

Supporting the transition to a 100% Zero Emission Vehicle fleet

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Challenges and considerations on the transportation electrification journey

Abstract

The U.S. has committed to acquiring 100% Zero-Emission Vehicles (ZEV) by 2035, a transition that will have a tremendous, positive impact on nation's energy independence, security, and carbon emissions. But a combination of factors challenges success in achieving this goal. As the Federal government begins its transportation electrification journey, we explore these factors and their implications and – importantly – an emerging technology that can support Federal agencies' missions well into the future.

As the world's largest institutional producer of greenhouse gas (GHG) emissionsⁱ, the Department of Defense in particular, and the Federal government in general, consume tremendous amounts of energy, much of which is supplied by local electrical distribution systems. The U.S. power grid, unfortunately, has experienced more frequent and sustained outages and disruptions – at a time when America has become more dependent upon the grid than everⁱⁱ.

The Federal government has placed decarbonization among its key priorities. With the signing of Executive Order 14057 and the Federal Sustainability Plan, the administration has committed to acquiring 100% Zero-Emission Vehicles (ZEV) by 2035ⁱⁱⁱ, establishing the U.S. as a global leader when it comes to transportation electrification.

These actions have been further bolstered by the Infrastructure Investment and Jobs Act (IIJA), which was signed into law as the Bipartisan Infrastructure Act (BIL) in 2021 and set aside billions of dollars for clean energy, electric grid resilience investments, the electrification of transportation fleets, a nationwide EV charging network, and other decarbonization investments^{iv}. Moreover, in 2023, a coalition of four Federal agencies published the U.S. National Blueprint for Transportation Decarbonization, an important step toward achieving Net Zero targets by 2050^v. This document outlines short-term and long-term strategies to transition to ZEVs across the country.

Despite the many well-documented benefits of electric vehicles (EVs), their impact on GHG emissions, and their associated reduced operational/maintenance costs, transitioning to a 100% EV Federal fleet is not without obstacles. For one, the sheer size of the total federal fleet (approximately 650,000 vehicles) makes it one of the largest and most diverse commercial fleets in North America^{vi}, a fact that carries its own set of challenges and considerations. Other concerns include access to EV charging infrastructure, power grid vulnerabilities, and the ability of utility providers to accommodate transportation electrification.

EV charging infrastructure access

Today, EVs comprise less than 1%^{vii} of the U.S. government's total fleet of vehicles, due in large part to limited access to charging infrastructure^{viii} at federal facilities. In fact, a lack of charging

infrastructure nationwide has impeded broader adoption of EVs for both commercial and personal use. As of 2022, however, all 50 states, Washington D.C., and Puerto Rico have approved plans to build charging stations along the nation’s highway system^{ix}.

The U.S. Government Accountability Office (GAO) estimates that the Federal Government will acquire approximately 30,000 ZEVs annually^x to meet transportation electrification requirements in the coming years. Access to EV charging infrastructure must expand accordingly. Although federal investments are planned, these projects will take time to develop and implement resulting in the last -mile challenges.

Grid issues

According to a 2021 report by the ASCE, more than 70% of the nation’s power lines have aged “well into the second half” of their 50-year life expectancy, with some components now more than 100 years old^{xi}. That is, these systems were designed and built at a time when today’s power needs, including EVs, weren’t imaginable. Further complicating the age of this system: the Department of Energy has deemed the grid’s transmission capacity as “insufficient.”^{xii}

Combining these issues with a recent spate of high-profile attacks on the electrical system and substations, the vulnerability of our nation’s power grid has come under scrutiny. Some experts have gone so far as to say that the Federal Government’s reliance on the local electrical distribution grid is a national security concern^{xiii}.

Utility impact

Deploying sufficient EV charging infrastructure to support a 100% ZEV government fleet will require careful planning and engagement with local utility providers, who will need to ensure they can accommodate increased energy demands and load.

The effects of climate change complicate utility preparations beyond capacity expansions. Heat waves, record-breaking hurricanes, increased flooding, intense winter storms, destructive wildfires, and other extreme events have adverse impacts on our nation’s utility providers. Longer and more frequent power outages, rolling blackouts, line losses, and so on are more common today – not to mention the ripple effects on other vital infrastructure, such as natural gas and water utilities, healthcare, and other critical facilities.

Although experts believe that utilities providers are taking the right steps to build in greater resiliency and prepare for the transition to EVs, there is room for improvement^{xiv} in a complex landscape.



Off-grid EV charging infrastructure emerges

Off-grid EV charging solutions that rely on renewable energy have emerged as one answer to overcoming these challenges while moving America forward with transportation electrification. They integrate EV

chargers, onsite energy generation, and battery storage into compact, containerized stations. Ideal for installations and facilities lacking access to traditional EV charging infrastructure, off-grid, containerized charging stations offer an innovative solution with a range of key advantages. Their compact, modular design means they can be deployed quickly, often without permits, engineering, construction, or utility connections.

From enhancing resilience and supporting energy independence to taking advantage of clean energy resources, these solutions create flexibility and ease of deployment for any Federal site that has begun its EV transition.

Standalone, off-grid EV charging solutions offer a range of key advantages

| | |
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| Resilience | Energy independence + security |
| Off-grid EV charging stations generate their own power, do not rely on the electric distribution grid, and integrate battery storage for enhanced reliability. | Onsite renewable energy generation minimizes dependence on global fossil fuel markets. |
| Clean energy resources | Flexibility in deployment |
| Solar energy is an emissions-free and inexhaustible, free source for power production. | Compact, versatile, modular designs enable rapid, flexible deployments and relocation and can be implemented without permits, engineering, construction, or utility connections. |

| Example site locations |
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| <ul style="list-style-type: none"> • Federal agency buildings + courthouses • DoD facilities and installations • Remote/temporary deployments • Post offices • Historic properties • National parks + recreation areas • Gas stations • Remote fossil fuel dependent communities • Tribal lands • State Welcome Centers + LPOE |

Choosing the right partner for the transition to EVs

Transitioning the U.S. government’s fleet to EVs is essential to limiting environmental impact, advancing energy independence and security, and achieving emissions targets^{xv}. So too is the

deployment of the charging infrastructure necessary to meet the power demands of an electrified fleet.

Partnerships will play a critical role for Federal agencies as they begin their fleet electrification journeys. Detailed planning, forecasting, site selection, design-build, maintenance, monitoring, scalability – all of these are key factors for a successful transition to EVs.

The right partner will not only have installed EV charging infrastructure in all 50 states, but they will also:

- Understand local requirements at the industry, commercial, and federal levels
- Partner with automotive OEMs, local service providers, and small businesses to enable a successful and reliable EV infrastructure installation
- Know how federal procurement processes, small business contracting requirements, DoD Risk Management Framework, Buy American requirements, and more will affect any deployment project
- Leading domestic manufacturer of EV charging station equipment and Green Energy solutions, providing clean, affordable, convenient, and rapidly deployable renewable energy supplies across all sectors

BC Energy, in a preferred partnership with Siemens, Mobile Modular, and Storz Power, is committed to providing complete EV charging and infrastructure solutions that will support Federal customers' missions well into the future. We are shaping the market with innovative, off-grid charging technology solutions, powering infrastructure across various sectors, servicing the entire EV charging lifecycle, and well as planning and implementing the solutions that enable the electrification of transportation fleets.

ⁱ Brown University's Watson Institute of International & Public Affairs | [link](#)

ⁱⁱ Wall Street Journal | [link](#)

ⁱⁱⁱ Sustainability.gov | [link](#)

^{iv} UN Sustainable Development Solutions Network (SDSN) | [link](#)

^v U.S. Department of Energy | [link](#)

^{vi} McKinsey & Company | [link](#)

^{vii} McKinsey & Company | [link](#)

^{viii} U.S. GAO | [link](#)

^{ix} U.S. Department of Transportation | [link](#)

^x U.S. GAO | [link](#)

^{xi} American Society of Civil Engineers Infrastructure Report Card | [link](#)

^{xii} Federal Register | [link](#)

^{xiii} National Defense University Press | [link](#)

^{xiv} POWER Magazine | [link](#)

^{xv} U.S. Department of Transportation | [link](#)