

Electric Vehicle Fleet and Infrastructure



Contact



School Bus Studies

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Electric vehicle (EV) charging is an essential part of the ongoing transition to sustainable transportation. As more consumers and businesses adopt electric vehicles to reduce carbon emissions and dependence on fossil fuels, the demand for convenient, efficient, and accessible charging infrastructure has grown significantly.

The EV transition is well underway with more vehicle choice, driving range, and other capabilities than even a few years ago. But still the prospect of implementing a fleet transition or even the first EV purchase can be daunting for resource-, experience-, and time-

constrained organizations. C&S employs a team of planning, design, engineering, and construction experts who have firsthand experience with all aspects of the vehicle electrification challenge. Together, we have helped our clients develop sensible and practical approaches to fleet electrification, including:

- ◆ Fleet evaluations
- ◆ Assessing and designing electrical infrastructure capacity to meet EV charging demand
- ◆ Bus fleet route analysis under a range of environmental conditions
- ◆ Selecting, siting, and designing charging infrastructure
- ◆ Installing EV charging stations
- ◆ Strategic planning and budgeting for fleet transitions, including integration with master and capital plans
- ◆ "In-reach" to an organization's stakeholders to invite their opinions and include them in the transition process

- ◆ Securing federal and state grants, utility rebates, and tax incentives for both vehicles and infrastructure

Fleet Planning

C&S has been instrumental in assisting major airports, including Philadelphia International Airport (PHL), San Antonio International Airport (SAT), Portland International Airport (PDX), and Albuquerque International Sunport (ABQ), in their transition toward electrifying their fleet vehicles.

This effort encompasses a wide range of vehicles, such as buses, sedans, trucks, heavy-duty equipment, and ground support equipment.

Our team helped these airports maintain their fleet replacement schedules, ensuring that the integration of EVs will take place without vastly exceeding capital budget constraints and in harmony



with and supportive of existing long-term planning goals, such as airport master plans and decarbonization and other sustainability targets.

School Bus Fleet Electrification Studies

C&S is assessing over 30 school districts' bus fleets' suitability for electrification. These studies support the eligibility of a school for state and federal funding for electric buses, and also identifies what electrical upgrades are needed for charging.



First, electrical engineers are sent on-site to review the existing electrical infrastructure, such as the panels and transformers. Then a routing analysis is conducted for the existing bus fleet to ensure that electric buses will be able to meet the requirements of the route (i.e. complete a route with a sufficient margin of charge, accounting for factors such as cold temperatures and hilly terrain). The analysis also determines whether buses will have sufficient time to re-charge between routes, and what the charging load will be.

After determining the charging load, C&S engages with the local utility to share the findings and

work collaboratively to evaluate the feasibility of any necessary electrical upgrades. These upgrades may include the installation of additional transformers, expansion of electrical service, or other infrastructure modifications to ensure that the charging infrastructure can meet demand. A phased plan with a financial analysis is created, considering the district's typical budget, operating costs, maintenance costs, and operational practices. These phased plans will help ensure that during the transition, there are minimal disruptions to the student's transportation services.

C&S can also prepare school bus electrification plans in parallel with larger facility energy audits and infrastructure assessments. This integrated approach ensures that the electrification process aligns with the broader

goals of improving overall energy efficiency and infrastructure capacity for the entire facility, offering a comprehensive solution that supports long-term sustainability and keeps costs down.

Fleet Charging Infrastructure Assessments

C&S has partnered with municipal transportation agencies, such as CENTRO (Central New York Regional Transportation Organization) and the Niagara Frontier Transportation Authority (NFTA) in Buffalo, NY, to provide in-depth analysis and practical evaluation of hub facilities for electric

bus charging equipment. These efforts aimed to accommodate the full fleet of electric buses in both regions, addressing the unique challenges posed by the scale and geographic distribution of municipal transportation operations.

Given the large fleet sizes and extensive service areas, C&S recommended significant upgrades to the existing electrical infrastructure to support the necessary charging capacity. These upgrades would be critical to ensuring that each transit authority could efficiently deploy and maintain their electric buses without compromising operational performance.

Within the fleet systems, the phasing of bus purchases was a major consideration when planning to integrate infrastructure that would need to be budgeted over multiple years. NFTA has moved forward with an electric bus infrastructure at one hub, while CENTRO is still considering the alternatives with insights provided by our evaluation.

C&S has also played a key role in assessing electrical infrastructure and capacity as part of the development of airport rental car facilities. For instance, at Portland International Airport (PDX) in Portland, OR, C&S addressed the anticipated but uncertain load growth from the increasing adoption of EV charging at the rental car center. As rental car fleets transition to EVs, the demand for charging infrastructure can grow rapidly, and managing that growth requires careful planning.

To help PDX prepare for this shift, C&S conducted detailed modeling of various EV and DC fast charging

adoption scenarios. By simulating different levels of EV adoption among rental fleets, the analysis forecasted when PDX would need to increase the electrical service capacity at the rental car facility to accommodate growing demand. This modeling also accounted for different rates of EV adoption, seasonal fluctuations in rental car traffic, and the installation of DC fast chargers, which can place significant strain on the electrical system.

In addition to infrastructure needs, C&S explored policy options for managing charging demand. One such policy considered was requiring rental car companies to require renters to return vehicles fully or partially charged, or adopting fleet management strategies to ensure that charging infrastructure could meet the needs of both rental customers and the operational needs of the facility.

Installation of Electrical Vehicle Charging Stations & Electrical Service Infrastructure

C&S is regularly involved in projects to install EV charging stations and connected infrastructure, often as part of larger projects. When it is desired to have EV charging stations for multiple vehicles, a more in-depth review of the electrical infrastructure is needed. Having multiple EV charging stations, particularly DC fast chargers, often requires more robust electrical infrastructure and often electrical service upgrades that require extensive coordination with electric utilities. Associated work often comprises tasks such as evaluating available makes and models for the best fit, researching



funding incentives, complying with applicable codes and ADA requirements, and potentially investigating integration with PV systems. Some examples include:

- ◆ Currently providing designs for Level 2 and DC fast charging stations and associated electrical infrastructure for 17 New York Department of Military and Naval Affairs (DMNA) locations across the state.
- ◆ Provided Level 2 charging stations for the Lewiston Art Park in Niagara Falls, NY
- ◆ Provided Level 2 charging stations as part of the Osinski Parking Garage Rehab in Buffalo, NY
- ◆ Provided infrastructure for DC fast charging stations as part of Niagara Frontier Transit Authority's (NFTA) University Station project on the campus of the University of Buffalo
- ◆ Provided Level 2 EV charging stations for Customs and Border Patrol facility at the Trout River Land Point of Entry (LPOE)

Each location was designed separately to be able to accommodate site-specific requirements. An assessment of the on-site electrical distribution

system was performed in each case to determine if the existing electrical infrastructure could be used. In cases where upgraded electrical service was required, C&S coordinated with the utility company to provide a design that was compatible with the utility system.

In support of some of electrical designs, C&S has also provided civil designs to include underground utility relocation, resurfacing of roadways and parking, and modifications needed to ensure proper drainage due to location of equipment pads.



Integrating EV's into Community, Facility, and Sustainability Master Plans

The transition to electric vehicles (EVs) must often be viewed in the broader context of urban and community planning. Beyond the technical aspects of vehicle electrification, there are numerous interrelated factors to consider, such as smart growth initiatives, affordable housing developments, community and facility master plans, climate action, energy resilience, and more. These factors can significantly impact how and when the transition to EVs occurs, and how it can be seamlessly integrated into broader sustainability and economic goals.

C&S is a firm of professionals with diverse experience across various planning disciplines, including climate action, carbon reduction, energy master planning, and municipal comprehensive planning.



We have successfully developed tailored plans for a wide range of clients—airports, schools, universities, cities, counties, and private sector entities—each with unique requirements and objectives. Our expertise in these areas allows us to approach the EV transition with a holistic perspective that ensures alignment with each client's broader strategic goals.

We work closely with our clients and their stakeholders to frame the EV transition within the larger context of their sustainability initiatives and long-term planning efforts. By taking into account all the moving parts—whether that be addressing

climate goals, energy resilience, or regional economic development—we ensure that EV transition plans are integrated in a way that enhances, rather than disrupts, these larger initiatives.

This collaborative approach helps our clients not only make the most of the EV transition but also achieve their broader goals for sustainable development, economic vitality, and community well-being. With C&S's guidance, EV transition strategies become a seamless part of the larger picture, driving positive outcomes for both the environment and local communities.





Grants, Rebates, and Tax Incentives

EVs and charging equipment can be expensive, particularly when DC fast chargers and the associated upgrades to electrical wiring come into play. Although subsidies for EVs themselves have been typically modest, they are increasing for certain types of heavy-duty vehicles such as school and transit buses. At both the state and federal levels, growing commitments to EV technology are helping to drive a range of incentives aimed at reducing the costs associated with both vehicles and charging infrastructure.

However, these incentives are often highly specific to states, utilities, or agencies, creating a complex landscape of programs that can be confusing for organizations to navigate. Understanding which grants, rebates, and incentives apply—and how to access them—can be overwhelming. This is where C&S's expertise proves invaluable. C&S has in-house grant writers who are experienced in combing

through the range of federal, state, and utility programs to identify the most relevant and beneficial incentives for our clients. By tapping into this knowledge and network, we help our clients maximize the financial support available for both the purchase of EVs and the deployment of associated charging infrastructure.

A notable example of C&S's success in securing funding for electrification projects includes our work with airport clients. We have helped them secure over \$100 million in Federal Aviation Administration (FAA) grants for electrification initiatives, significantly reducing the financial burden of transitioning to electric vehicle fleets and installing charging infrastructure. On a more local level, C&S also applied its expertise to the installation of EV charging stations at our Syracuse headquarters.



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in federal and state grants for
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By leveraging a combination of state and utility incentives, we were able to have 95% of the project cost reimbursed within months of project completion.

At C&S, we are committed to applying the same level of diligence to secure supplemental funding for our clients' EV charging station projects. Whether it's a large-scale initiative or a smaller, localized project, we work tirelessly to uncover and access the incentives that will reduce costs and accelerate the transition to electric transportation. Our goal is to ensure that our clients receive the financial support necessary to make their EV adoption and charging infrastructure deployment as cost-effective as possible.