Electric Vehicle Supply Equipment (EVSE) Opportunities for Prince William County, Virginia

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1 Introduction

Virginia Clean Cities is collaborating with Prince Wiliam County and the National Renewable Energy Laboratory on an Energy to Communities Expert Match program. Task 1 of this project to 1) research incentives and ordinances for electric vehicle supply equipment (EVSE) and 2) compile examples of strategies for incentives to private industry for installing EV chargers along Alternative Fuel Corridors.

2 Incentives for Electric Vehicle (EV) Charging Stations along Alternative Fuel Corridors

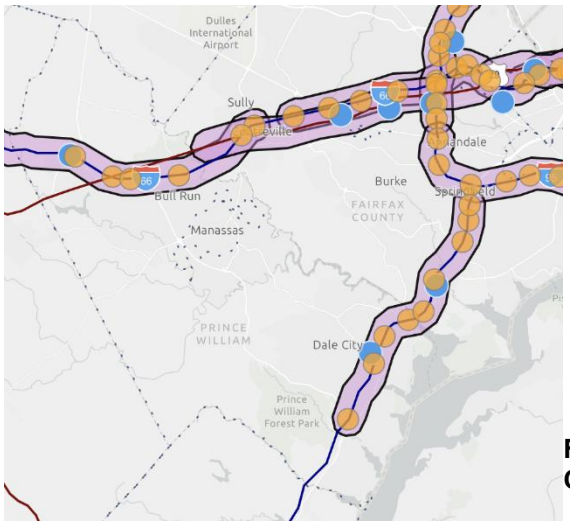


Figure 1 NEVI Corridors in Prince William County, Virginia

2.1 National Electric Vehicle Initiative (NEVI) program

The Commonwealth of Virginia is investing a projected $100 million in federal funding over the next five years to install public electric vehicle charging stations (EVSE) across Virginia. Fifty-three sites have been funded as of Dec. 31, 2024, at an average of $500,000 per site. Currently, the program is in Phase 1-C and has identified the following exits in Prince William County as priorities:

- Interstate 66/Route 15
- Exit 40, 43, 44, and 47
- Interstate 95
- Exits 160, 158, 156 and 152

2.2 Section 30(C) Alternative Fuel Property Tax credit

The federal tax incentive provides up to 30% reimbursement for qualifying expenses of purchasing and installing EVSE at private and public sector properties in qualifying low income or rural census tracts.

2.3 MidAtlantic Electrification Partnership

Managed by Virginia Clean Cities and Virginia Energy, this program provides EVSE at no cost to qualifying private or public sector applicants. Program expires on Sept. 30, 2025.

3 Opportunities and strategies for engaging with local private industry to incentivize participation in infrastructure deployment

3.1 Conduct a Community Needs Assessment

- Identify the community's priorities, needs (especially as they pertain to transportation and energy), and the impediments preventing private sector investment
- Identify collaboration benefits, and goal overlaps
- Ensure the planning process is conducive to what the public/private audience seek to achieve.
- Enlist locals to participate in this assessment as reviewers, collaborators, advisors, for community outreach.

3.2 Stakeholder Mapping

- Identify key stakeholders and audience
- Answering the following questions: Who will be impacted and impact EVSE Infrastructure Deployment? What value is this deployment bringing them? What could motivate them to participate and support it? What negative externalities could they face?
- Include Community groups – Local Business, Social/Civic, Community, Religious, workplaces

3.3 Outreach, Local Businesses

- Strategy: Meet people where they are. Engage participants from communities facing disproportionate burdens. Engage a representative array of perspectives; public, private, and community (e.g., community-based organizations, local government, local businesses, faith-based orgs, neighborhood associations). Uphold transparency and ensure intentions are shared and expectations aligned. Ensure that public concerns and aspirations are consistently understood and considered.
    - Contact chamber of commerce
    - Contract convenience store association
    - Contact real estate developers association
- Includes offering transportation technology information, providing useful resources, and collaboration benefits (partnerships, relationships, networking)
- Target strategic areas where vehicles dwell for long periods (more than 2 hours)
- Community Event Exposure: Participate in local events. We can provide information and resources on EVSE Infrastructure Deployment. These events can give the opportunity to help locals navigate the technology, as well as gain information on what would be the best way to move forward in this community.

4 Available Federal Tax Incentives

4.1 Homeowner

If you purchase EV charging equipment for your principal residence, you may be eligible for a tax credit for the charging station. This credit is 30% of the cost of 1) the EV charging port, 2) components and parts that are essential to the operation of the charging port, and 3) labor for constructing and installing the charger, up to $1,000. A credit in the same amount is also available for energy storage associated with the home charger.

Eligibility is based on the installation location being in an eligible census tract. To help you determine if your installation location is in an eligible census tract, visit the 30C Tax Credit Eligibility Locator page and mapping tool from Argonne National Laboratory. Refer to Individuals and the Alternative Fuel Vehicle Refueling Property Credit*(PDF)* for more details.

4.2 Businesses and Fleets

If you purchase EV charging equipment for a business, fleet, or tax-exempt entity, you may be eligible for a tax credit. Starting on Jan. 1, 2023, the value of this credit is 6% of the cost of property subject to depreciation, with a maximum credit of $100,000 for each single item of property.

A single item of property is each charging port, as well as each energy storage property for electricity (this tax credit also applies to fueling dispensers and energy storage for hydrogen, natural gas, propane, E85, or biodiesel blends of at least 20%[B20]). The costs of components and parts that are essential to the operation of the charging port or fuel dispenser, including labor costs for constructing and installing the property, are also eligible for the credit. The entity claiming the credit must be the owner of the item(s).

Projects that meet prevailing wage and apprenticeship requirements may be eligible to receive a tax credit equal to 30% of the cost of property subject to depreciation.

Eligibility is also based on the location of installation being in an eligible census tract. To help you determine if your installation location is in an eligible census tract, visit the 30C Tax Credit Eligibility Locator page and mapping tool from Argonne National Laboratory. Refer to Businesses and the Alternative Fuel Vehicle Refueling Property Credit*(PDF)* for more details.

4.3 Tax Exempt Entities

Tax-exempt entities can qualify to receive full payment for the federal alternative fuel infrastructure tax credit. Starting on Jan. 1, 2023, the value of this credit is 6% of the cost of property subject to depreciation, with a maximum credit of $100,000 for each single item of property.

A single item of property is each charging port, as well as each energy storage property for electricity (this tax credit also applies to fueling dispensers and energy storage for hydrogen, natural gas, propane, E85, or biodiesel blends of at least 20%[B20]). The costs of components and parts that are essential to the operation of the charging port or fuel dispenser, including labor costs for constructing and installing the property, are also eligible for the credit. Your

organization or the seller installing the property could claim the credit, and the choice is up to you to determine which path is more beneficial.

Projects that meet prevailing wage and apprenticeship requirements may be eligible to receive a 30% tax credit.

Eligibility is also based on the location of installation being in an eligible census tract. To help you determine if your installation location is in an eligible census tract, visit the 30C Tax Credit Eligibility Locator page and mapping tool from Argonne National Laboratory. Refer to Tax-Exempt Entities and the Alternative Fuel Vehicle Refueling Property Credit*(PDF)* for more details.

MAJOR POLICY TYPE	POLICY TYPE	DESCRIPTION
Incentives (either "state incentive" or "utility or private incentive")	Grant	EVSE-related grants
	Tax incentive	EVSE-related tax incentives
	Loans and leases	EVSE-related direct loans, loan guarantees, and leases
	Rebate	EVSE-related rebates
	Exemption	EVSE-related exemptions from taxes or regulations
	Other	Miscellaneous EVSE-related policies, mostly utility or private incentives such as EV-specific rates, make-ready programs, utility-offered grants or rebates, technical assistance, etc.
Laws and regulations	Acquisition/fuel use	EVSE-related acquisition or alternative fuel use requirements
	Driving/idling	EVSE-related regulations regarding vehicle operations, including signage authorization and parking regulations
	Registration/licensing	EVSE-related requirements for fuel use, fuel production, vehicle conversion, etc.
	Fuel taxes	EVSE-related fuel/electricity taxes
	Air quality/emissions	EVSE-related emissions standards, goals and targets, and regulations
	Climate change/ energy initiatives	Programs aimed at reducing greenhouse gas (GHG) emissions, reducing petroleum use, and/or promoting energy independence
	Utility definition	EVSE-related definitions of a regulated public utility as it pertains to the resale of electricity
	Other	Miscellaneous EVSE-related laws and regulations such as regulations to promulgate rules, establish study groups or committees, etc.

Figure 2. Types of Policies and Incentive programs for Regulating or Incentivizing EVSE

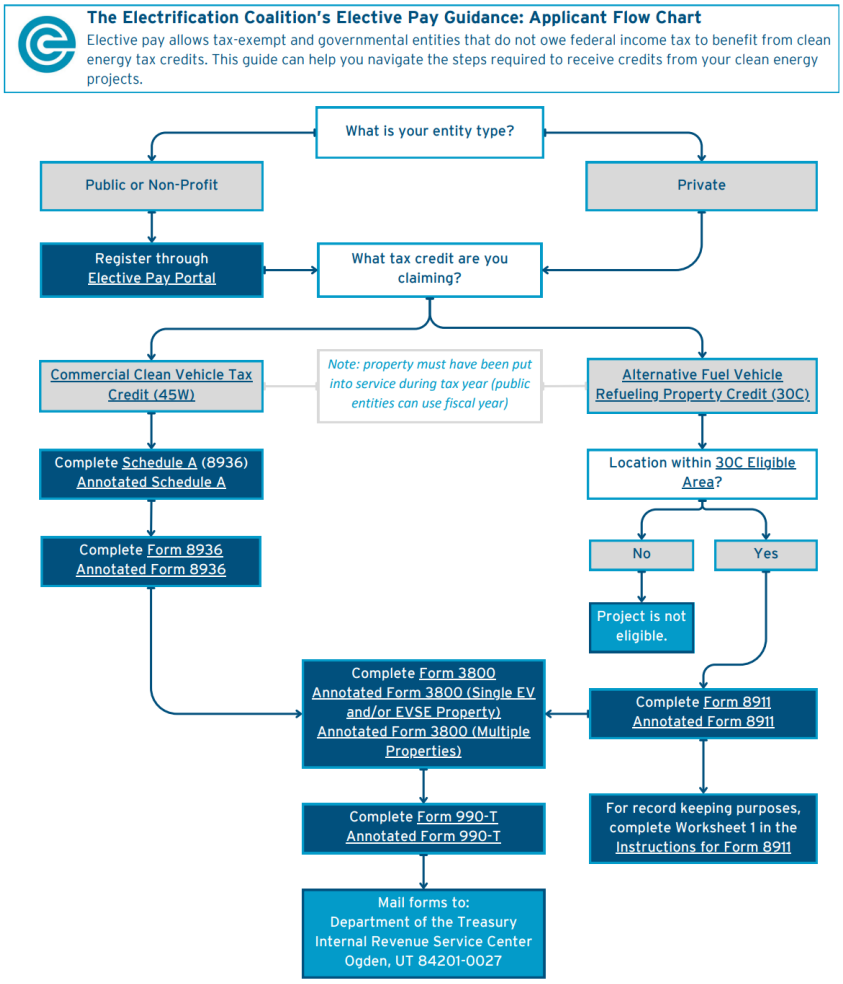


Figure 2 Flowchart of the Section 30(c) Tax Credit Direct Pay Process (source: Electrification Coalition)

The tax credit can be obtained via direct pay, also referred to as elective pay. You must register with the IRS to make an elective pay election. For additional information, see the IRS elective pay overview*(PDF)* and frequently asked questions.

Tax-exempt entities may also wish to consider obtaining the value of the credit indirectly. Per a provision in the tax code, sellers/installers of charging infrastructure can be treated as the taxpayer, as long as they disclose the amount of the credit to the tax exempt/government entity. The buyer can then negotiate a lower upfront cost for the acquisition and installation of charging equipment. This approach may be helpful in instances where upfront funding available to tax-exempt entities is limited.

4.4 Charging and Fueling Infrastructure Discretionary Grant Program (CFI Program)

The CFI Program was created by the Bipartisan Infrastructure Law to support the deployment of public EV charging and create more equitable access to refueling stations. The CFI Program offers two funding categories: Community Charging and Fueling Grants and the Alternative Fuel Corridor Grants. While the Community Charging and Fueling Grants category focuses on expanding EV charging in local neighborhoods, the Alternative Fuel Corridor Grants fund stations along major national highways. Community awards range from $500,000 to $15 million and Corridor awards start at $1 million. Grant recipients must provide at least 20% of the total

project cost as a matching share. Eligible infrastructure for the CFI Program includes EV charging, hydrogen, natural gas, and propane fueling stations. Funds may be used for the acquisition and installation of infrastructure, as well as educational and community engagement activities to promote zero-emissions vehicles in the region. Units of local governments, such as Prince William County, are among the list of eligible applicants.

The funding for each category is released in phases through Notice of Funding Opportunity postings on the Federal Highway Administration website. The application, to be submitted to Grants.gov, must include (1) the completed standard forms listed in the Notice of Funding Opportunity, and (2) a narrative document that addresses the following elements: project narrative, budget information, project merit criteria, project readiness, and environmental risk. Additional details and frequently asked questions regarding the contents of the application can be found on the CFI Program webpage.

4.5 Inflation Reduction Act (IRA)

The IRA contains several provisions aimed at increasing the number of clean fuels and vehicles. The IRA offers refundable income tax credits for qualifying EVs and extends tax credits for alternative fuel refueling property through 2032. The most notable is the Alternative Fuel Vehicle Refueling Property Credit, which is a federal income tax credit for businesses and individuals to install alternative fueling infrastructure. As of Jan. 1, 2023, fueling equipment for natural gas, propane, hydrogen, electricity, E85, or diesel fuel blends containing a minimum of 20% biodiesel is eligible for a tax credit of 30% of the cost or 6% in the case of property subject to depreciation, not to exceed $100,000. Note that permitting and inspection fees are not included as part of the covered expenses.

Eligible fueling equipment must be installed in locations that meet one of the following census tract requirements:

- The census tract is not an urban area,
- The poverty rate in a population census tract is at least 20%, or
- The median family income in a metropolitan and non-metropolitan area census tract is less than 80% of the state median family income level.

Eligible projects also must meet workforce requirements, such as apprenticeships and prevailing wages. To apply for the credit, contact the Internal Revenue service.

4.6 High Performing Buildings Act of 2021

https://law.lis.virginia.gov/vacode/title2.2/chapter11/section2.2-1183/

Any executive branch agency or institution entering the design phase for the construction of a new building greater than 5,000 gross square feet in size, or the renovation of a building where the cost of the renovation exceeds 50 percent of the value of the building, shall ensure that such building has sufficient electric vehicle charging infrastructure. However, the provisions of this subdivision shall not apply to buildings located in the right-of-way of the Interstate System

Municipality/State	Year	Process Type	Single-Family	Multifamily	Commercial
Orlando, FL	2021	Land Development Code	-	20% EV-Capable	10% EV-Capable, 2% EV-Installed (250+ spaces)
Avon, CO	2021	IECC / IRC	1 EV-Ready Space per dwelling Unit	5% EV-Installed, 10% EV-Ready, 15% EV-Capable (7+ spaces)	5% EV-Installed, 10% EV-Ready, 15% EV-Capable (10+ spaces)
St. Louis, MO	2021	IBC / IRC	1 EV-Ready Space per dwelling Unit	2% EV-Installed, 5% EV-Ready (increases to 10% in 2025)	2% EV-Installed, 5% EV-Ready
Madison, WI	2021	Zoning Code	-	2% EV-Installed, 10% EV-Ready (increases by 10% every 5 years)	1% EV-Installed (increases by 1% every 5 years), 10% EV-Ready (increases by 10% every 5 years)
Washington D.C.	2021	Green Building Ordinance	-	20% EV-Ready (3+ spaces)	20% EV-Ready (3+ spaces)
Summit County, CO	2020	Green Code	1 EV-Ready Space per dwelling Unit	5% EV-Installed, 10% EV-Ready, 40% EV-Capable (10+ spaces)	5% EV-Installed, 10% EV-Ready, 40% EV-Capable (25+ spaces)
Dillon, CO	2020	Green Code	1 EV-Ready Space per dwelling Unit	5% EV-Installed (at least 1 dual-port charging station), 10% EV-Ready, 40% of remaining spaces EV-Capable (10+ spaces)	5% EV-Installed (at least 1 dual-port charging station), 10% EV-Ready, 40% of remaining spaces EV-Capable (25+ spaces)
Breckenridge, CO	2020	Green Code	1 EV-Ready Space per dwelling Unit	5% EV-Installed, 10% EV-Ready, 40% EV-Capable (10+ spaces)	5% EV-Installed, 10% EV-Ready, 40% EV-Capable (25+ spaces)
Frisco, CO	2020	Green Code	1 EV-Ready Space per dwelling Unit	2 EV-Installed Spaces, 20% EV-Capable (26+ spaces)	2 EV-Installed Spaces, 20% EV-Capable (26+ spaces)
Salt Lake City, UT	2020	Zoning Code	-	1 EV-installed per 25 spaces (>5,000sf)	1 EV-Installed per 25 spaces (>5,000sf)
Denver, CO	2020	IECC / IRC	1 EV-Ready Space per dwelling Unit	5% EV-Installed, 15% EV-Ready, 80% EV-Capable	5% EV-Installed, 10% EV-Ready, 10% EV-Capable
Honolulu, HI	2020	IECC / IRC	1 EV-Capable Space per dwelling unit	25% EV-Ready (8+ spaces)	25% EV-Ready (12+ spaces)
Chicago, IL	2020	Zoning & Land Use Code		20% EV-Ready (5+ spaces)	20% EV-Ready (30+ spaces)
Lakewood, CO	2019	Zoning Ordinance	1 EV-Capable Space per dwelling unit	2% EV-Installed, 18% EV-Capable (10+ spaces)	2% EV-Installed, 13% - 18% EV-Capable (10+ spaces)
Flagstaff, AZ	2019	IBC / IRC	1 EV-Ready Space per dwelling Unit	3% EV-Ready	3% EV-Ready
Massachusetts	2019	IECC	-	-	1 EV-Ready space (15+ spaces)
Seattle, WA	2019	Land Use Code	1 EV-Ready Space per dwelling Unit	100% EV-Ready up to 6 space, 20% for parking lots with 7+ spaces	10% EV-Ready
Sedona, AZ	2019	IECC	1 EV-Capable Space per dwelling Unit	-	5% EV-Capable
Golden, CO	2019	Zoning Code	-	1 EV-Installed Space per 15 parking space, 15% EV-Capable	
San Jose, CA	2019	Reach/Green Code	1 EV-Ready Space per dwelling Unit	10% EV-Installed, 20% EV-Ready, 70% EV-Capable	10% EV-Installed, 40% EV-Capable
Fort Collins, CO	2019	NEC/IRC	1 EV-Capable Space per dwelling Unit	10% EV-Capable	-
Vancouver, BC	2019	BC Building Code	1 EV-Ready Space per dwelling Unit	100% EV-Ready	10% EV-Ready
Oakland, CA	2018	Green Code	-	10% EV-Ready, 90% "Raceway Installed", 20% total panel capacity	10% EV-Ready, 10% "Raceway Installed", 20% total panel capacity
Atlanta, GA	2017	NEC	1 EV-Capable Space per dwelling Unit	20% EV-Capable	
Aspen, CO	2017	IBC / IRC	1 EV-Capable Space per dwelling Unit	3% EV-Capable (240V individual circuit branch with EV CAPABLE labelling)	-
San Francisco, CA	2017	Green Code	1 EV-Ready Space per dwelling Unit	10% EV-Ready, Panel Capacity for 20%, Raceway for 100%	
Palo Alto, CA	2017	Green Code	1 EV-Capable Space per dwelling Unit	1 EV-Ready Space per Unit, 20% EV-Capable for Guest Parking with 5% EV-Installed	20% EV-Capable, 5% EV-Installed
Oregon	2017	IBC	-	5% EV-Ready	
Boulder County, CO	2015	IBC / NEC / IRC	1 EV-Ready Space per dwelling Unit	2% EV-Ready (for new construction and 50% or 5,000 SF additions)	
Washington	2015	IBC	-	For Group B, Group R-1 hotel and motel only, Group R-2 occupancies: 5% of parking spaces shall be EV Capable. Size electrical room to serve 20% of spaces.	
New York City, NY	2013	IBC	-	20% EV-Capable	-
California (CALGreen)	2010	Green Code	1 EV-Capable Space per dwelling Unit	10% EV-Capable	

Note: Number of spaces in parentheses indicate the threshold where requirements begin.

Figure 3 Other Codes and Ordinances for EV Ready Buildings/Parking

5 Lessons learned from Public/Private Partnerships (P3) for Electric Vehicle Supply Equipment (EVSE)

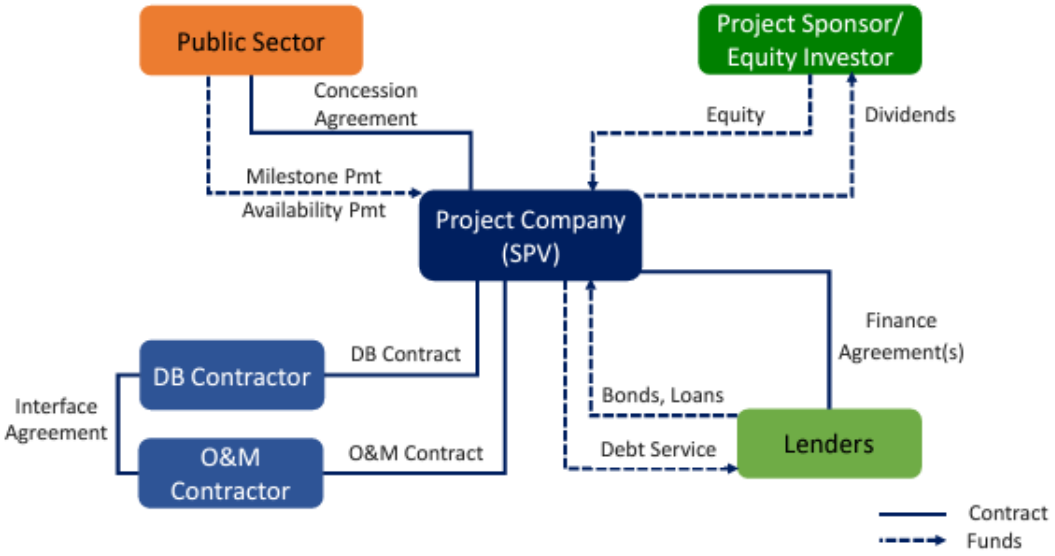
Public-Private Partnerships (P3s) can be used to build charging infrastructure by involving a private partner who finances initial capital costs with private debt and equity in exchange for returns on investment over time. This involves a partnership between a government entity and a private sector company, where the latter takes the lead in designing, financing, constructing, and operating the charging infrastructure. The government entity provides funding, land, and other resources, while the private partner is responsible for financing and operating the charging infrastructure. This model allows for the sharing of risks and benefits and can lead to the faster deployment of charging infrastructure, as well as increased innovation. There are several PPP models that are available for charging infrastructure deployment. Some of the common PPP models include the following

- Build-Operate-Transfer (BOT) Model: Under this model, a private partner is responsible for the design, construction, and operations of charging infrastructure, and transfers ownership to the government or public entity after a specified period of time.
- Design-Build-Finance-Operate-Maintain (DBFOM) Model: Similar to the Build-Operate-Transfer model, a private partner takes responsibility for the design, construction, financing, operations, and maintenance of charging infrastructure; however, the private partner operates it for a specified period of time before transferring ownership back to the government or public entity.
- Concession Model: This model involves the government granting a private partner the right to build and operate charging infrastructure within a specified area for a specified period of time in exchange for payment or a share of the revenue. The charging stations would require a new, separate electrical service and meter that would assign the electricity expense to the private partner.
- Joint Venture Model: This model involves the formation of a joint venture between the public and private sectors, where both partners collaborate to develop and operate charging infrastructure. The choice of PPP model depends on the specific goals and needs of the government or public entity and the private partner. The model selected should allow for efficient and effective deployment of charging infrastructure while ensuring that the public interest is protected.

EVSE has unique challenges and characteristics that are very different from other infrastructure sectors that will need to be addressed in the structuring of contracting arrangements:

Market Characteristic	Description
Public Sector Role	Public entities do not want to operate EVSE but instead can support the private sector through their deployment
Technological Change	EVSE is rapidly changing and there is significant risk of technological obsolescence and performance issues.
Uncertain revenue generation	Demand for EVSE varies greatly by location and revenue models are highly uncertain
Relatively Low Capital Costs	Compared to highway and transit facilities, the capital required for Level 2 EVSE is significantly lower
Risk Allocation	There is no roadmap for managing and allocating risks
Land Ownership	The vast majority of EVSE will developed on private land

The Figure below depicts a typical contractual structure for a transportation project where the public entity enters a P3 agreement.



Notes: SPV – Special Purpose Vehicle; DB – Design-Build; Interface Agreement – Ensures that identified risks are appropriately allocated among contractors.

Figure 4 Example of contractual structure

5.1 Performance-based contracting

A single private entity (Project Company) is responsible for the design, construction, financing, operation, and maintenance of EVSE.

- The Project Company will collect revenues directly from users
- The public agency will provide financial support using NEVI funds through a) a direct subsidy, most likely performance-based and therefore in the nature of an availability payment; b) a de-risking mechanism, most likely structured as a minimum revenue guarantee or a revenue sharing mechanism; c) a combination of a direct subsidy and de-risking mechanism. The Project Company will retain most of the risks and will only under exceptional circumstances be granted relief under the arrangement
- The term of the arrangement will be five years (and often even longer for contracts with local governments)
- There may be a hand back provision to allow the public agency to competitively reprocure the site after expiration of the arrangement

Market Characteristic	Description
Public Sector Role	An arrangement that shifts ownership and operations responsibilities to a private partner that addresses public agency concerns.
Technological Change	The public sector assigns the private sector the risks and the mandate to continue to improve performance and technology. Concerns about obsolescence may lead to relatively shorter contract periods.
Uncertain revenue generation	Some level of sharing of revenue risk may be considered.
Relatively Low Capital Costs	The higher P3 transaction costs may be justified for projects with a significant scale, warranting consideration of bundling of projects into a single procurement.
Risk Allocation	There may be exceptional circumstances in which the private party may be granted relief through clauses relating to “supervening events” in the P3 agreement.
Land Ownership	Where publicly owned land is leased and the EV charging infrastructure is expected to generate positive cash flows, lease terms may include either revenue sharing or ongoing lease payments by the private partner to the public entity in exchange for the future stream of user fee revenues from the EV charging infrastructure project.
Third-party involvement	Utilities are likely to constitute an important element in the overall success of the project. Third-party risks should be addressed within the P3 contract and possibly through separate agreements.

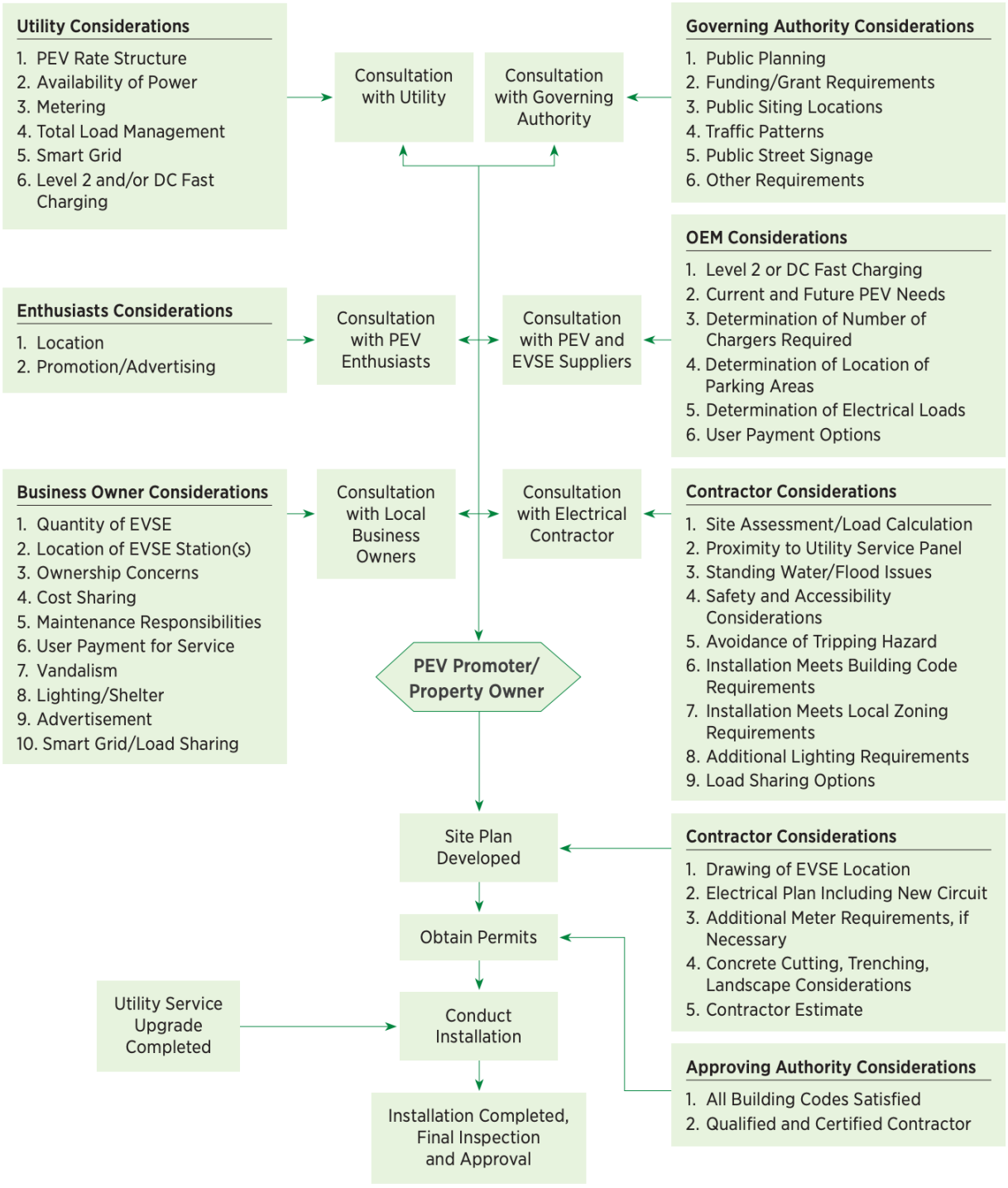


Figure 5 Flowchart of Contractor Installation of EVSE

An EV-ready building has the electrical infrastructure to support an electric vehicle charging station at a parking spot. This includes:

- **Electrical panel**: A panel with enough capacity to support an EV charger

- **Dedicated circuit**: A circuit that's dedicated to the EV charger
- **Continuous power supply**: A direct, continuous path for power to reach the parking spot
- **Wired outlet**: An outlet that's capable of charging an EV
- **Compliance with the National Electrical Code**: The charger uses no more than 80% of the capacity of the circuit it is attached to

To make a building EV-ready, you can:

- Retrofit parking spots with energized electrical outlets
- Prewire new homes for EV charging during construction
- Have a professional create an EV Ready Plan for your property
- EV readiness is a community-wide effort that involves planning, policies, and support services.

6 References

1. City of Moreno Valley Electric Vehicle Charging Infrastructure Master Plan. ICF. May 2024.
2. State of the Practice and Emerging Practices in Public-Private Partnerships for Electric Vehicle Charging Infrastructure. USDOT. June 2024
3. Plug-In Electric Vehicle Handbook for Public Charging Station Hosts. National Renewable Energy Laboratory. DOE/GO-102012. April 2012.
4. Plug-In Electric Vehicle Handbook for Electrical Contractors. National Renewable Energy Laboratory. DOE/GO-102012. April 2012.

7 EVSE Siting Analysis Template

In the siting analysis, a numerical score is assigned to objectively compare the sites for hosting EV chargers. The score captures the demand for EV chargers so they are placed where they are needed most. It also seeks to deprioritize locations that already have access to chargers nearby.

Altogether, the goals are as follows:

- Identify areas with large numbers of personal automotive trips.
- Consider the types of trips that are most conducive to public charging needs (long distance, not home based).
- Consider the length of time that vehicles are parked at each destination (under an hour is best suited for fast charging, more than 2 hours is more conducive to Level 2).
- Prioritize trips that originated within Disadvantaged Communities.
- Prioritize areas where people could charge their EVs and ride transit, encouraging multimodal transportation.
- Ensure that chargers are located at destinations where motorists naturally go and would want to spend a significant amount of time.

Site name and Address		**Date**
Minimum Criteria	**Criteria Met? (Yes/No)**	**Comment**
Is this site somewhere that people would be reasonably nearby for, like restaurants, shops, rest stop?		
Is this site monitored by any security cameras or personnel?		
Are there any amenities on site (e.g., restrooms, convenience store, car services)?		
Site Accessibility		
Would this site allow public charging?		
Is this site's entrance blocked by anything (e.g., gate, traffic control spikes)?		
Is this site adequately sized for its current parking requirements?		
Will this site's potential chargers not cause conflict for vehicle maneuverability?		
Does the site have adequate lighting?		
Does the site have enough visibility?		
Scalability		

Is this site's electrical panel reasonably close to where chargers might go?		
Is there room for expansion in the future if demand for charging increases?		
Are there existing utility connections (e.g., electricity, water) nearby?		
Is there any broadband connection (e.g., Public WIFI or Internet access)?		
Community		
Does the site currently experience high traffic or pedestrian flow?		
Will it be possible for the community to provide input about the impact of chargers at this site (e.g., public forum, town hall meeting, community-based organization engagement)?		
Is the site accessible to individuals with disabilities?		
Special Criteria		
Available electric service (240V? 480V?)		
Make Ready Effort (Low, Medium, High)		
Intended Vehicles (Light, Medium, Heavy)		