps



Data and analytics are central to developing a ZEV fleet strategy. Our framework is powered by our Fleet Suite™ analytics software depicted in **Figure 3**. The software assesses fleet electrification potential to inform ZEV procurement decision-making.

Figure 3. Fleet Suite™ Analytics Engine

Fleet Suite™ Analytics	Guidehouse's Fleet Suite™ analytics software supports strategies for incorporating ZEV into active fleet optimization planning and operations to make efficient use of supply chains, infrastructure, partnerships, and continuous improvement practices.
 FINANCIAL	Calculate fuel and maintenance cost savings per ZEV use case relative to comparable internal combustion engine (ICE) vehicles (annualized), often resulting in lower total cost of ownership.
 ENVIRONMENTAL	Estimate emissions reductions and associated benefits to climate targets, air quality, public health, and job creation/preservation (including underserved communities).
 OPERATIONAL	Identify best-fit hardware and software configurations across charging speeds (Level 1, Level 2, fast charging) to make the most of vehicle uptime and enhance utility purchases.

The following case studies highlight key outcomes from applying our fleet electrification framework in the commercial sector.

Case Study: Exelon Fleet Electrification Plan

- Guidehouse fleet electrification plan basis of enterprise fleet roadmap
- Exelon to electrify 30% of utility fleet by 2025; 50% by 2030
- Use cases for vehicle classes 1 to 8

Case Study: Amazon Fleet Electrification Guide

- Reliable electricity supply
- Technology interoperability
- Alternative rate structures
- Electrification expertise
- Flexible terms and requirements

Exelon Fleet Electrification Plan

Exelon, a Fortune 100 investor-owned energy company operating in multiple regions throughout the US sought support to conduct an assessment for enterprise-wide fleet electrification of its vehicles. The energy company wanted a summary of the current state of its fleet, characterizing local supply chain viability to meet its electrification needs over the next 10 years.

Guidehouse developed a comprehensive inventory of the company's current state of fleet and related fueling/charging infrastructure across the enterprise. The team characterized primary vehicle use cases, constraints, and key opportunity areas. The team then conducted a comprehensive external review of vehicle

Amazon Fleet Electrification Guide

Guidehouse, in partnership with [Ceres](#) and [California Trucking Association](#), prepared a report funded by [Amazon](#) that defined specific actions that utilities, regulators, and policymakers can take to make fleet electrification more successful. Improved electric vehicle (EV) technology allows for lower costs, greater range, and faster charging, which is further enabling EV use in the commercial transportation sector. However, fleet operators also face challenges that may inhibit adoption.

Guidehouse Insights' industry experts surveyed market actors with early fleet electrification projects to identify common challenges and recommended actions utilities, regulators, and policymakers could take to make electrification more efficient, environmentally friendly, and cost-effective.

and part availability by class and use case. A menu of Class 1-8 electric vehicle options was developed for identified opportunity areas, and key considerations for electrification (e.g., charging, O&M, user experience) were identified. The team assessed fleet electrification potential based on operational requirements of primary use cases, market availability, and overall cost implications. Finally, the team determined the scenario-based potential under different assumptions and overall cost implications.

The company used Guidehouse's findings to develop a roadmap for enterprise fleet electrification 2020 targeting 30% of utility fleet vehicles by 2025 and 50% by 2030. The company also expects to leverage findings to support customers interested in fleet electrification.

Guidehouse developed recommendations that covered:

- Access to renewable energy
- Alternative rate structures
- Upfront information
- Reliable electricity supply
- Flexible terms and requirements
- Streamlined paperwork and processes
- Technology interoperability
- Fleet electrification expertise

The [Road to Fleet Electrification report](#) was published in 2020, and marketed by Amazon, Ceres, and California Trucking Association. Through these improvements, the report asserts that electrified fleets can become an asset for a more efficient and sustainable grid, offering opportunities for the environment, businesses, and all electricity customers.

**Case Study: WBCSD
Corporate EV Adoption Guide**

- Comprehensive online guide for corporate fleet electrification
- Clear steps to deploying an EV fleet
- Overview of best practices and learnings

World Business Council for Sustainable Development

The World Business Council for Sustainable Development (WBCSD), a CEO-led organization of over 200 international companies, sought support from Guidehouse in creating a comprehensive online guide for corporate electric vehicle (EV) fleet adoption to help companies accelerate their transition to sustainable, electric mobility.

To assist the WBCSD, Guidehouse identified key use cases for corporate fleet managers considering electrifying their fleets. We developed case studies and detailed best practices, bringing together practical experiences and specific expertise in EV fleet transition from a wide range of industry and global perspectives. We also conducted working group reviews and gained

consensus on content with members of the WBCSD's E-Mobility Group, including Eaton, EDP, Enel, LeasePlan, Mahindra, Michelin, Nissan, Solvay, and UPS. Next, we created a resource database, providing an overview on charging technologies, ownership costs, environmental and practical implementation information, to be easily read by fleet managers. Finally, Guidehouse structured a microsite and provided recommendations on graphics requirements and site design to WBCSD's design team.

The [WBCSD Corporate EV Adoption Guide](#) is available to a global audience and features up-to-date and geographically relevant information on EV technologies, clear steps to deploying an EV fleet, and an overview of best practices and learnings.

To learn more, download the [executive summary](#).

Key Takeaways

- Partner with mobility and fleet experts that provide full site—fleet, facility and fuel—awareness to help federal, state and local agencies de-risk the integration of ZEVs. Key insights to cover include:
 - Customer-side ZEVs and charging infrastructure deployments
 - Infrastructure upgrades required on the utility side of the electric meter.
 - Experience formulating, executing, monitoring, and adapting various electrification strategies to deploy ZEVs
- Plan for full site cost estimation and risk mitigation across fleets, facilities and fuel
 - Include utility and customer side development and infrastructure
 - Prevent local project timeline complications with utilities and permitting agencies
 - Right-size energy rates, design, engineering, construction and installation provider services
- Optimize capex vs. opex outlays for ZEVs and charging infrastructure to align with agency procurement priorities and supply chain realities
 - Agency-owned charging-as-a-service pilots inform optimal ratio of owned vs. leased assets
 - Agency-owned ZEVs support workforce training and transition to managing and servicing new fleet technologies and electricity as a fuel supply

Lessons Learned

Acquisition

- Decision to lease or buy is dependent on an organization's risk profile, incentive availability, electrification timeline and the EV market.
- Stakeholder engagement and education early on increases the likelihood of a successful transition; capture the needs and motivations of drivers, fleet managers, procurement, engineering and facility managers.

Infrastructure

- Access to low-cost renewable energy for charging is key to fully decarbonizing a fleet; this may include infrastructure upgrades such as installing on-site solar and storage or entering a power purchase agreement.
- For continuity of service during grid outage events, consider backup power and storage to cover charging needs for essential vehicles. Additionally, V2G vehicles can serve as a backup power source for facilities during outage events.
- Full site decarbonization—pair facility upgrades (energy efficiency, on-site generation and storage) with EV infrastructure upgrades to maximize cost and energy savings.
- Engage utility during initial planning for infrastructure upgrade needs, ensuring the grid can handle the increase in load and planning for potential transformer upgrades.
- Selecting the optimal utility rate structure—ideally one that is time-variable, real-time, market-based and rewards charging coinciding with peak renewable generation—can keep charging costs at a minimum while benefiting both the grid and environment.

Full Site Decarbonization



Resiliency

- During our recent meetings with members of the military, this term attracted a lot of attention.
- Additionally, V2G-enabled vehicles can site-level resiliency in the event of a power outage.

Interoperability

- Network management is critical. Engage your utility and a network management/data provider to ensure the same interoperability standards are set for all hardware and software related to EV supply equipment (EVSE) and vehicles.
- For data streams, at a minimum includes telematics, EVSE data and utility price signals.
- For operational standards, include stakeholders and partner organizations such as GSA.

Change Management

- Communication is key from the beginning—from selection of site to strategy for moving forward and communication needs differ from user to fleet maintenance.
- Communication needs differ from site to site and stakeholders at each site need to understand what their role is in making this a success; there is no one size fits all change management approach
- Impacts to operating standards and mission/objective need to be identified early.



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The Guidehouse Difference

Guidehouse brings a proven combination of breadth and depth to support federal fleet managers ongoing electrification efforts. Our ZEV expertise spans acquisition, charging infrastructure deployment, utility energy supply, electric grid operations, fleet management and government program management. We have partnered with mobility clients from Fortune 500 firms and innovative startups, as well as federal, state and local governments on their infrastructure agendas. We work with the nation's largest and smallest public and investor-owned utilities. Our electric utility expertise covers infrastructure planning, energy procurement and resilient grid operations. We help clients plan for change, manage risks, and maximize impactful outcomes for their stakeholders.

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About Guidehouse

Guidehouse is a leading global provider of consulting services to the public sector and commercial markets, with broad capabilities in management, technology, and risk consulting. By combining our public and private sector expertise, we help clients address their most complex challenges and navigate significant regulatory pressures focusing on transformational change, business resiliency, and technology-driven innovation. Across a range of advisory, consulting, outsourcing, and digital services, we create scalable, innovative solutions that help our clients outwit complexity and position them for future growth and success. The company has more than 12,000 professionals in over 50 locations globally. Guidehouse is a Veritas Capital portfolio company, led by seasoned professionals with proven and diverse expertise in traditional and emerging technologies, markets, and agenda-setting issues driving national and global economies. For more information, please visit www.guidehouse.com.

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