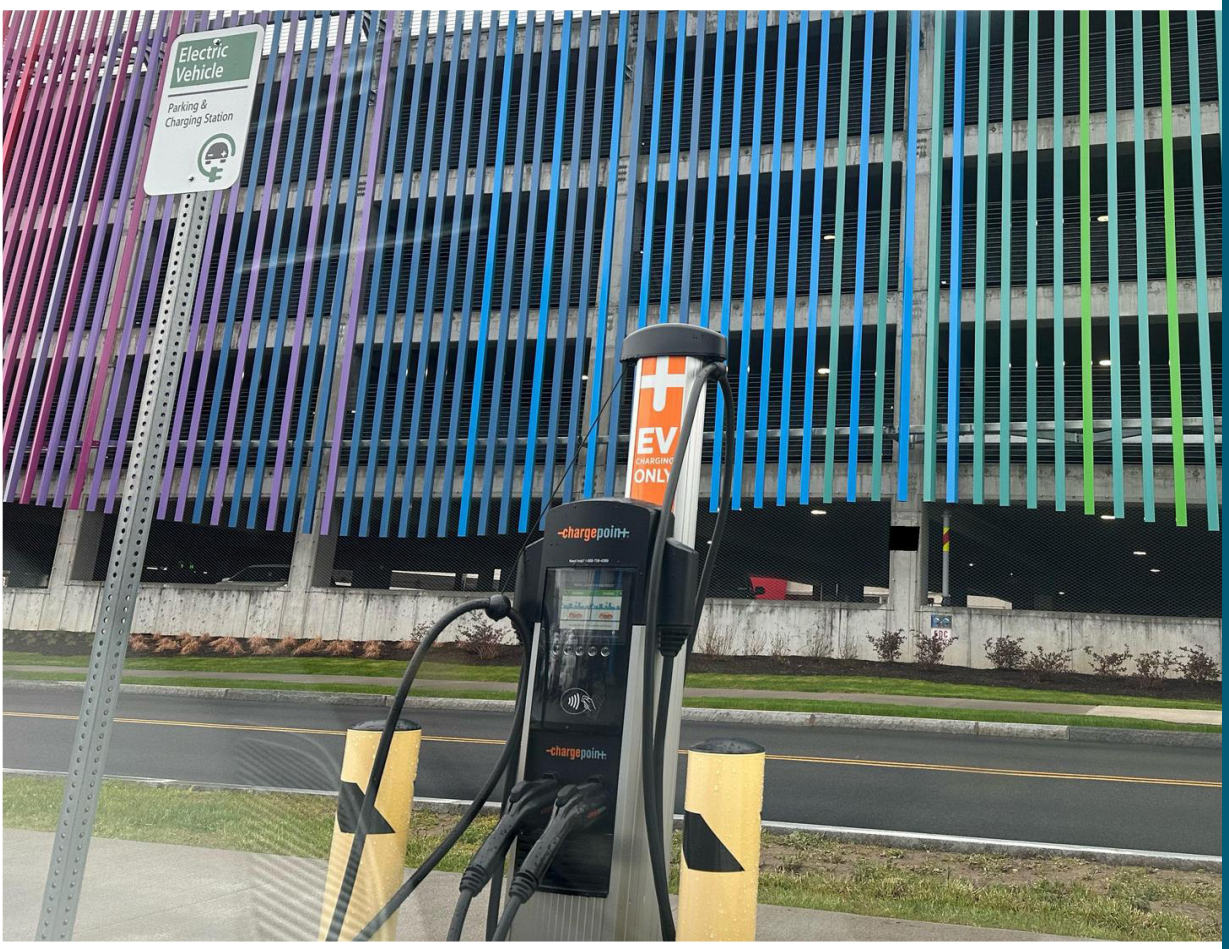
Charging Ahead:

A Strategic Guide to EV Station Design



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Executive Summary

Introduction

Charging Ahead: A Strategic Guide to EV Station Design provides a comprehensive guide for individuals involved in the planning, designing, constructing, and implementing of electric vehicle (EV) charging infrastructure in New York State, specifically focusing within the Genesee-Finger Lakes region. This report is purposefully framed within NY state's ambitious **clean energy and transportation electrification goals**, which includes a widespread adoption of EVs and the expansion of accessible charging stations.

This report aims to directly emphasize the overlooked importance of **amenity design considerations**, to ensure that EV charging stations are not just functional but also maximize their user experience. From careful site selection and infrastructure planning, this report lays out how small alterations to layout, design, and construction can be crucial for the successful deployment of EV charging facilities.

Key Findings and Recommendations

1. Charging Needs and Infrastructure Planning

- By **2030**, New York will need between **18-28 million home chargers, over 1 million public chargers, and 550,000-1.2 million workplace chargers** to meet demand.
- The report outlines projected workplace, public, and fast-changing needs under conservative and aggressive EV adoption scenarios.
- Strategic deployment of **Level 1, Level 2, and DC Fast Charging (DCFC) stations** is necessary to support varied user needs across residential, public, and commercial locations.

2. Amenity Considerations for Charging Stations

- **Amenities such as restrooms, food services, Wi-Fi, and shaded seating** improve the charging experience, increase user satisfaction, and encourage EV adoption.Well-designed **charging hubs** can expand local economies by increasing foot traffic to nearby businesses.
- The report categorizes amenity needs based on **location type**, such as **shopping centers, municipal garages, residential areas, highway rest stops, and village main streets**, creating unique considerations regardless of location.

3. Regulatory and Code Compliance

- EV charging station installations require **zoning and permitting approvals**, which vary by location and type (residential, private, or public).
- **ADA compliance** is essential for accessibility, including features such as **dedicated accessible charging spaces, signage, and user-friendly station interfaces.**
- The **EV Make-Ready Program** provides financial incentives for public and workplace chargers, reducing infrastructure costs.

4. Funding Opportunities

- The report outlines **federal, state, and local funding programs** available to support EV infrastructure, including:
- **National Electric Vehicle Infrastructure (NEVI) Program** – Funds up to **80% of project** costs for public fast chargers along highway corridors.

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- **Alternative Fuel Infrastructure Tax Credit** – Provides **30% tax credits (up to $100,000 per station).**
- **NYSERDA's Charge Ready NY Program** – Offers **$4,000 rebates per Level 2 charging port**.
- **EV Make-Ready Program** – Covers up to **100% of make-ready infrastructure costs**, especially for disadvantaged communities.

5. Grid Capacity and Sustainability Considerations

- Large-scale EV adoption **increases electricity demand**, requiring **grid capacity assessments and load management strategies.**
- **Smart charging technologies** can optimize charging times to prevent grid congestion
- **Renewable energy integration** (solar, wind, battery storage, Hydrogen fuel-cell) enhances sustainability and reduces reliance on fossil fuels.

6. Future-Proofing and Emerging Trends

- **Wireless (inductive) charging** and **autonomous vehicle charging integration** are being explored for long-term infrastructure viability.
- **Vehicle-to-Grid (V2G) technology** allows EVs to supply energy back to the grid, enhancing **grid resilience.**
- **Expanded amenity expectations**, such as retail integration and high-speed connectivity, are becoming critical for user adoption.

Conclusion

New York State's ambitious **climate goals and transportation electrification efforts** necessitate a strategic and user-centered approach to EV infrastructure deployment. **Key best practices** include:

- Strategic Planning – Site locations should be **equitably distributed**, with a focus on accessibility.
- User Experience Enhancements – Well-designed **charging hubs** with **essential amenities** can drive adoption.
- Regulatory Compliance – Adhering to **zoning laws, ADA requirements, and permitting processes** ensures seamless installations.
- Sustainability – **Smart charging, renewable energy integration, and grid management** reduce environmental impact.
- Funding Utilization – Leveraging **state and federal incentives** helps offset installation costs.

Despite policy uncertainties at the federal level, New York has strong state-level programs and public and private partnerships that will maintain progress in EV infrastructure development. This report serves as a foundational resource for municipalities, businesses, and developers aiming to accelerate the transition to clean transportation while ensuring economic and community benefits.

Introduction

Purpose of the Playbook

According to experts, supporting the number of private passenger EVs expected in 2030 will require NY State to house 18 million to 28 million home chargers, over 1 million public chargers, and between 550,000 to 1.2 million workplace chargers.

To meet New York's clean energy goals, it will be imperative that we electrify our transportation. An important initial step in transportation electronification planning is estimating the number of types of EV chargers needed in the state. From a report done by the Department of Energy, the goals are as follows:

Workplace Level 2 Plugs	Public Level 2 Plugs	Public DC Fast Plugs
Conservative Adoption: 505	Conservative Adoption: 364	Conservative Adoption: 714
Aggressive Adoption: 16,153	Aggressive Adoption: 9,399	Aggressive Adoption: 12,038

The EV Charging Station Amenity Design Playbook serves as a comprehensive guide for stakeholders in planning, designing, and implementing electric vehicle (EV) charging infrastructure across the Region. As New York State works to meet ambitious clean energy goals, expanding accessible and strategically designed EV charging stations will be vital in supporting a shift toward electrified transportation.

Target Audience

This playbook addresses the essential components needed to install and manage EV charging stations effectively, from regulatory requirements and location-specific best practices to user experience and amenity design considerations. It is structured to offer tailored guidance to:

Fleet Managers Optimizing the placement and management of charging infrastructure to support vehicle fleets efficiently and sustainably.

Contractors Ensuring that installation meets state and federal regulations, support seamless operations, and meet long-term maintenance requirements.

Municipal Leadership Planning and implementing accessible public charging options in urban, suburban, and rural areas, with a focus on community integration.

The public Providing accessible, convenient, and well-supported charging options that fit various users' needs and make EV charging as straightforward as fueling a traditional vehicle.

Importance of Amenity Design

Amenities like restrooms, food options, wi-fi, and shaded seating significantly enhance the EV charging experience by offering comfort and convenience, especially during longer charging times. Charging stations equipped with thoughtful amenities transform from functional stops into inviting spaces that may encourage more people to adopt electric vehicles. Amenities such as these can make the waiting period more productive and enjoyable while also increasing the appeal of EV stations, fostering a sense of accessibility and ease for diverse users.

Focusing this study on considerations aimed at amenities is essential because they contribute to station success. Well-appointed stations see higher utilization rates, attract partnerships with nearby businesses, and positively impact surrounding communities. By including amenities specific to each type of location – such as food and retail access in shopping centers or restrooms at highway stops – this report highlights the importance of carefully considering the totality of the implementation of electric vehicle charging stations to increase not only the success of the station itself, but New York State's far reaching clean energy goals.

Introduction

Types of Charging Stations

Level 1

AC Level 1 Charging is limited to 120 volts of alternating current (VAC) and uses a typical household three-prong plug. All current EVs are sold with AC Level 1 capabilities and only need a dedicated 20-amp outlet to charge. AC Level 1 stations charge slowly and are generally used in the home or workplace charging applications where EVs will be parked for long periods of time. AC Level 1 charging adds 2 to 5 miles of electric range per hour of charging time. Usually, a portable AC Level 1 charger is included in the initial vehicle purchase price. Hardware costs: $1,000.

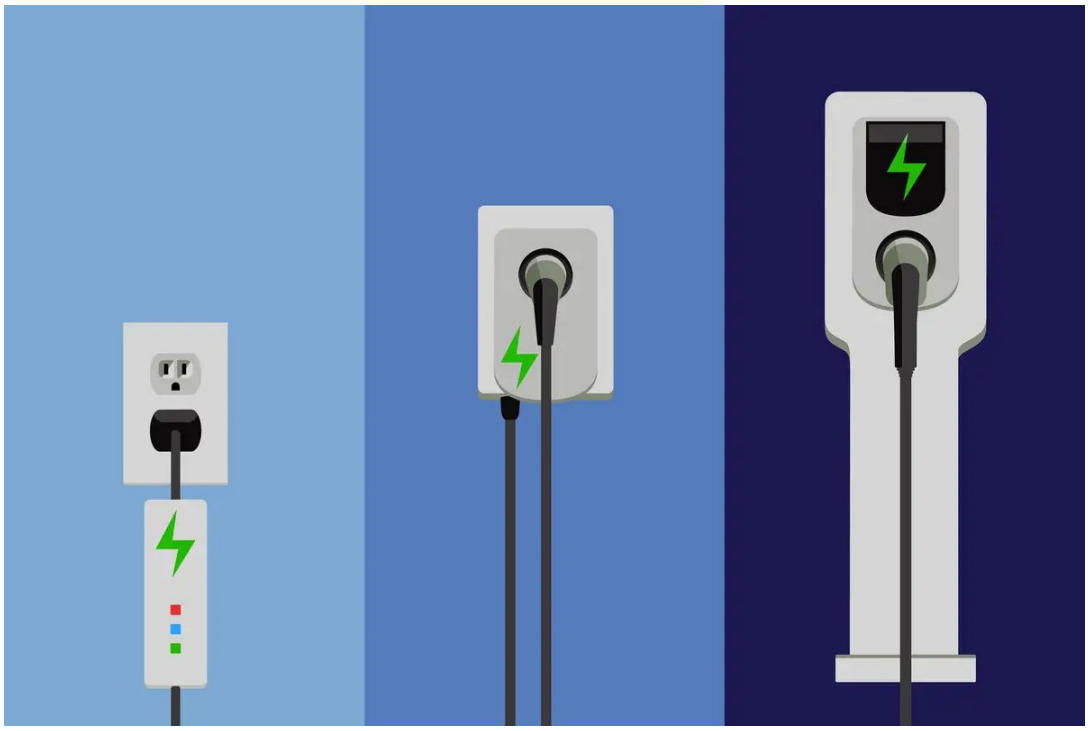
Level 2

AC Level 2 Charging provides electrical energy at either 240 VAC (typical for residential applications) or 208 (typical for commercial and industrial applications). This level of charging is viable for both residential and public charging locations.

Unlike AC Level 1 charging, AC Level 2 charging requires additional hardware that can be mounted on the wall, to a pole, or as a stand-alone pedestal. It must be hard-wired to the electrical source. The increased charging rate and affordability of AC Level 2 charging stations make them the most popular choice for all EV charging applications. It provides up to 7.2 kilowatts (kW) for residential and up to 19.2 kW for commercial, which typically results in 10-20 miles of range added per hour of charging time. Hardware cost: $450-$5,000.

DC Fast Charging

DC Fast Charging utilizes direct-current (DC) energy transfer and a 480 VAC input to provide extremely rapid recharges at heavily used public charging locations. This type of station is generally cost prohibitive for home applications. However, depending on the EV, DC fast charge stations can provide an 80% recharge in as little as 20 minutes. This option is only available on certain EVs. Hardware cost: $7,000-$40,000.



Cars.com illistration by Paul Dolan

Introduction

Types of Locations for Charging Stations

Public Installation

Public charging stations are any station that allows the public to charge their vehicle and can be found in dedicated charging stations (like those found at existing gas stations), or at businesses and multi-unit dwellings offering public access. Like private, the definition of public charging stations can vary depending on access and location, but in general, public charging is accessible without restrictions on which drivers can utilize the station.

Pros: High level of financial incentives including tax rebates, and grant funding. Station utilization, while net-positive from a sustainability perspective (when compared to gas-powered vehicles), also means more revenue. The increased utilization and subsequent revenue can snowball into expanded opportunities (i.e., larger networks, more power chargers, increasing infrastructure, funding availability to increase amenities) for owners.

Cons: Many drivers rely on quick charging speeds when using public charging stations. Meaning that the use of level 3, or DC charging stations (which require a much higher upfront cost) will be necessary for successful utilization. This also implies that maintenance costs will also be high. The greatest barrier to public EV charging is the existing power infrastructure needed to support the demand of these high-powered electric vehicles.

Private Installation

Private charging stations are defined as any station that is not accessible by the public. This includes residential, multi-family properties, offices, and other business dwellings that limit access to the charging stations to only employees or residents.

Pros: For multi-family residences, offices, and other business dwellings, it can be to their benefit to limit access due to the increased longevity less usage can provide to the station.

Cons: Private charging stations are not always eligible for the same incentives as public charging infrastructure. This inevitably leads to higher upfront costs.

Regulatory and Code Requirements

Zoning and Permitting

To accurately support those looking to begin the process of installing an EV charger, it is necessary to obtain the correct permits and follow all zoning regulations within the area. Follow these steps when looking to obtain permits for construction.

Residential Installations

Determine Zoning Regulations Check local zoning codes by contacting your local municipality where the property is located to review zoning ordinances. Look for sections related to residential use, accessory structures, or EV charging. Information can typically be found on municipal websites or by contacting a zoning officer, the building department, or the Town Clerk who can assist by pointing you in the correct direction. Confirm if EV charging stations are categorized as accessory uses in residential zones. Some municipalities may require additional approval if visible from the street.

Assess HOA Rules (if applicable) If the property is within a homeowner's association (HOA), consult HOA bylaws. Some HOAs regulate visible outdoor installations, such as chargers.

Introduction

Apply for Necessary Permits Most municipalities require an electrical permit for new installations. Contact the municipal building department to confirm requirements. If an excavation or a permanent structure is required (e.g., a pedestal charger), a building permit may also be needed.

Work with a Licensed Electrician Hire a certified electrician to assess your electrical system's capacity and install the charging station with local codes.

Verify Utility Requirements Contact your utility provider to ensure compliance with their requirements, such as load assessments or participation in managed charging programs.

Complete Inspections After installation, schedule inspections as required by your local building department to finalize permits.

Fairport, NY. Taken by GFLRPC Staff

Private Property Installations

Check Property Zoning Verify if EV chargers are permitted in the zone where the building is located. Look for designations such as "commercial" or "mixed-use." Refer to zoning maps and codes for your municipality or county. Determine if the charger requires site plan approval from a planning board, especially if exterior changes or significant infrastructure upgrades are planned.

Apply for Necessary Permits Obtain the required permits for electrical work and, if necessary, structural modifications.

Signage Permits (if applicable): If you plan to add directional or pricing signage, some municipalities require a separate permit.

Accessibility and ADA Compliance If the charging station will be available to the public, ensure it meets Americans with Disabilities Act (ADA) guidelines, such as providing accessible parking spaces.

Utility Coordination Contact the utility to assess the building's electrical capacity and determine if upgrades to the service panel are required.

Incorporate Sustainable Design Consider integrating solar power or battery storage to reduce grid reliance. Check for incentives through programs like NYSERDA's Charge Ready NY.

Complete Inspections After installation, schedule inspections with the building department and finalize all permits.

Introduction

Public Property Installations

Identify the Authority Having Jurisdiction Determine the owner of the public area (e.g., municipal government, state agency, or federal land). Contact the relevant department to request permission.

Example: For municipal properties, reach out to the Department of Public Works or Planning Department.

Review Land Use and Zoning Verify if the area is designated for EV infrastructure in public plans (e.g., transportation or sustainability plans). Example: Check your county or town's comprehensive plan for EV policies.

Apply Necessary Permits (Site Plan Review) Public projects often require site plan review by the local planning board or zoning board of appeals.

Environmental Assessments (if applicable): Larger projects may require environmental reviews under SEQRA (State Environmental Quality Review Act).

Comply with Accessibility Standards Public EV stations must meet ADA requirements for accessible parking, clear paths, and signage.

Apply for Fund Assistance NYSERDA Charge Ready NY, Incentives for Public EV chargers; or the NEVI Program, Federal Funding for highway corridors.

Coordinate with Utility Providers Ensure the charging infrastructure can connect to the grid and confirm any requirements for demand management or upgrades.

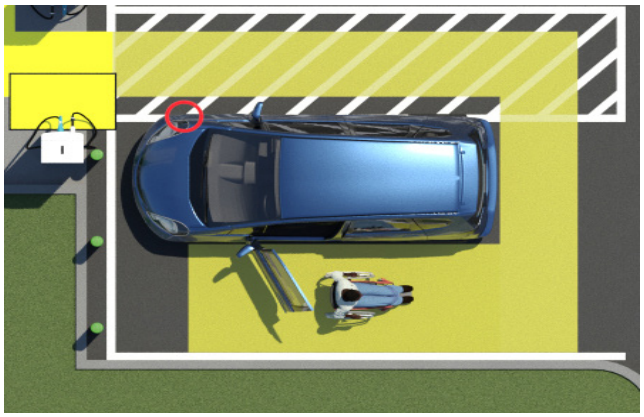
Final Inspections and Launch Schedule inspections and obtain approvals for operation. Once cleared, announce the public EV station to ensure it is utilized effectively.

Safety Standards and ADA Compliance

ADA/ABA Compliance

The ADA (Americans with Disabilities Act) and ABA (Architectural Barriers Act) requires that buildings or facilities that were designed, built, or altered with federal dollars or leased by federal agencies be accessible. The ADA and ABA Accessibility Standards include many requirements applicable to electric vehicle charging stations regarding access to sites, facilities, buildings, and elements, as well as specific requirements for operable parts and accessible routes.

The U.S. Access Board provides detailed Guidance on how to ensure electric vehicle (EV) Charging stations are accessible to people with disabilities, covering requirements under the ADA and ABA. It emphasizes that EV charging stations must include accessible parking spaces, pathways, and user interfaces, such as touchscreens, for independent use by individuals with disabilities. The document also covers requirements for communication features and technical standards under §508 for electronic and information technology components. These guidelines ensure equal access for all users at public and private EV charging stations.



https://www.access-board.gov/tad/ev/

Introduction

EV Station Locations That Must Be Accessible:

- State and local government offices
- Public parks
- Municipal building parking lots
- Street Parking and the public right-of-way
- Residential housing facilities provided by state or local government
- Public EV charging stations provided by a private entity
- Fleet charging stations used by the federal government
- Commercial fleet charging stations available to corporate clients
- Rest stops along the Interstate Highway System

Read more on ADA/ABA Compliance HERE

Utility and Electrical Requirements

Rochester Gas and Electric (RG&E), New York State Electric and Gas (NYSEG), and National Grid

Any party looking to install a charging station will need to go through their respective electrical companies for approval. While it is not necessary to go through the Make-Ready Program, the zoning and citing support and financial incentives make it a great option for many parties.

The goal of the Electric Vehicle ("EV") Make-Ready Program ("EV Make-Ready Program") is to support the development of electric infrastructure and equipment necessary to accommodate an increased deployment of EVs within New York State by reducing the upfront costs of building charging stations for EVs. Through this EV Make-Ready Program, entities seeking to install or participate in the installation of Level 2 ("L2") and/or Direct Current Fast Charging ("DCFC") chargers can earn incentives that will offset a large portion of, or in some cases, all the infrastructure costs associated with preparing a site for EV charger installation. Several utility providers in New York State, including National Grid, Rochester Gas & Electric (RG&E), and New York State Electric & Gas (NYSEG), participate in this program, offering incentives and technical assistance for charger installation.

https://www.nyseg.com/

Introduction

Make-Read Program

Application and Approval: The interested party must apply to be accepted into the Make-Ready Program. The utility company will assess eligibility based on infrastructure needs, site location, and project maturity (i.e., projects initiated post-July 16, 2020) to ensure alignment with program goals.

What is covered:

Utility-Side Infrastructure: Includes distribution systems such as transformers and overhead service lines, owned and operated by the utility company.

Customer-Side Infrastructure: Includes necessary wiring, trenching, and panels on the customer's property, which the applicant will own. Future-proofing features for potential expansion may also be eligible.

Load Capacity and Plug Requirements: EV charging stations must have a minimum of two plugs, DC Fast Charging (DCFC) stations must comply with capacity guidelines (e.g., stations with over 10 plugs or those with demand exceeding 2 Megawatts will have additional requirements). Public stations must offer standardized plug types to maximize accessibility (see ADA and ABA requirements).

Contractor and Equipment Standards: All installations must be completed by utility-approved contractors to qualify for the program incentives.

Incentives for Disadvantaged Communities: Projects within or near disadvantaged communities may qualify for up to 100% coverage of eligible infrastructure costs, depending on accessibility and plug type. **Find out if you are in a disadvantaged community HERE.**

Incentive Level	Eligible Project Criteria
Up to 100%	• Publicly available DCFC projects with standardized plug types located within Disadvantaged Communities (DAC) or Disadvantaged Community Zones, as applicable. • Publicly available DCFC projects with proprietary plug types that also include an equal number of standardized plugs of an equal or greater charging capacity to the proprietary plugs located within a DAC or Disadvantaged Community Zones, as applicable. • L2 projects located at eligible multi-unit dwellings (MUD) (see Table 2). • L2 curbside projects within or adjacent to a DAC. • Enhanced incentive eligibility by utility is detailed below.
Up to 90%	• Publicly available L2 and DCFC projects with standardized plug types. • Publicly available L2 and DCFC projects with proprietary plugs that also have an equal or greater number of standardized plugs of an equal or greater charging capacity to the proprietary plugs. • Includes municipal pay-to-park locations and free parking offered while charging.
Up to 50%	• Non-public L2 and DCFC projects, such as workplaces or MUDs with restricted access and privately owned pay-to-park lots that require payment for parking while charging. • Public and non-public L2 and DCFC projects with proprietary plugs that do not include an equal or greater number of standardized plugs of an equal or greater charging capacity to the proprietary plugs.

Table is provided for illustrative purposes. Individual utilities reserve the right to make determinations regarding incentive level eligibility based on their assessment of the proposed project and available information at the time of review. Customers are responsible for all costs not eligible for incentives including the cost of chargers, maintenance, electricity, networking fees, and other operational costs. DAC areas will be defined in each utility's implementation plan filings.

https://swtchenergy.com/blog/incentives/incentive-joint-utilities-new-york-ev-make-ready-program-increases-incentive-amounts-for-2024/

Introduction

Grid Capacity

Grid capacity is the ability of the power system to provide electricity to a given location. Large-scale electrification of the transportation fleet, especially if medium- and heavy-duty vehicles are included, can significantly increase the amount of load on the power system. In some instances, the demand for electricity may go beyond the grid's capacity, causing a multitude of issues (ex: **Electric Grid Upgrade in Henrietta Moving Forward**).

The rate of electrification has accelerated to a feverish pace. With this ever-expanding demand for electricity comes the issue of the grids' capacity to undertake it. As of 2020, the transportation sector was 90% on petroleum, 5% on biomass, 4% on natural gas, and less than 1% on electricity. The influx of demand for electric transportation will require a reassessment of how the grid is designed and operated to account for this new use and type of customer.

Find Out if Your Grid Has Capacity

Contact your utility provider: They can provide specific details on grid capacity for a particular location, especially important for DC Fast Charging (DCFC) stations, which require higher power levels. RG&E and NYSEG have dedicated contacts for their EV Make-Ready programs who can assist with site assessments.

Contact **evprograms@rge.com** or call 1+(800)-572-1111.

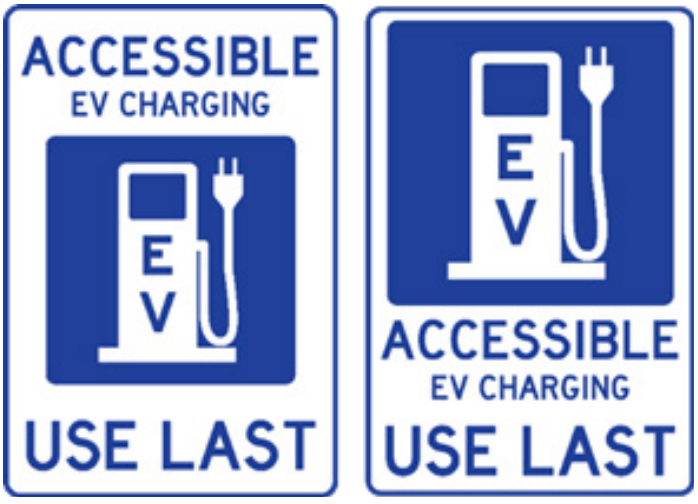
Request a Site Feasibility Study: Utility companies often conduct feasibility studies or load assessments to evaluate if the grid in a specific area can handle the additional load of an EV charging station. This includes reviewing the existing infrastructure and determining if upgrades are necessary.

View the NYSEG/RGE Electrification Capacity Map HERE.

Signage and Branding Regulations

Accessibility Signage: The "use last" model suggests that accessible EV charging spaces be open for general use when other chargers are occupied, rather than being reserved solely for users with disability placards. This approach maximizes charger utilization while still providing accessible options for mobility device users. Although no current standards exist for "use last" signage, the Access Board has developed sample designs to help guide implementation. This model aims to ensure flexibility for all users while keeping accessible features available when needed.

Read more HERE.



https://www.access-board.gov/tad/ev/

Introduction

Federal Level Funding Streams

National Electric Vehicle Infrastructure (NEVI) Program

Description: Provides funding to develop EV charging corridors along designated highways. Focuses on high-speed charging stations.

Eligible Projects: Public EV fast chargers along alternative fuel corridors.

Administrator: U.S. Department of Transportation (DOT) and state DOTs.

Details: Funds up to 80% of project costs.

Learn More: NEVI Program Overview

Alternative Fuel Infrastructure Tax Credit

Description: Offers a tax credit of 30% of the cost of installing EV charging equipment, up to $100,000 per station.

Eligibility: Businesses and property owners installing public or private charging stations.

Details: Extended under the Inflation Reduction Act (IRA).

Learn More: IRS Tax Credit for EV Infrastructure

Congestion Mitigation and Air Quality (CMAQ) Program

Description: Provides funding for projects that reduce air pollution and traffic congestion.

Eligible Projects: Includes EV charging stations as part of broader emission-reduction initiatives.

Administrator: Federal Highway Administration (FHWA) via state DOTs.

Learn More: CMAQ Program

Direct Pay

Description: Direct Pay allows tax-exempt entities to receive federal tax credits as cash payments, ensuring equitable access to incentives under the Inflation Reduction Act (IRA).

Who Is Eligible: Eligible entities include municipalities, tribal governments, nonprofits, rural electric cooperatives, and public utilities. For-profit businesses are not eligible.

What Projects Are Eligible: Projects include EV charging infrastructure, renewable energy systems (e.g., solar or battery storage), and emissions reduction initiatives.

Administration: The IRS administers Direct Pay, with claims submitted directly to the agency for approval and payment.

Details: Eligible entities can receive up to 30% of project costs as cash payments, such as up to $100,000 per EV charging unit under the Alternative Fuel Infrastructure Tax Credit.

Introduction

State-Level Funding Programs

NYSERDA's Charge Ready NY Program

Description: Offers a $4,000 rebate per charging port for publicly accessible Level 2 EV chargers.

Eligibility: Municipalities, businesses, and nonprofits in New York State.

Learn More: Charge Ready NY

Clean Energy Communities (CEC) Program

Description: Provides grants for municipalities achieving clean energy milestones, including EV infrastructure projects.

Eligibility: Local governments are participating in the Genesee-Finger Lakes Region's clean energy efforts.

Learn More: Clean Energy Communities

Regional Economic Development Councils (REDC)

Description: Offers competitive grants for projects that align with regional economic priorities, including EV infrastructure development.

Learn More: REDC Grants

NY Green Bank Financing

Description: Provides low-interest loans and financing for clean energy projects, including EV chargers.

Learn More: NY Green Bank

Local and Utility Programs

EV Make-Ready Program (Joint Utilities of New York)

Description: Covers up to 100% of the cost of make-ready infrastructure for EV chargers.

Eligibility: Public, workplace, and multi-unit dwelling projects in New York State.

Learn More: EV Make-Ready

Local Grant Programs

Description: Counties and municipalities often offer grants for EV infrastructure development as part of sustainability initiatives.

Example: Monroe County's Green Infrastructure Incentive Program.

Learn More: Contact your local planning department.

RG&E EV Charging Program

Description: Offers incentives for installing EV charging stations.

Eligibility: RG&E customers.

Learn More: RG&E EV Program

Location-Specific Best Practices

Parking Lots

Space Allocation and Design Considerations: The U.S. Department of Transportation provides a comprehensive checklist for EV infrastructure project planning, including site-level considerations for parking lots. **Learn More: HERE**

Accessibility and Safety: The U.S. Access Board offers design recommendations to ensure EV charging stations are accessible and secure for all users. **Learn More: HERE**

Impact on Traffic Flow and Parking Capacity: The International Code Council discusses the integration of EV charging facilities and their effects on parking requirements and traffic flow. **Learn More: HERE**

Garages

Municipal Garages

Public Access and Security Considerations: The National Renewable Energy Laboratory (NREL) provides insights into public access and security for EV charging in municipal settings.
Fee Structures and Payment Systems: The U.S. Department of Energy discusses various payment models and fee structures for public EV charging stations. **Learn More: HERE**

Private Garages

Restricted Access vs. Public Use: The International Code Council explores zoning and building codes related to EV charging, addressing access considerations. **Learn More: Planning and Zoning Guidance for EV Charger Deployment**.

Customization Options for Businesses: AmpControl designs optimizations for EV charging stations, including customization for business needs. **Learn More: a Guide to Optimizing EV Charging Station Design**.

Residential Garages

Homeowner vs HOA installations: The U.S. Department of Energy offers guidance on installing EV charging stations in residential settings, considering individual homeowners and HOAs. **Learn More: charging Electric Vehicles at Home**.

Evaluate your electrical system (grid capacity): Ensure your home's electrical system can handle the additional load of the station. Different stations require different levels of power. Depending on the station installed you may need to upgrade your electrical system. Consult a licensed electrician: they can help determine if your home is compatible with the station you want to install.

Use Certified equipment: Consider purchasing equipment that's certified under the Energy Star label.

Location-Specific Best Practices

Shopping Centers

Customer Convenience and Experience

An MIT study found that opening a charging station boosted annual spending at each nearby business by an average of $1,500 in 2019. Showcasing to shop owners the benefit of supporting such works. See HERE.

This article on Cyberswitching explores how integrating EV charging stations within retail centers enhances the shopping experience by providing convenient charging options thus transforming the act of charging into a complimentary part of the overall shopping experience. See HERE.

Traffic Flow and Parking Design

This resource provides insights into planning the location of EV charging stations within large parking facilities to ensure they do not disrupt existing traffic patterns and are easily accessible to users. See HERE.

Security Considerations

The Electric Vehicle Charging Station Security Guidebook offers comprehensive information on planning and site evaluation, including considerations for lighting and equipment placement, to enhance the safety and security of EV charging stations. See HERE.

Residential/Multi-family Housing

Shared vs. Dedicated Charging Options

The U.S. Department of Energy discusses solutions for multi-family housing, including shared and dedicated options. See HERE.

Workplaces

Employee Usage vs. Public Access

Alternative Fuels Data Center houses many resources dedicated to Workplace charging for electric vehicles. See HERE.

Access Control

Workplace Charging Challenge created a sample Workplace Charging Policy. See HERE.

Pricing Strategies

NYSERDA created the Workplace Electric Vehicle Charging Policies to support business owners in creating a mutually beneficial and well managed on-site charging system for their employees. Within the document it also discusses how a workplace may go about with pricing structures. See HERE.

Village/Hamlet Main Streets and Downtowns

Street Parking and Pedestrian Access

The U.S. Access Board Provides design recommendations for integrating EV charging stations into public rights-of-way, considering pedestrian access. See HERE.

Integrating Charging Stations into Historic and Scenic Areas

The U.S. Department of Transportation offers guidance on planning EV infrastructure in various community settings, including historic areas. See HERE.

Wayfinding and Signage to Support Charging Stations

The U.S. Department of Energy discusses best practices for signage and wayfinding to enhance the visibility and accessibility of Charging sites. See HERE.

Amenity Considerations by Location

Parking Lots and Garages

Lighting and Security

Importance: Adequate lighting and robust security measures are essential to ensure user safety, deter vandalism, and foster a sense of security, especially during nighttime or in secluded areas.

Resources:

1. This document provides guidelines on enhancing safety at EV charging stations through strategic lighting and site placement. Click here: Drive Electric.
2. This article discusses the importance of security measures, including lighting, to protect EV charging infrastructure and users. Click here: NovaCharge.

Bathrooms and Vending Machines

Importance: Providing restrooms and vending options enhances convenience, making charging stops more comfortable and encouraging longer stays, which can benefit nearby businesses.

Resources:

1. This article highlights EV charging stations that offer amenities like customer lounges, restrooms, and vending machines to improve user experience. Click here: Edmunds
2. This piece discusses Tesla's implementation of lounges equipped with restrooms and automated vending machines at charging stations. Click here: Electrek

Wi-Fi Access

Importance: Offering free Wi-Fi allows users to work or entertain themselves during charging sessions, enhancing the overall experience and making the location more attractive.

Resources:

1. This article describes charging hubs that provide amenities such as free Wi-Fi to enhance the user experience. Click here: Spectrum News 1
2. This article highlights a charging station offering a 24/7 lounge with Wi-Fi access, improving convenience for users. Click here: InsideEVs

Shade or Sheltered Areas

Importance: Providing shaded or sheltered areas protects users from adverse weather conditions and can improve the efficiency of the charging process by keeping vehicle batteries cooler.

Resources:

1. This article discusses the benefits of adding shade structures to EV charging stations, including faster charging times and enhanced user comfort. Click here: Apollo Sun Guard
2. This piece explores the integration of solar lighting and shading solutions to improve safety and user experience at charging stations. Click here: Solar Lighting

Amenity Considerations by Location

Shopping Centers and Malls

Access to Food and Beverage Options

Importance: Providing access to food and beverages allows EV drivers to utilize charging time effectively, enhancing convenience and satisfaction.

Resources:

1. Case studies of how fast-food chains like McDonald's and Burger King have integrated EV Charging stations to attract customers, offering insights into the benefits of co-locating charging infrastructure with food services. Click here: EV Charging Summit
2. This piece discusses how Irish service stations are evolving into food hubs to cater to EV drivers, highlighting the importance of food amenities at charging locations. Click here: The Times

Retail Shopping Amenities

Importance: Locating charging stations near retail stores encourages drivers to shop while charging, benefiting both consumers and retailers.

Resources:

1. This article explores how integrating EV charging stations within retail centers enhances the shopping experience and aligns with changing consumer expectations. Click here: Cyber Switching
2. This study reveals that the presence of EV charging stations increases consumer spending at adjacent retail businesses, underscoring the mutual benefits of such integration. Click here: MIT News

Restrooms and Lounge Areas

Importance: Offering restrooms and comfortable waiting areas improves the charging experience, especially during longer charging sessions.

Resources:

1. This article describes a Tesla Supercharger station featuring a retro diner and movie theater, providing restrooms and lounge areas for users. Click here: New York Post
2. This piece highlights Rivian's charging station offering amenities like a conversation pit and indoor air-conditioned areas, enhancing user comfort during charging. Click here: The Verge

Amenity Considerations by Location

Shade and Seating for Customers Waiting

Importance: Providing shaded areas and seating enhances comfort, encouraging drivers to utilize the charging station and nearby amenities.

Resources:

1. This piece highlights Rivian's charging station featuring shaded areas and seating, creating a welcoming environment for users. **Learn More:** The Verge
2. Enhanced Charging Efficiency: Excessive heat can impair battery function, causing electric vehicles in direct sunlight to require up to 2 kW more power to achieve a full charge. Shading EV charging stations helps maintain optimal battery temperatures, leading to faster and more efficient charging sessions. **Learn More:** Apollo Sun Guard
3. Protection of Vehicles and Equipment: Prolonged exposure to the sun's ultraviolet (UV) rays can cause fading interiors and cracking dashboards in cars. Shade structures block up to 93% of harmful UV rays, safeguarding both vehicles and charging equipment from sun-induced damage, thereby reducing maintenance needs and extending their lifespan. **Learn More:** Apollo Sun Guard
4. Improved User Comfort and Safety: Shaded areas provide a more comfortable environment for users, especially in regions with intense sunlight. This not only enhances the user experience but also reduces the risk of burns from hot surfaces and overheating issues, contributing to overall safety. **Learn More:** Phoenix Canopy Shades

Coppenhagen, Denmark

Amenity Considerations by Location

Highway Rest Stops

Bathrooms and Showers

Importance: Providing clean and accessible restrooms and showers at charging stations allows drivers to utilize charging time effectively, enhancing overall convenience and satisfaction.

Resources:

1. "EV Infrastructure and the Future of Highway Rest Stops" discusses the necessity of efficient charging stations equipped with essential amenities like bathrooms and showers to alleviate range anxiety and improve the EV travel experience. **Learn More:** PureTravel.
2. "EV Charging Stations and Highway Rest Areas" This resource explores the strategic placement of EV charging stations at highway rest areas, emphasizing the importance of facilities such as restrooms to enhance driver comfort during charging stops. **Learn More:** StoryMaps

Restaurants or Cafes

Importance: Offering dining options enables drivers to eat and relax while their vehicles charge, making the waiting time more pleasant and productive.

Resources:

1. "EV Charging Needs a Rethink: Add Chargers to Highway Rest Areas" This piece advocates for integrating EV chargers with rest areas that offer food services, enhancing convenience for travelers. **Learn More:** Autoblog
2. "The Debate Over EV Charging at Interstate Rest Stops" This article examines the potential of adding commercial services, such as restaurants, at rest stops equipped with EV charging stations to improve the user experience. **Learn More:** Trucking Dive

EV Charging Station Lounge or Waiting Area

Importance: Designated lounges provide a comfortable space for drivers to wait during charging sessions, contributing to a more relaxed and enjoyable experience.

Resources:

1. "First-Ever EV 'Gas Station' with Mini Grocery Store and WiFi Lounge Set to Open" This news article highlights a new EV charging station concept that includes a WiFi lounge and mini grocery store, enhancing the waiting experience for users. **Learn More:** The Sun
2. "GM and EVgo Plan More 'Flagship' EV Charging Locations That Look Like Gas Stations" This article discusses plans to establish EV charging stations with amenities such as shopping and food, providing comfortable waiting areas for users. **Learn More:** The Verge

Wi-Fi, Shade, and Seating Options

Importance: Access to Wi-Fi, shaded areas, and comfortable seating allows drivers to work or relax during charging, making the experience more convenient and enjoyable.

Resources:

1. "New Ways to Find EV Charging Stations on Google Maps" This blog post introduces features that help users locate EV charging stations with amenities like Wi-Fi and seating, enhancing the charging experience. **Learn More:** Google Blog
2. "EV Charging Stations: Everything You Need to Know" This comprehensive guide provides insights into the importance of amenities such as Wi-Fi and seating at EV charging stations for user convenience. **Learn More:** Edmunds

Amenity Considerations by Location

https://www.loopnet.com/Listing/56383-Mojave-Pointe-Rd-Baker-CA/25673862/

Residential/Multi-family

Maintenance Support for Homeowners

Importance: Routine maintenance can drastically improve the lifespan of a charger station.

Resources:

1. This guide provides insights into routine maintenance practices essential for the longevity and reliability of home EV charging stations. **Learn More:** Charges Martev
2. This article discusses the importance of regular maintenance for home EV chargers and offers practical tips for homeowners to ensure their charging equipment remains in optimal condition. **Learn More:** EnergySage
3. This resource emphasizes the significance of regular inspections and upkeep for EV charging stations, detailing key maintenance considerations for homeowners. **Learn More:** Seam Group

Customer Service Availability

Importance: The improvement of consistent, well supported customer service increases reliability, consumer trust, brand loyalty.

Resources:

1. This article highlights the necessity of round-the-clock customer support for EV charging stations, discussing its impact on user satisfaction and operational efficiency. **Learn More:** EV Connect
2. This piece explores effective customer service approaches for EV charging stations, emphasizing the role of responsive support in enhancing the user experience. **Learn More:** Anfu Energy
3. This article discusses the importance of comprehensive customer service programs for EV charging stations, focusing on maximizing performance and user satisfaction. **Learn More:** EV Connectv

Amenity Considerations by Location

Village/Hamlet Main Streets Downtowns

Public Restrooms

Importance: Providing accessible public restrooms near EV charging stations enhances driver comfort during charging periods and encourages longer visits to local businesses.

Resources:

1. New York City Public Restroom Initiative: This initiative outlines plans to construct and renovate public restrooms across the city, aiming to improve accessibility and convenience for residents and visitors. **Learn More:** NYC.gov
2. NYC Public Restroom Map: A Google Maps layer developed by the city to help users locate public restrooms, enhancing convenience for both residents and visitors. **Learn More:** StateScoop

Cafes, Restaurants, and Shops

Importance: Locating EV charging stations near dining and retail establishments allows drivers to dine and shop while their vehicles charge, directly benefiting local businesses.

Resources:

1. NYSERDA's EV Charging Station Programs: This program supports the installation of EV charging stations at various locations, including those near cafes, restaurants, and shops, to enhance consumer convenience.
2. EVolve NY Program: This program aims to install fast chargers throughout New York State, including in downtown areas, to support local businesses by attracting EV drivers. **Learn More:** Evolve NY

Pedestrian-Friendly Amenities (Seating, Shade, Wi-Fi)

Importance: Amenities such as seating, shaded areas, and Wi-Fi access create a comfortable environment for individuals waiting for their vehicles to charge, enhancing the overall user experience.

Resources:

1. Gravity's EV Charging Trees in NYC: This initiative plans to install stylish 'trees' that provide fast EV charging along with amenities like seating and shade, aiming to enhance the urban charging experience. **Learn More:** The Wall Street Journal
2. Rivian's Charging Stations with Amenities: Rivian is developing charging stations that include amenities such as seating, shade, and Wi-Fi to improve the user experience during charging sessions. **Learn More:** The Wall Street Journal

Promoting Local Business with EV Infrastructure

Importance: Integrating EV charging stations into downtown areas can attract EV drivers, increasing foot traffic and sales for local businesses.

Resources:

1. Village of New Paltz EV Charging Station: This example demonstrates how a village-installed EV charging station, located within walking distance of downtown businesses, can serve as a model for promoting local commerce through EV infrastructure. **Learn More:** NYSERDA
2. NYSERDA's Electric Vehicle and Charging Stations Program: This program provides information on how businesses can attract customers by installing EV charging stations, thereby promoting local commerce. **Learn More:** NYSERDA

Amenity Considerations by Location

Trailheads & Public Parks

Importance: Installing EV charging stations at trailheads and public parks presents a unique opportunity to enhance visitor experiences while promoting sustainable transportation. These locations cater to recreational users and outdoor enthusiasts, making thoughtful amenity design essential for maximizing usability and engagement.

Key Considerations

Location Accessibility: Charging stations should be strategically placed near parking areas with clear signage directing users from entry points. Stations should not disrupt natural landscapes or obstruct pedestrian pathways. Accessibility features, such as ADA-compliant spaces and clear navigation signage, are critical for equitable access. Learn more about ADA accessibility for EV chargers

Integration with Recreational Use

Trailhead and park visitors often spend extended periods at these locations. Level 2 chargers are ideal, as they align with the average visit duration of 2-4 hours. Stations should be located near key amenities such as restrooms, picnic areas, or visitor centers to ensure convenience.

Sustainability Features

Incorporate renewable energy options, such as solar-powered chargers, to align with the environmental ethos of trailheads and parks. Use permeable surfaces and eco-friendly materials to minimize the impact on natural surroundings. Click here: Discover renewable energy integration for EV chargers

Visitor Safety and Security

Install proper lighting and surveillance systems to enhance user safety, particularly for early-morning or evening visitors. Provide emergency contact information and instructions for using the charging stations.

User-Friendly Design

Include shaded seating or covered shelters for users to relax while their vehicles charge, encouraging comfort during warmer months. Offer QR codes or apps to provide real-time charging status updates and payment options.

https://bizneworleans.com/entergy-installs-free-ev-chargers-vfor-public-use-at-city-park/

Energy and Sustainability Considerations

Integrating energy and sustainability considerations into the deployment of electric vehicle (EV) charging infrastructure is crucial for New York State's Genesee-Finger Lakes region. Key areas of focus include:

Renewable Energy Integration (Solar, Wind)

Incorporating renewable energy sources like solar and wind into EV charging stations enhances environmental benefits and supports New York State's clean energy goals. The state has committed over $35 billion to large-scale renewable projects, aiming to increase the share of renewables in its energy mix (New York Governor's Office).

The National Electric Vehicle Infrastructure (NEVI) program facilitates the development of EV charging infrastructure powered by renewable energy along Alternative Fuel Corridors in New York (NYSERDA).

Additionally, the New York State Energy Research and Development Authority (NYSERDA) offers resources to support the integration of renewable energy into EV charging stations, promoting sustainability and grid resilience.

Grid Impact and Load Management

The increasing adoption of EVs presents challenges and opportunities for the electrical grid. Effective load management is essential to prevent grid strain during peak demand periods. NYSERDA's white paper on managed charging emphasizes the importance of policies and programs that promote smart management of EV charging loads to maintain grid stability (NYSERDA).

The U.S. Department of Energy's report on EV grid impacts highlights the need for comprehensive planning to integrate EV charging into the grid effectively (Energy.gov).

Furthermore, the National Renewable Energy Laboratory (NREL) provides insights into smart-charge management, offering strategies to mitigate potential grid impacts through coordinated charging practices (NREL)

What is Smart Charging

Smart charging refers to the intelligent management of EV charging to optimize energy consumption, costs, and grid stability. It involves adjusting charging times and rates based on factors like electricity demand, generation capacity, and user preferences. NYSERDA's research indicates that well-designed and managed charging programs can significantly enhance the societal benefits of EV adoption by reducing electricity costs and minimizing the need for grid upgrades (Power Magazine).

The U.S. Department of Energy's EVGrid Assist program offers resources on smart charging technologies, emphasizing their role in harmonizing EV integration with grid operations (Energy.gov)

Additionally, a pilot study in Upstate New York demonstrated the effectiveness of coordinated residential EV charging in shifting loads to off-peak periods, thereby alleviating grid stress (arXiv).

https://www.michigan.gov/leo/bureaus-agencies/wd/industry-business/mobility/electric-vehicle-workforce-hub

Energy and Sustainability Considerations

Sustainability Certifications and Standards

Adhering to sustainability certifications and standards ensures that EV charging infrastructure aligns with environmental and energy efficiency goals. The Leadership in Energy and Environmental Design (LEED) certification, for instance, recognizes projects that implement sustainable practices, including the integration of EV charging stations powered by renewable energy. New York State encourages such certifications to promote environmentally responsible construction and operation (New York Governor's Office).

The International Organization for Standardization (ISO) provides standards like ISO 15118, which facilitates secure communication between EVs and charging stations, enhancing the efficiency and sustainability of charging operations (The Verge).

Moreover, the National Electric Vehicle Infrastructure (NEVI) program sets guidelines to ensure that federally funded charging stations meet specific sustainability and performance criteria (NYSERDA).

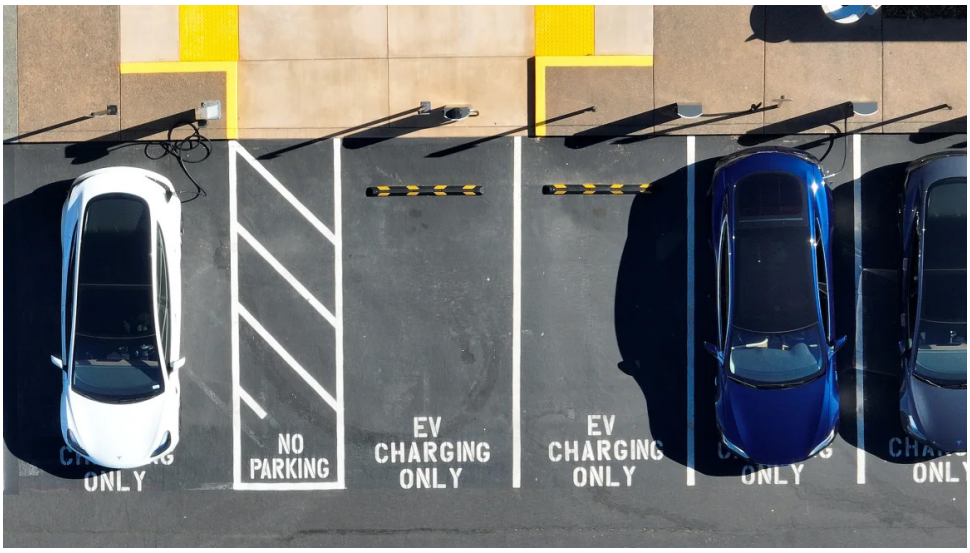
Futureproofing and Scalability

Designing EV charging infrastructure with future growth and technological advancements in mind is vital for long-term viability. New York State's EV Make-Ready Program supports the development of scalable charging solutions, covering up to 100% of the electrical infrastructure costs to accommodate future demand (New York State Document Access).

The state's plan for expanding EV infrastructure includes provisions for upgrading existing facilities to support higher charging capacities and emerging technologies, ensuring that the infrastructure remains adaptable to evolving needs (NYSERDA).

Additionally, initiatives like the collaboration between Nissan, Ford, BMW, and Honda to develop vehicle-to-grid integration platforms exemplify efforts to futureproof charging infrastructure, enabling bidirectional energy flow and enhancing grid resilience (The Verge)

By focusing on these energy and sustainability considerations, the Genesee-Finger Lakes region can develop an EV charging network that is environmentally responsible, grid-friendly, and prepared for future advancements.



https://buildingclimate.substack.com/p/evs-get-a-regulatory-boost?utm_source=profile&utm_medium=reader2

Energy and Sustainability Considerations

Enhancing the user experience of electric vehicle (EV) charging stations is crucial for promoting EV adoption in New York State. Key considerations include:

Payment and Access Models

Offering diverse and convenient payment options is essential for user satisfaction. Common methods include:

RFID Cards: Many charging networks provide RFID cards to registered users, enabling quick authentication and payment. Users tap their cards on the station's reader to initiate charging. This method is widely adopted due to its simplicity and speed (Drive Electric)

Mobile Applications: Charging networks often offer apps that allow users to locate stations, check availability, and manage payments. These apps can store payment information, facilitating seamless transactions. For example, the EVolve NY network, administered through EV Connect, provides such functionalities (Evolve NY).

Contactless Credit/Debit Cards: Integrating Near Field Communication (NFC) technology enables users to pay directly with contactless cards, enhancing accessibility for those without network-specific accounts. The National Electric Vehicle Infrastructure (NEVI) program emphasizes the importance of such payment methods to ensure inclusivity (Drive Electric). Implementing multiple payment options caters to a broader user base, enhancing the overall charging experience.

Charging Speed and Availability Information

Providing clear information on charging speeds and station availability is vital for user planning and satisfaction. Best practices include:

Real-Time Data: Utilizing mobile apps and online platforms to display real-time station status helps users locate available chargers efficiently. Networks like EVolve NY offer such features, allowing drivers to plan their charging stops effectively (Evolve NY).

Standardized Signage: Implementing consistent signage indicating charging levels (e.g., Level 2, DC Fast Charging) and expected charging times assists users in making informed decisions. NYSERDA provides guidelines on appropriate signage design and placement to enhance user experience (NYSERDA).

Charging Speed Transparency: Clearly communicating the power output and estimated charging duration at each station helps set user expectations and reduces uncertainty. This transparency is crucial for effective trip planning and user trust. Ensuring that users have access to accurate and timely information about charging options enhances their confidence and convenience.

https://www.bppulse.co.uk/going-electric/what-is-an-rfid-card

Energy and Sustainability Considerations

Customer Support and Troubleshooting

Accessible customer support is essential for addressing user issues and maintaining trust. Effective strategies include:

24/7 Support Lines: Providing round-the-clock customer service ensures that users can receive assistance at any time. For instance, EV Connect offers customer support to address user inquiries and technical issues (Evolve NY).

In-App Support Features: Integrating troubleshooting guides and support chat functions within mobile apps allows users to resolve common issues promptly. This approach enhances user autonomy and reduces downtime.

Regular Maintenance and Updates: Conducting routine maintenance and promptly addressing reported issues ensure that charging stations remain operational and reliable. NYSERDA emphasizes the importance of maintenance in their best practices guide for EV charging station installers (NYSERDA).

Providing robust customer support mechanisms enhances user confidence and encourages the continued use of EV charging infrastructure.

Monitoring Usage and Gathering Feedback

Collecting data on charging station usage and soliciting user feedback are critical for continuous improvement. Approaches include:

Data Analytics: Utilizing networked charging stations to gather data on usage patterns helps operators understand demand and optimize station deployment. NYSERDA's workplace charging policies guide discusses the benefits of data collection for assessing system use (NYSERDA).

User Surveys: Implementing surveys to gather user experience and suggestions provides valuable insights into areas needing improvement. Engaging with the user community fosters a sense of involvement and loyalty.

Feedback Integration: Actively incorporating user feedback into service enhancements demonstrates responsiveness and commitment to quality. This practice leads to more user-centric services and higher satisfaction rates.

By systematically monitoring usage and integrating user feedback, operators can adapt to evolving needs and enhance the overall charging experience.

Implementing these users' experience best practices aligns with New York State's commitment to expanding and improving its EV charging infrastructure, thereby supporting the broader adoption of electric vehicles.

Security and Safety Best Practices

Ensuring the safety and security of electric vehicle (EV) charging stations is paramount for user confidence and the integrity of the charging infrastructure.

Key considerations include:

Surveillance and Monitoring

Implementing effective surveillance and monitoring systems at EV charging stations enhances user safety and deters criminal activities. Best practices include:

Video Surveillance: Installing high-resolution cameras provides continuous monitoring, deterring vandalism and theft. The National Renewable Energy Laboratory (NREL) emphasizes that "visible surveillance cameras can deter criminal activity and provide evidence if incidents occur," (Drive Electric).

Remote Monitoring: Utilizing Internet of Things (IoT) technologies enables real-time monitoring of charging stations, allowing operators to detect and address issues promptly. Telit highlights that "remote monitoring decreases infrastructure failure" by enabling preventive maintenance (Telit).

Data Analytics: Analyzing usage patterns helps identify anomalies that may indicate security concerns, allowing for proactive measures. PlugFlare notes that "data analytics can help in predicting and preventing issues," (PlugFlare).

Cybersecurity for Connected Charging Stations

As EV charging stations become more interconnected, robust cybersecurity measures are essential to protect against cyber threats. Key strategies include:

Secure Communication Protocols: Implementing protocols like ISO 15118 ensures secure data exchange between EVs and charging stations. The Verge reports that a universal 'Plug and Charge' protocol is being developed to enhance security and user convenience (The Verge).

Regular Software Updates: Keeping firmware and software up to date addresses vulnerabilities and enhances security. NREL advises that "regular updates are crucial to protect against emerging threats," (NREL).

Access Controls: Implementing strong authentication mechanisms prevents unauthorized access to charging infrastructure. The National Institute of Standards and Technology (NIST) provides a Cybersecurity Framework Profile for EV charging infrastructure to guide these efforts (NIST Publications).

Physical Safety Features (Lighting, Barriers)

Designing charging stations with physical safety features enhances user comfort and deters malicious activities. Recommendations include:

Emergency Service: Proximity to a blue light or panic button to increase safety of passengers.

Adequate Lighting: Ensuring well-lit areas around charging stations increases visibility and deters criminal behavior. NREL emphasizes that "adequate lighting is a critical component of site security," (Drive Electric).

Protective Barriers: Installing bollards or barriers protects charging equipment from vehicle collisions and unauthorized access. The U.S. Department of Energy suggests that "physical barriers can prevent accidental or intentional damage to charging stations," (Drive Electric).

Clear Signage: Providing clear instructions and safety information enhances user confidence and ensures proper use of the equipment. NREL notes that "clear signage contributes to both safety and user experience," (Drive Electric).

Security and Safety Best Practices

Emergency Access and Maintenance Support

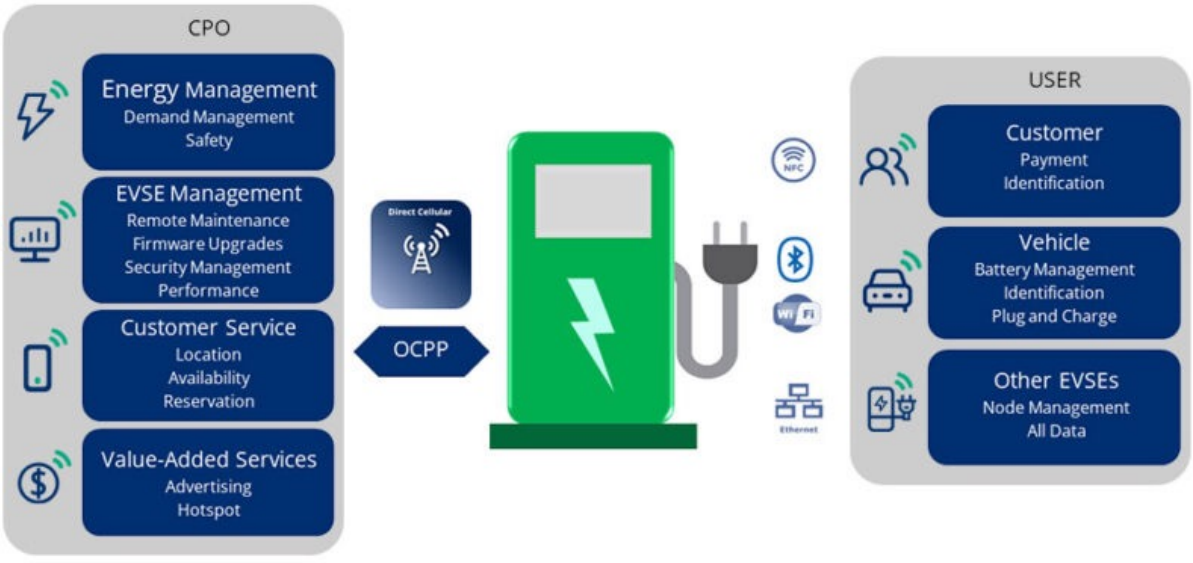
Establishing protocols for emergency situations and regular maintenance ensures the reliability and safety of charging stations. Best practices include:

Emergency Shutoff Mechanisms: Equipping stations with accessible emergency shutoff controls allows users to halt charging in case of malfunction or hazard. NREL advises that "emergency shutoff mechanisms are essential for user safety," (Drive Electric).

24/7 Support Hotlines: Providing round-the-clock customer support enables users to report issues and receive assistance promptly. Numocity highlights the importance of "accessible customer support for addressing user concerns," (Numocity).

Routine Maintenance Schedules: Implementing regular maintenance checks ensures equipment functionality and addresses potential hazards. Momentum Electric emphasizes that "routine maintenance is key to the longevity and reliability of charging stations," (Momentum Electric).

By adhering to these safety and security best practices, EV charging station operators can provide a secure and reliable environment for users, fostering greater confidence in the EV charging infrastructure



https://www.telit.com/blog/ev-charging-preventive-maintenance-real-time-monitoring-iot/

Maintenance and Monitoring

Ensuring the optimal performance and longevity of electric vehicle (EV) charging stations in New York State requires a comprehensive approach to maintenance and monitoring.

Key considerations include:

Routine Maintenance and Inspection Schedules

Regular maintenance is essential for the reliability and safety of EV charging stations. The New York State Energy Research and Development Authority (NYSERDA) emphasizes that "routine inspections help identify potential issues before they lead to equipment failure." Their best practices guide suggests that operators should establish maintenance schedules that include visual inspections, testing of electrical components, and verification of software functionality (NYSERDA).

Remote Monitoring Systems for Charging Stations

Implementing remote monitoring systems enables real-time oversight of charging station performance. According to Rugged Monitoring, their Online Condition Monitoring System (OLCMS) "is engineered to monitor critical parameters like temperature and voltage and enable remote management and predictive maintenance." These systems can monitor various parameters, including energy usage, operational status, and connectivity, facilitating timely maintenance and reducing downtime (Rugged Monitoring).

Troubleshooting Common Issues

Effective troubleshooting protocols are vital for maintaining service continuity. PlugFlare notes that "remote monitoring systems can help identify and troubleshoot a variety of issues commonly encountered in EV charging stations," such as connectivity problems, hardware failures, and software glitches. Developing standardized procedures for diagnosing and resolving these issues ensures that charging stations remain operational and users experience minimal disruption (PlugFlare).

Software Updates and Connectivity

Regular software updates are crucial for the security and efficiency of charging stations. ChargeSmart EV advises that "keeping software and firmware up to date is essential for maintaining the security and functionality of EV charging stations." Establishing a schedule for updates and ensuring reliable connectivity for remote deployment of these updates are best practices for maintaining optimal functionality (Charges Martev)

Battery Health

Monitoring the health of batteries, particularly in charging stations with energy storage systems, is essential for performance and safety. Regular assessments of battery capacity, charge/discharge cycles, and temperature can prevent failures and extend battery life. Implementing battery management systems that provide real-time data and alerts can aid in maintaining battery health and ensuring the reliability of the charging infrastructure.

By adhering to this maintenance and monitoring the best practices, operators can ensure that EV charging stations in New York State remain reliable, safe, and efficient, thereby supporting the growing adoption of electric vehicles.

Emerging Trends and Future Considerations

Wireless and Inductive Charging

Wireless charging enables EVs to recharge without physical connectors, enhancing convenience and paving the way for autonomous vehicle integration. InductEV, a leader in this field, has deployed proprietary on-route wireless solutions across North America and Europe, revolutionizing how electric commercial fleet vehicles charge their batteries (Inductev).

Similarly, Valeo's Ineez Air Charging system offers a lighter and more efficient wireless charging solution, maintaining 93% efficiency from grid to battery (Design News).

These advancements align with New York State's goals to expand EV infrastructure, as outlined by the New York State Energy Research and Development Authority (NYSERDA).

Autonomous Vehicles and Charging Integration

The rise of autonomous vehicles (AVs) necessitates charging solutions that operate without human intervention. Wireless charging systems are particularly suited for AVs, allowing them to recharge seamlessly. Companies like WiTricity are developing wireless charging solutions that support vehicle-to-grid (V2G) capabilities, enabling autonomous EVs to contribute to grid stability (WiTricity).
In New York City, startups such as Gravity are planning to install curbside charging "trees" capable of delivering rapid charges, which could be beneficial for autonomous fleets (New York Post).

Vehicle-to-Grid (V2G) Technology

V2G technology allows EVs to discharge stored energy back into the grid, enhancing grid resilience and providing additional revenue streams for vehicle owners. In New York City, Revel, NineDot Energy, and Fermata Energy have deployed a bidirectional charging system that enables EVs to supply energy to Con Edison's grid during peak demand (Electrive). Similarly, Lion Electric has successfully implemented V2G technology with Con Edison, marking a significant milestone in advancing V2G in the state (Power Grid).

These initiatives demonstrate the potential of V2G to support New York's clean energy goals.

Evolving Amenity Expectations and Needs

As EV adoption grows, drivers expect more comprehensive amenities at charging locations, including retail options, restrooms, and Wi-Fi. General Motors and EVgo are collaborating to establish "flagship" EV charging stations modeled after gas stations, featuring multiple fast-charging stalls and amenities such as shopping and food services (The Verge).

In the Genesee-Finger Lakes region, installations like the EV charging station at Batavia Downs provide essential services to EV drivers, supporting regional tourism and economic development (Visit Geneva NY).

NYSERDA's Charge Ready NY program further supports the installation of charging stations at workplaces, multi-family buildings, and public facilities, recognizing that such amenities are becoming a necessity as EV ownership accelerates (NYSERDA).

Conclusion

New York's Climate Leadership and Community Protection Act (CLCPA) outlines very ambitious goals to mitigate the effects of climate change. Reaching 40% reduction in greenhouse gas emissions from 1990 levels by 2030, 100% light duty zero-emission vehicle sales by 2035, 100% zero-emission electricity by 2040, and 85% reduction in greenhouse gas emissions from 1990 levels by 2050.

The next 25 years will be marked by expansive measures to tackle climate change. It is not only important that these goals be met, but imperative they are met with thoughtful, equitable, and research-based solutions. This playbook's aim is to provide residents, municipalities, non-government organizations, and businesses with a clear guide for best practices for all considerations surrounding the installation of EV charging infrastructure.

Summary of Key Best Practices

This playbook has outlined the key best practices for planning, designing, and implementing electric vehicle (EV) charging infrastructure to support New York State's transition to cleaner, more sustainable transportation. As the demand for EVs grows, the thoughtful development of charging stations that prioritize user experience, accessibility, and operational efficiency will be critical to achieving the state's ambitious climate and energy goals. Below, we summarize the key best practices discussed in this playbook:

1. Strategic Planning and Site Selection

Location-Specific Considerations: Charging stations should be tailored to their environments, whether urban, suburban, rural, or along highways. Each location demands unique design elements, such as pedestrian access in downtown areas or ample parking at highway rest stops.
Equity and Accessibility: Prioritize charging infrastructure in disadvantaged communities to ensure equitable access to clean transportation and eligibility for incentives that cover up to 100% of installation costs.

2. User-Centric Design

Amenities for User Comfort: Include features such as restrooms, shaded seating, Wi-Fi, and retail partnerships to enhance the user experience, encourage longer stays, and support nearby businesses.
ADA Compliance: Design stations to be fully accessible, meeting guidelines for parking, pathways, and interactive elements to serve users with disabilities.

3. Robust Infrastructure and Technology

Futureproofing: Incorporate scalable infrastructure to accommodate future demand and emerging technologies, such as wireless charging and vehicle-to-grid (V2G) integration.

Reliable and Resilient Systems: Use durable materials, conduct regular maintenance, and implement remote monitoring systems to ensure long-term reliability and operational efficiency.

4. Integration with Renewable Energy

Sustainability Goals: Align charging infrastructure with New York's renewable energy targets by incorporating solar panels, wind energy, or battery storage systems at charging locations.

Grid Impact Management: Use smart-charging technologies to balance load demands and reduce strain on the electrical grid, particularly during peak hours.

Conclusion

5. Effective Partnerships and Funding

Public-Private Collaborations: Leverage partnerships with businesses, utilities, and municipalities to share costs, encourage investment, and accelerate deployment.

Incentives and Grants: Maximize the use of available funding programs, such as NYSERDA's Charge Ready NY and federal programs like the NEVI initiative, to offset installation costs and expand access.

6. Comprehensive User Education and Outreach

Awareness Campaigns: Engage communities with educational efforts to promote EV adoption and inform users about available charging options.

Clear Signage and Wayfinding: Ensure consistent, user-friendly signage to help drivers locate chargers and understand station capabilities.

Recent Political Implications

The recent executive order titled "Unleashing American Energy," issued by President Trump in January 2025, has **shifted federal policy for the development of electric vehicle (EV)** charging infrastructure in New York State. **This order suspends federal funding for key programs such as the National Electric Vehicle Infrastructure (NEVI) and the Charging and Fueling Infrastructure (CFI) Grant Programs**, which were pivotal in expanding EV charging networks nationwide. The suspension directly impacts New York's EV initiatives, including the development of critical charging corridors and public-private partnerships emphasized in the Charge Ahead: Strategic Guide to EV Station Design.

Strategic Considerations Moving Forward:

Diversifying Funding Sources: New York may need to explore alternative financing models, such as public-private partnerships, state-level grants, and investments from green banks, to sustain momentum in EV infrastructure development.

Strengthening State Policies: Reinforcing state-level commitments to clean energy and transportation can help mitigate the impact of federal policy changes. This includes maintaining or enhancing state incentives for EV adoption and infrastructure.

Legal Advocacy: Engaging in legal actions to challenge federal decisions that impede state-led clean energy initiatives may be necessary to protect New York's environmental and public health interests.

Community Engagement: Collaborating with local communities, especially those disadvantaged, to identify needs and develop tailored solutions can ensure that infrastructure development is inclusive and equitable.

In conclusion, while the federal policy shifts present significant challenges, New York State's proactive measures and commitment to clean energy provide a foundation to navigate this evolving landscape. The Charge Ahead report puts emphasis on integrating user-centric amenities and fostering public-private partnerships remains vital in achieving resilient and equitable EV infrastructure development.

Conclusion

Final Recommendations

While these policy changes present significant challenges, there is still hope for New York to maintain momentum in its EV infrastructure and amenity goals. The state has been a national leader in clean energy and electrification, with strong frameworks already in place, such as NYSERDA's Charge Ready NY and EVolve NY programs. These initiatives have built a solid foundation for charging infrastructure development, with clear strategies to integrate amenities that enhance user experience and equity. New York's existing partnerships with municipalities, private developers, and community organizations will be crucial in navigating this period of uncertainty and ensuring progress continues.

Additionally, New York's ambitious climate goals, codified in the Climate Leadership and Community Protection Act (CLCPA), mandate significant reductions in greenhouse gas emissions and increased investment in renewable energy. This legal framework ensures that clean energy and transportation priorities remain central to the state's future. Local governments and private sector stakeholders are already working to fill gaps in federal support, pursuing innovative solutions such as community-driven EV projects, green bonds, and localized public-private partnerships.

The report focuses on creating user-friendly, accessible, and strategically located charging stations positioning New York to thrive in this space. Even in the face of federal challenges, the state's emphasis on amenities and thoughtful design ensures that its EV infrastructure can meet the needs of all users, fostering adoption and supporting economic growth. While the path ahead may be complex, New York's leadership, adaptability, and commitment to sustainability provide a strong foundation for continued progress toward an electrified transportation future.