CHARGING FORWARD

Delaware's Strategy for Electric Vehicle Charging Infrastructure (2024)

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Abbreviations

BEV	Battery Electric Vehicle
BIL	Bipartisan Infrastructure Law
CCS	Combined Charging System
CFI	Charging and Fueling Infrastructure
DCFC	Direct Current Fast Charging
DelDOT	Delaware Department of Transportation
DNREC	Department of Natural Resources and Environmental Control
DOT	Department of Transportation
EV	Electric Vehicle
NACS	North American Charging Standard
NEVI	National Electric Vehicle Infrastructure
TOU	Time-of-Use
USDOT	United States Department of Transportation
ZEV	Zero Emission Vehicle

1 Executive Summary

Delaware is committed to reducing transportation emissions through the transition to electric vehicles (EVs) powered by clean, renewable electricity. CHARGING FORWARD: Delaware's Strategy for Electric Vehicle Charging Infrastructure (2024) (or the Strategy), initiated by the Delaware Department of Transportation (DelDOT) and the Department of Natural Resources and Environmental Control (DNREC), is intended to facilitate current and future users of EVs to confidently travel in and across Delaware for work, education, recreation, and exploration. This Strategy focuses on planning an EV charging network in an equitable, reliable, connected manner with educational initiatives and evaluation mechanisms to improve and enhance the network as needed.

DelDOT and DNREC held a series of working groups with key stakeholders and public workshops. These engagement sessions helped verify Strategy outcomes, understand EV infrastructure needs, determine barriers to electrification, and advise on strategies for EV charging network deployment.

Establishing a more robust EV charging network first requires an understanding of current conditions in Delaware. As of publication of this report, 8,349 battery electric vehicles (BEVs) are on the road in Delaware.[1] The state has a total of 185 direct current fast charging (DCFC) and 308 Level 2 charging ports publicly available to support EV charging;[2] however, chargers are concentrated mostly in northern New Castle County and the southeast portion of Sussex County around the beach destinations.

The EV charging network will need to be expanded throughout the state to provide seamless travel experiences, support equal opportunities for low and moderate income households to access EVs, and meet future EV demand. This Strategy forecasts EV adoption throughout 2032 consistent with the state's goal of 82% new zero emission vehicles (ZEVs) delivered by 2032 under the Advanced Clean Cars II standards. Results from the forecast provide insight on how many charging ports will be required within Delaware to support EV adoption. Based on the findings, Delaware is expected to have 205,217 EVs on the road by 2032. The expected level of adoption will necessitate an estimated 821 DCFC ports and 12,313 public Level 2 ports to fully support ZEVs delivered to Delaware by 2032.

Government subsidized charging stations will be critical to cover a portion of the needed charging ports in the near-term to encourage private sector investment, particularly in disadvantaged communities, rural areas, and multi-family dwellings as these residents have the largest barriers to EV adoption and would benefit most from a public charging network. Longer term, it is expected that government subsidies can be phased out as the technology advances and costs decrease. This Strategy identifies which zip codes should be prioritized for funding based on EV adoption levels, existing charging network sites, multi-family housing density, and equity factors. Such information can support Delaware government entities in budgeting and funding dispersion decisions for future EV charging programs.

[1] Source: DelDOT, data accessed September 25, 2023
[2] Source: DOE Alternative Fuels Data Center, accessed November 7, 2023

While deploying EV charging infrastructure can be a costly endeavor, the moment to pursue deployment is now. Decarbonization is a focus at both the state and federal level, offering opportunities to secure funds. Additionally, local governments are beginning to investigate or implement policies that promote EV charger installations.

In addition to state actions, the federal government issued the Infrastructure Investment and Jobs Act in 2021, also known as the Bipartisan Infrastructure Law (BIL), which provided $500 billion of funding opportunities for infrastructure and planning resources, including for EV charging station deployments for state governments through the establishment of the National Electric Vehicle Infrastructure (NEVI) program. In accordance with the NEVI program, DelDOT submitted a state plan to leverage $17.7 million in available funds to deploy a fast and reliable charging network.[3] Funding for EV charging stations continues to be a focal point for federal and state governments due to rising consumer demand for EVs, climate action policies, and buy-in from automakers.[4] Key recommendations from this Strategy to achieve an equitable, reliable, connected charging network are:

- Utilize results from the zip code prioritization assessment included in this Strategy (Section 6) to develop programs that encourage the deployment of EV charging stations through funding, technical assistance, or other incentives. This includes incentives for EV charging technologies through existing energy efficiency programs.
- Encourage local jurisdictions to leverage information from this Strategy for federal funding opportunity applications, particularly the Department of Transportation (DOT) Charging and Fueling Infrastructure Discretionary Grant Program.
- Coordinate with Delaware Electric Cooperative, Delaware Municipal Electric Corporation, and Delmarva Power to streamline charging installations in high priority zip codes, particularly in disadvantaged communities and high multi-family density areas to mitigate EV adoption barriers. Additionally, work with the electric utilities to develop new electric demand consumption management programs such as Time of Use Rates. These programs can greatly assist in managing grid load and keeping electricity prices affordable.
- Ensure data tracking and transparent data sharing between government entities of EV registrations and charging locations to improve assessment and monitoring tactics.

2 Overview of the Strategy

Tailpipe exhaust from cars and trucks contains pollutants that are harmful to human health and the environment including carbon monoxide, formaldehyde, nitrogen oxides, sulfur dioxide, hydrocarbons, and particulate matter. Emissions from the transportation sector are also the largest single source of greenhouse gases released to the atmosphere in Delaware.[5] This Strategy is intended to complement previous planning efforts by identifying areas to prioritize charging station deployments throughout the state based on expected adoption rates in future years.

[3] Source: National Electric Vehicle Infrastructure Plan, State of Delaware, 2023
[4] Source: U.S Bureau of Labor Statistics
[5] Source: Environmental Protection Agency

Delaware's Climate Action Plan, published in 2021, takes a comprehensive approach to reducing greenhouse gas emissions and increasing resiliency to climate change impacts. Modeling done for the Climate Action Plan shows that transitioning to electric vehicles has the largest potential for emissions reductions in the transportation sector.[6] The Climate Action Plan identifies strategies to accelerate electric vehicle adoption, many of which are underway. Delaware has already taken numerous steps to transition to electric vehicles including pilot projects, consumer and business incentives for electric vehicles and charging stations, policy updates, technical assistance, and educational opportunities.

Recently, Delaware adopted the Advanced Clean Cars II emissions standards. Advanced Clean Cars II requires automakers to deliver an increasing number of ZEVs for sale in Delaware. Under the finalized regulation, starting with model year 2027, 43% of new cars and trucks sent to Delaware for sale will be ZEVs. The percentage will increase to 82% in 2032. If those goals are met, about 21% of the passenger vehicles registered in Delaware will be zero-emissions and the expectation is that most of these will be electric. Even in absence of these regulations, electric vehicle adoption by consumers is accelerating rapidly as vehicle manufacturers introduce new electric vehicle models, prices come down, and consumers realize the value and convenience of electric vehicles.

As of publication of this report, Delaware had 8,349 BEVs on the road with 185 DCFC ports and 308 Level 2 ports publicly available.[7] Based on modeling results detailed in Section 4.2, the state will need to have up to 821 public DCFC ports and 12,313 public Level 2 ports installed by 2032 – a significant increase compared to current conditions. To support the accelerating transition from internal combustion vehicles to electric vehicles, a robust network of charging stations available for public use is necessary, as well as private home and workplace charging stations. Delaware seeks to ensure widespread accessibility and availability of charging stations, effectively removing barriers to EV deployment and fostering a seamless and equitable transition towards cleaner transportation.

The Strategy identifies EV charging needs of Delaware by assembling data on existing conditions, preparing EV adoption forecasts, performing stakeholder and public engagement activities, and recommending priority areas at a zip code level of where charging infrastructure should be deployed. A particular focus of this Strategy is on disadvantaged communities, rural areas, and residents of multi-family dwellings, including EV owners who must rely on street parking, as these parties often face significant barriers to EV adoption and lack infrastructure deployment.

2.1 State Agencies Background

DelDOT and DNREC are working towards developing new initiatives to support the transition to EVs. The initiatives are intended to support the statewide expansion of EV charging infrastructure, ensure EVs contribute to grid stability, stimulate the economy, create jobs, and strengthen consumer adoption of EVs. The role of DelDOT and DNREC in Delaware's EV charging infrastructure is to provide funding for public Level 2 and DCFC stations, and identify areas where policies may need to be updated or created to support the transition to EVs. Some agencies are beginning to install public Level 2 charging stations for their employees and

[6] Source: ICF
[7] Source: DelDOT accessed September 25th, 2023; Alternative Fuel Data accessed November 7th, 2023

visitors. In addition, state agencies plan to lead by example by transitioning their fleet vehicles to electric and installing charging stations to support state owned vehicles. The overall goal for the state agencies is to ensure practical and feasible charging services for Delaware drivers.

2.2 DelDOT

DelDOT's mission is to plan the state's infrastructure in a manner that results in a safe, cost-effective, and efficient multi-modal transportation network that enhances mobility, commerce, and livability. They seek to be inclusive and undertake comprehensive transportation planning and permitting processes that provide solutions to the state's transportation needs by balancing environmental safety, economic development, and improvement of accessibility. DelDOT's goals to provide transportation information and advice to local governments with land use decision-making will be reflected in this Strategy. The Department will ensure solutions to transportation problems by collecting, analyzing, and publishing transportation data, as well as continue to minimize the environmental impact of the state's transportation system.[8]

2.3 DNREC

DNREC's mission is to engage all stakeholders to ensure the wise management, conservation, and enhancement of Delaware's natural resources. They seek to protect public health and the environment, improve the quality of life, and lead energy policy and climate preparedness. Having worked closely on past infrastructure and climate development plans, the Division of Air Quality and Division of Climate, Coastal and Energy monitor and regulate statewide emissions and lead climate change mitigation and adaptation programs.

2.4 Strategy Vision and Outcomes

The following vision statement and outcomes have been developed to reflect the priorities of the Strategy. The vision statement and outcomes were developed with input from a stakeholder working group and feedback from workshops. Details of these sessions are further detailed in Section 9.

2.5 Strategy Vision Statement

Enable current and future users of electric vehicles to confidently travel in and across Delaware for work, education, recreation, and exploration.

2.6 Strategy Outcomes

The outcomes below were developed to guide electric vehicle infrastructure deployment and provide an overall framework for transportation decarbonization planning in Delaware.

- ***Equity:*** ensure that rural, underserved, and disadvantaged communities, including suppliers and contractors, are engaged and realize Strategy benefits
- ***Reliability:*** develop a reliable, convenient, affordable, and equitable EV charging infrastructure network in Delaware for all users

[8] Source: DelDOT

- ***Connections:*** connect Delawareans and travelers in Delaware to EV chargers to support an electric transportation future
- ***Education*****:** develop outreach materials on electric vehicles, good charging habits, station location, station usage, equipment capability, and how to provide feedback on the network; use social media and apps
- ***Evaluation*****:** develop a framework to collect data and evaluate the plan over time; refine and update as needed

3 Existing Conditions

As of publication of this report, Delaware has 8,349 BEVs on the road, roughly 0.83% of the 1,007,705 registered passenger vehicles.[9] Providing further insight on total EV adoption, where adoption is occurring, and historical trends is difficult based on the current data recording and sharing methods; however, geographical information is available on where EV rebates are occurring.[10] Delaware has 176 DCFC and 287 Level 2 ports publicly available to support EV charging.[11] Level 2 charging, as shown in Figure 18, is concentrated mostly in northern New Castle County and along the popular beach destinations in southeast Sussex County. Similarly, much of the existing DCFC network is concentrated along major highway corridors or high population areas as seen in Figure 19. The EV charging infrastructure network will need to be expanded throughout Delaware to provide seamless travel experiences and support equitable EV adoption.

4 Basics of Electric Vehicles and Charging Infrastructure

Developing a baseline understanding of electric vehicles and charging infrastructure is vital for effective site planning and policy decisions. Both electric vehicles and charging infrastructure are rapidly evolving and expected to continue to evolve. Each charging option has its own unique considerations such as cost, power level, and infrastructure that should be well understood to identify the appropriate solution to best serve community needs.

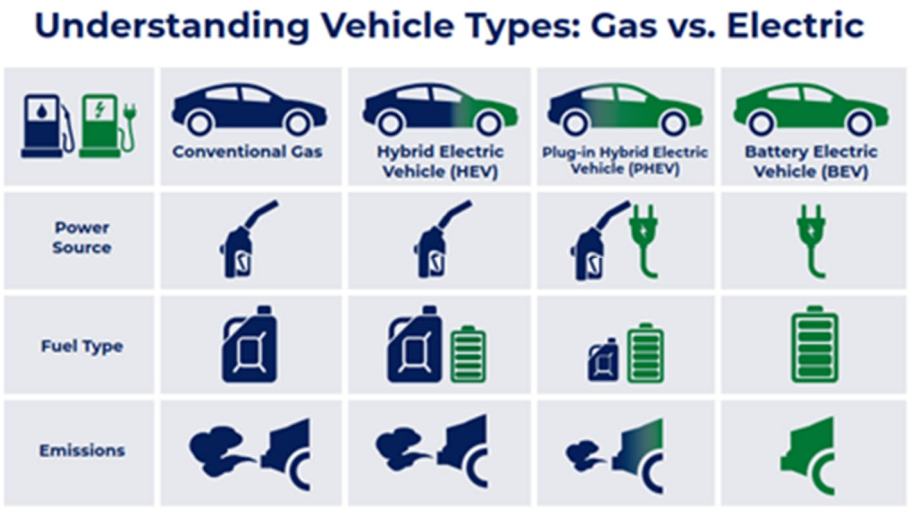
4.1 EV Basics

Electric vehicles come in three varieties, two of which are plug-in EVs (Figure 1):

1. Battery Electric Vehicles
2. Plug-In Hybrid Electric Vehicles
3. Hybrid Vehicles

[9] Source: DelDOT accessed September 25th, 2023
[10] Source: DNREC
[11] Source: Alternative Fuel Data accessed November 7th, 2023

Figure 1: Summary of Electric Vehicle Types[12]



Full BEVs are entirely powered by electricity through the vehicle's battery. Like plug-in hybrids, battery electric vehicles have large variability in driving range and prices based on the year and model of the vehicle. For 2023 BEV models, vehicles range between 114 to up to 516 miles of range, with most vehicles between 200 and 350 miles of range.[13] Overall average transaction price of a BEV in July 2023 was $53,438, according to Cox Automotive.[14]

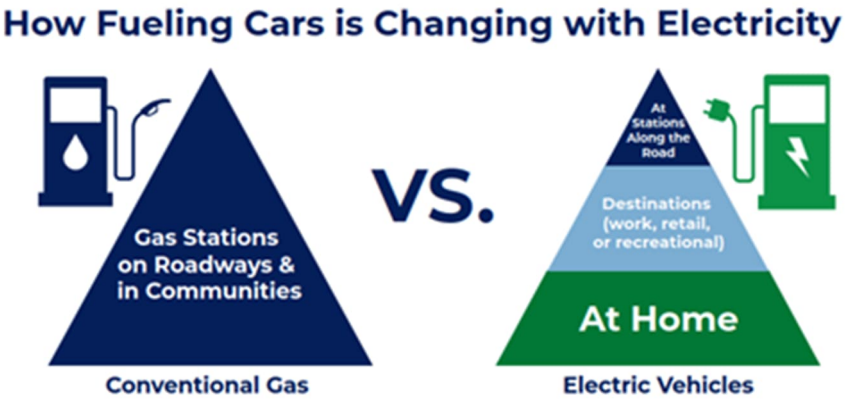
Plug-in hybrid vehicles are powered by a battery and backed up by an internal combustion engine that is fueled by gasoline. Based on the year and model of the plug-in hybrid vehicle, the range and prices available can vary. For 2023 models, plug-in hybrids have all electric ranges as low as 10 miles and up to 45 miles. Newer models of plug-in hybrid vehicles provide upwards of 600 miles of range on combined electric and gas fuel. [15] As of 2023, the average price for new plug-in hybrids is approximately $55,451.[16]

Hybrid vehicles are primarily powered by an internal combustion engine but are also equipped with a small battery to provide supplemental power for a short period of time to improve fuel efficiency. The battery is recharged solely through regenerative braking; thus, the vehicle does not need to recharge using a charging station.

The two plug-in vehicle types, BEVs and plug-in hybrids, are powered by electricity through plugging into a charging station, similar as a phone charging configuration. Charging can occur at various locations such as destinations or along the roadside, but the majority of time it is likely to occur at-home installed charging station for convenience (Figure 2). This is much different compared to the typical gas station model that is along roadways.

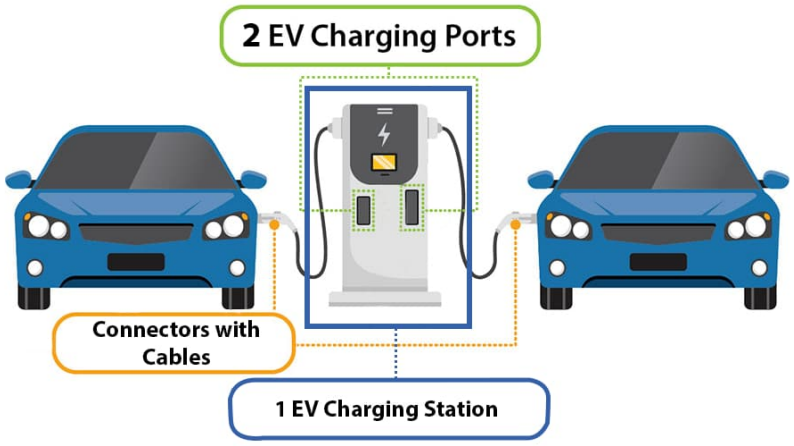
[12] Source: PennDOT EV 101 Infographic
[13] Source: US DOE, Fuel Economy, Edmunds
[14] Source: Cox Automotive
[15] Source: US DOE, Fuel Economy
[16] Source: EVAdoption

Figure 2: Comparison of EV to ICE Refueling Methods[17]



An EV charging station describes the entirety of the equipment used to charge a plug-in vehicle. The charging station has charging ports that connect to the vehicle via a cable with a connector. A charging station can consist of numerous ports which allow vehicles to simultaneously charge at a single charging station; however, each connected vehicle cannot be recharged at the same rate as the rated charging station power. For example, a dual port 100kW charger can simultaneously charge each vehicle at 50kW – not 100kW. A diagram of a typical charging station is shown in Figure 3.

Figure 3: EV Charging Station Diagram



4.1.1 Charger Types

Electric vehicle chargers vary in terms of power output and by the connector type. The power output of a charge is directly linked to vehicle charging time - the higher the power, the shorter the charging time. There are three charger power levels:

- Level 1 chargers use standard three-pronged 120-volt outlets typically used in homes. Such chargers are only suited for home and overnight charging locations due to slow charging

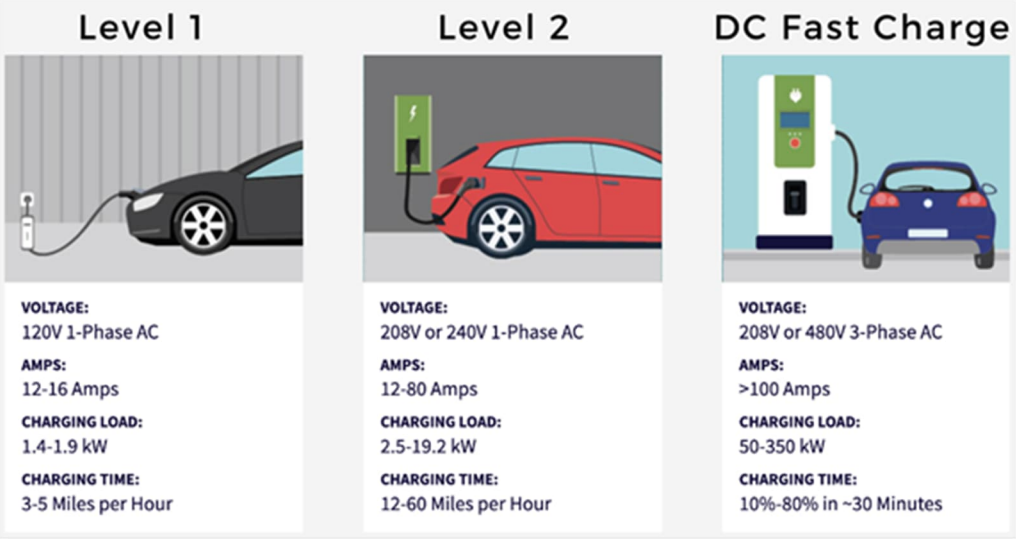
[17] Source: PennDOT EV 101 Infographic

speeds of 3-5 miles of range per hour. They are ideal for EV drivers with somewhat average daily commute, many plug-in hybrid electric vehicles and Level 1 chargers require no additional equipment or installation costs.

- Level 2 chargers use 240-volt outlets, commonly used by clothes dryers, electric stoves, or air conditioners. The higher voltage allows these chargers to charge at a rate of 12-60 miles of range per hour. Level 2 chargers are typically found at workplaces, shopping centers, or public parking locations and can be easily installed within residential spaces as well. This makes them the best option for long-range EVs that would benefit from overnight charging as installation only requires renovation of the home-circuit to supply 240 volts.
- Level 3, or DCFC, relies on commercial power levels, enabling rapid charging with the capability to add up to 80% charge to a vehicle within the initial 30 minutes. These chargers can require more extensive implementation considerations and/or permitting processes due to their power and electrical infrastructure requirements. DCFC stations are generally installed where drivers need a full charge in a short amount of time, like along highway corridors and at rest stops. DCFC stations are analogous to gas stations, where a driver stops for a short period of time and then continues their trip. DCFC chargers are bigger, faster, and help alleviate the range anxiety that some drivers experience on long trips. DCFC may be an especially important factor to drive EV adoption in environmental justice communities as residents in such areas may face upfront cost barriers to installing at home-chargers, causing them to rely on a public charging network. Note that not all electric vehicles can use DCFC including almost all plug-in hybrids and older models.[18] The NEVI program funding is specified to deploy DCFC infrastructure along major highway corridors.

When selecting a charger, the associated costs, charging speeds, and grid impacts need to be considered as shown in Figure 4. The mission of this Strategy is to identify where additional Level 2 and DCFC infrastructure is needed to meet state outcomes.

Figure 4: Comparison of EV Charging Station Technology

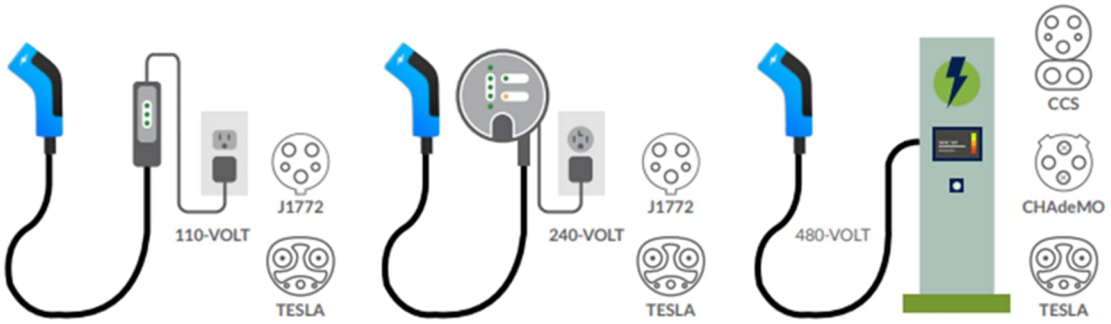


[18] J117 was introduced in 2009 and CCS was introduced in 2012. Some standard current models only allow Level 2 charging.

Each charger is equipped with a connector that transfers power from the electric grid to the vehicle. In the United States, four connector types are used as shown in Figure 5. The connector types refer to the shape of the charging inlet on the vehicle, which needs to be compatible with the charging station port. Adapters are available to allow cross compatibility between connector types except for Tesla Superchargers, these chargers are only accessible to Tesla vehicles.

- **J1772 & J1772 Combo**: J1772 primary connector type used for Level 1 and Level 2 charging. A J1772 Combo is a J1772 connector with additional ports to also enable DCFC, also known as Combined Charging System (CCS) .
- **CHAdeMO**: CHAdeMO is the standard connector for Japanese auto manufacturers. The CHAdeMO connector is currently being phased out in the U.S. While new vehicle models in the U.S. will use CCS exclusively, providing charging stations that can accommodate CHAdeMO is necessary to support older EV models.
- **North American Charging Standard (NACS)**: Previously known as the Tesla Combo, the NACS is a connector that can be used for Level 2 or DCFC. In addition to Tesla, numerous automakers have announced they are switching to NACS ports including Ford, GM, Honda, Mercedes-Benz, Nissan, and Volvo among others.

Figure 5: EV Charger Connector Types[19]



4.2 Delaware EV Adoption and Infrastructure Forecast

An analysis was performed to forecast EV adoption in Delaware throughout 2040 to provide insight on how much public charging infrastructure would be required within Delaware to properly support electric vehicle adoption under the Advanced Clean Cars II standard and beyond. The assessment considers historical EV adoption, EV cost projections, EV model availability, policy environment – specifically the Advanced Clean Cars II standard, and localized demographics that correlate to EV adoption. Assumptions are made on how the EV landscape will evolve to provide projections beyond the 2032 timeline regulated by Advanced Clean Cars II.

4.2.1 Methodology

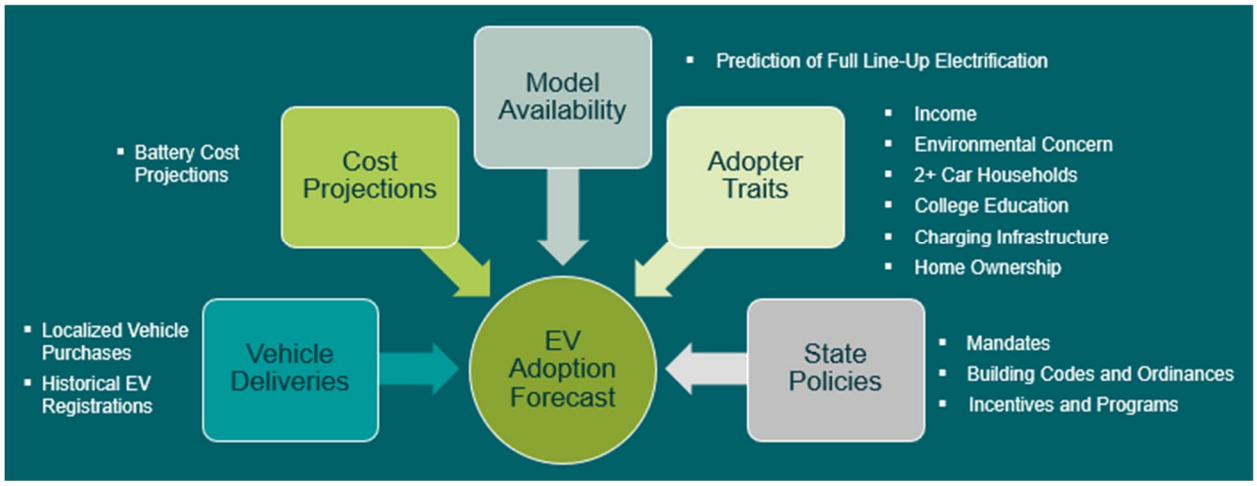
Delaware's EV adoption forecast inputs include U.S. Census data, state policy information, vehicle manufacturer announcements, and industry papers as shown in Figure 6. The

[19] Source: DNREC's EV Charging Station Installation Guide

assessment was based on historical EV adoption in the United States and localized data inputs to forecast future EV adoption. The inputs for each year are updated to account for changes in the EV landscape such as cost declines due to improvements in battery manufacturing, increases in EV model availability, and deployment of charging infrastructure. Results from the assessment provided information on EV deliveries per year, total EV adoption, and public EV infrastructure needed to support EV adoption levels. The following assumptions were made to perform the assessment:

- There is no consensus on specific number of Level 2 and DCFC ports needed to meet EV adoption projections; however, research papers target public charging infrastructure ratio of 4 DCFC ports per 1000 EVs on the road and 60 Level 2 port per 1000 EVs on the road.
- Vehicle deliveries are highly volatile based on economic conditions. It is assumed that there will be a constant number of total vehicles on the road and vehicle deliveries per year throughout 2032.
- Numerous vehicle manufacturers have made commitments to achieving fully electric line-ups in the future. It is assumed that all manufacturers will have fully electric line-ups by 2040 due to internal goals, consumer demand, and national policies.
- Based on battery cost projections, EVs will begin to achieve cost parity with internal combustion engines by 2025.[20]
- As mentioned in Section 3, it is difficult to obtain information on the breakdown of registered EVs at the zip code level. For this forecast, it is assumed each zip code has the same EV adoption percentage across Delaware.

Figure 6: EV Adoption Methodology



4.2.1.1 EV Adoption Growth Scenario

For this Strategy, forecasted EV adoption was modeled to align with the Advanced Clean Cars II standard which requires 82% new light-duty vehicles delivered to Delaware must be zero emission by 2032.

[20] Source: The International Council on Clean Transportation

4.2.2 Findings

The projected EVs on the road until 2040 based on the assessment results for the EV adoption scenario is demonstrated in Figure 7 and Table 2. Delaware is expected to have nearly 58,835 EVs on the road by 2027 and over 205,217 EVs by 2032 to align with the Advanced Clean Cars II standards, representing roughly 6% and 21% of Delaware's passenger market. It is worth noting that total market penetration remains well below 50% in 2032 even under the Advanced Clean Cars II standard. The transition to a fully electrified market requires several years, even after 82% of new vehicles delivered in the state are zero emission, due to long vehicle replacement times.

Figure 7: Delaware EV Adoption Forecast Under Advanced Clean Cars II

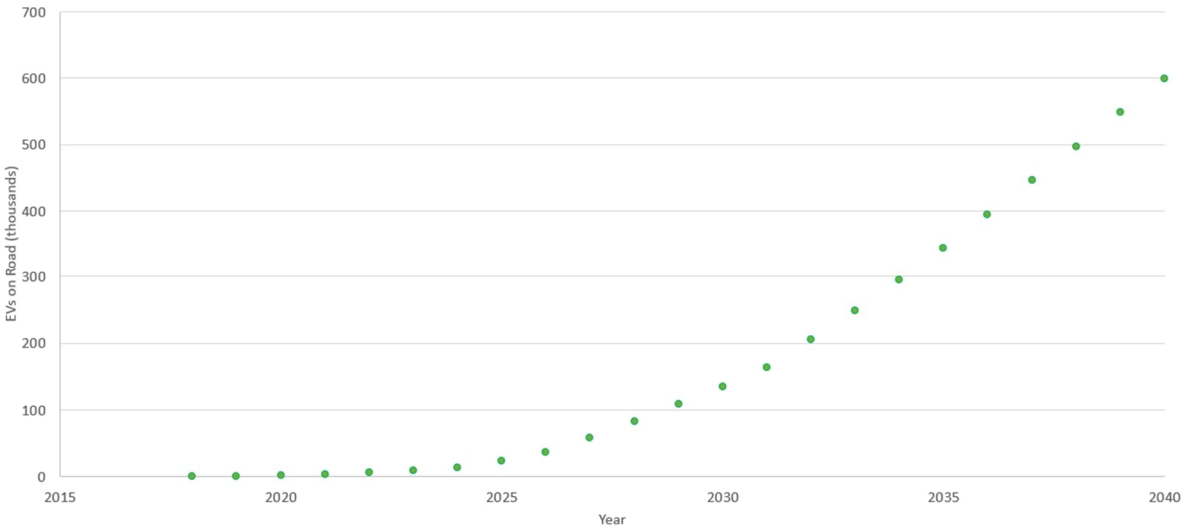


Table 1: Delaware EV Adoption Forecast (2027, 2032)

EV Adoption Rate	2023[21]	2027	2032
% EV Delivered	5%	43%	82%
% EV on the Road	1%	6%	21%

The number of public charging ports required to support the forecasted EV adoption scenario is shown in Table 2. Based on the findings from the assessment, Delaware is well positioned to achieve the near-term DCFC targets, having nearly triple the amount of infrastructure currently installed to meet current adoption levels. This illustrates the success of the state's historical efforts to leverage Volkswagen funding and private sector investment to deploy a DCFC to drive EV adoption. However, significant development of the public Level 2 charging network is needed compared to the 308 existing Level 2 ports. Public parking lots, local businesses, workplaces, and multi-family dwellings are attractive options to meet the infrastructure gap due to the high number of parking spaces and ideal dwell time for Level 2 chargers.

[21] Source: DelDOT accessed September 25th, 2023

Table 2: Delaware Public EV Infrastructure Targets (2027, 2032)

EV Infrastructure	2023[22]	2027	2032
DCFC Ports	176	235	821
Level 2 Ports	287	3,530	12,313

4.2.3 Recommendation and Considerations

To meet Delaware's projected EV adoption rates, significant behavioral, consumer, and infrastructure changes are required to expedite the transition based on current observed levels of adoption. This is especially true to achieve Advanced Clean Cars II standards, as the rate of EV adoption is much faster compared to current conditions. Enhancing the public charging network, implementing policies and programs to create an environment that supports EV adoption, and enhanced education efforts should be pursued to achieve such changes. Section 8 outlines planning initiatives for local jurisdictions to consider implementing. Initiating the rollout of these strategies now is recommended to support a smooth transition to EVs.

5 EV Charging Demand Analysis

Charging EVs creates new challenges and opportunities for electricity providers and the electricity grid. While EVs will increase demand for electricity, this demand can be managed in a variety of ways to ensure the grid continues to operate efficiently. This section provides a basic forecast on EV charging demand (from Level 2 and DCFC stations) at public and private charging stations based on the forecasted EV adoption rates in Section 4. This information is helpful in determining grid impacts and identifying demand management strategies. Details on the methodology to estimate electric demand, findings, and recommended demand management strategies are further defined in this section.

5.1 Methodology

The U.S. Department of Energy's Electric Vehicle Infrastructure Projection Tool was used to perform the charging demand assessment. This tool has the capability to generate EV load profiles for the average weekday and weekend day based on user entered assumptions. It was of interest to examine the impact of an unmanaged charging scenario compared to a managed scenario where demand was as constant, or flat, as possible. Under the unmanaged scenario, EV users recharge their vehicle as quickly as the applicable charger type provides upon connection. Under the managed scenario, charging is spread out evenly over the course of the time the vehicle is plugged in to manage grid demand. The tool includes the impact of public and private at-home charging in both scenarios. Assumptions for each scenario are presented in Table 3. It was important to model these scenarios to understand that while unmanaged charging provides the comfort of having a fully charged car as quickly as possible, it can tax the electrical grid system. Charging demand can be shifted to desirable hours of the day to help alleviate grid constraints.

[22] Source: Alternative Fuel Data accessed November 7th, 2023

Table 3: EV Charging Demand Assumptions

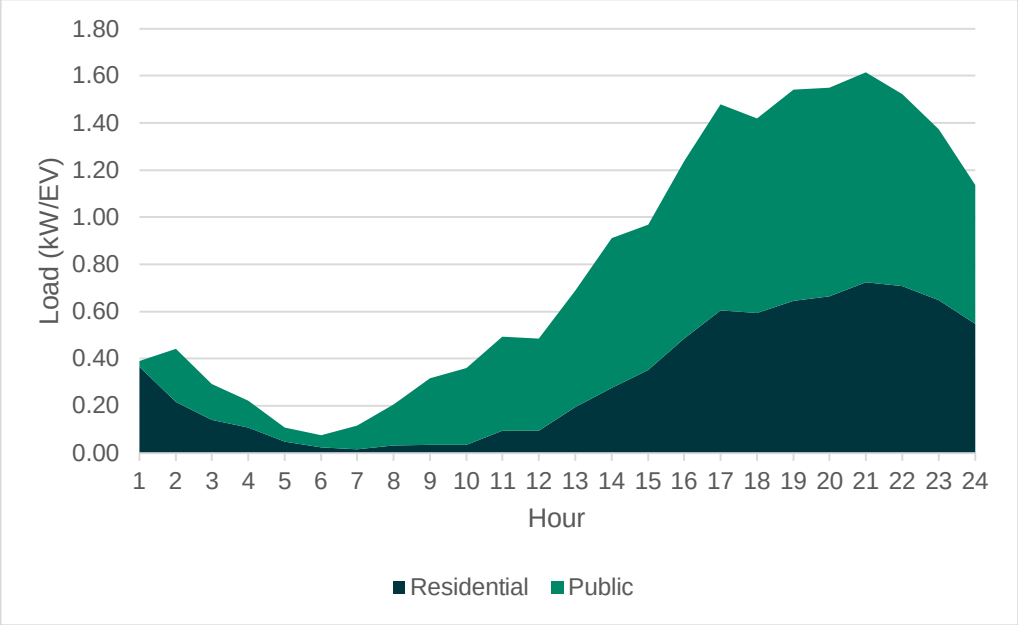
Description	Unmanaged Scenario	Managed Scenario
Location	Dover	
Average Daily Miles Traveled per Vehicle	35 miles	
Average Ambient Temperature	50°F	
Plug-In Vehicles that are All-Electric	50%	
Plug-In Vehicles that are Sedans	80%	
Mix of Workplace Charging	20% Level 1, 80% Level 2	
Access to Home Charging	100% with 50% Level 1 and 50% Level 2	
Preference for Home Charging	Strong preference for at-home charging versus public network	
Home Charging Strategy	As fast as possible	As constant as possible
Workplace Charging Strategy	As fast as possible	As constant as possible

5.2 Findings

Charging profiles demonstrating single day charging loads per EV for the unmanaged scenario are shown in Figure 8 and 9. Charging peaks in the unmanaged scenario occur between 6:00 p.m. and 10:00 p.m. as EV users return home from work or during weekend activities. During the weekday, workplace charging is utilized in the morning, but the bulk of load occurs overnight at-home. During the weekend, users that are traveling are more likely to rely on the public network than at-home charging. Users that remain locally are likely to charge overnight at-home to prevent public charging during the day. Expected peak demand from passenger vehicle EV charging, based on adoption rates presented in Section 4, is estimated at 328 megawatts in 2032 (weekend at 10:00 pm). This is the expected additional demand solely from EV charging load and does not include the existing load.

Figure 8: Delaware Weekday Charge Load – Unmanaged per EV

Figure 9: Delaware Weekend Charge Load – Unmanaged per EV



Charging profiles demonstrating single day charging loads per EV for the managed scenario are shown in Figure 10 and 11. Charging peaks overnight between 11:00 pm and 5:00 am when electricity demand is low. In both scenarios, the demand curve is “flatter” which is considered to be more manageable for grid operation. Based on adoption rates presented in Section 6, expected peak demand from passenger vehicle EV charging is estimated at 217 megawatts in 2032 (weekend overnight), a substantial amount less than the unmanaged scenario.

Figure 10: Delaware Weekday Charge Load – Managed per EV

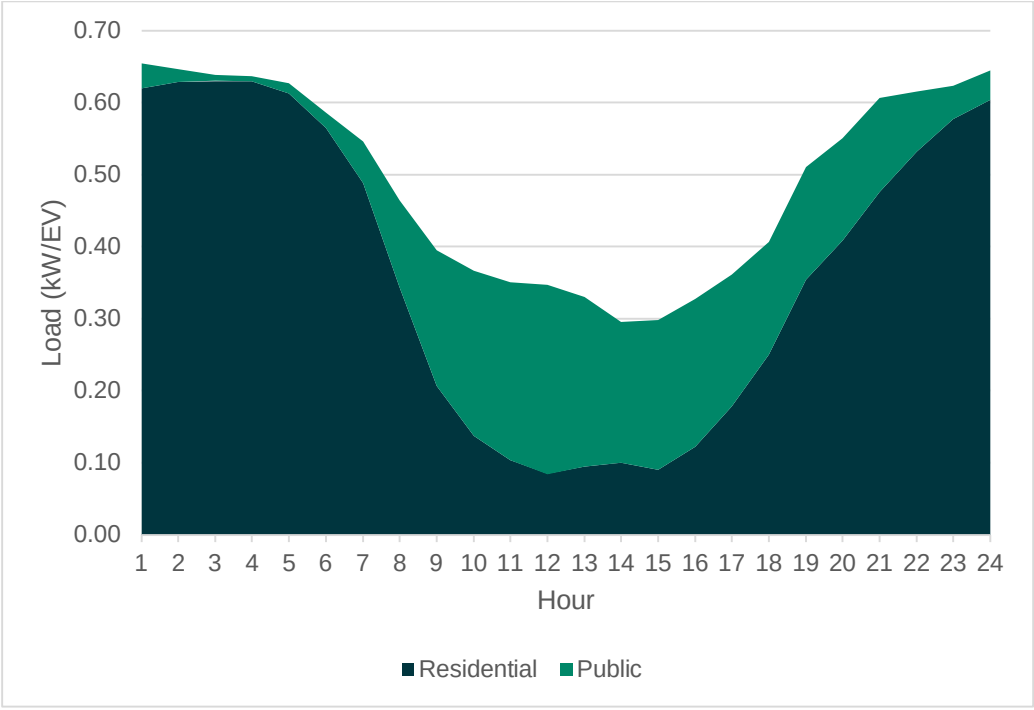
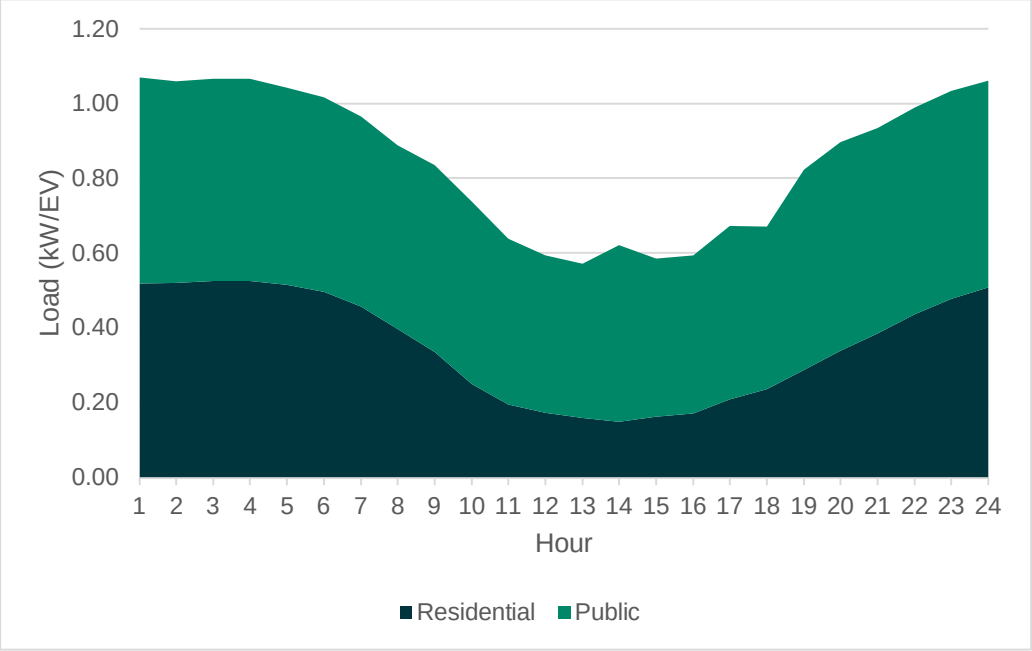


Figure 11: Delaware Weekend Charge Load – Managed per EV



5.3 Recommendations and Considerations

Coordination with Delaware Electric Cooperative, Delaware Municipal Electric Corporation, and Delmarva Power will be essential to ensure the grid can accommodate future EV demand in a reliable, cost-effective manner. A popular method utilities have been providing to reduce grid constraint is an EV Time-of-Use (TOU) rate. An EV TOU-Only rate is where EV usage is measured and priced separately from the rest of the household, letting the customer easily understand the electricity usage and cost associated with their plug-in electric vehicle. Under a TOU rate, users are encouraged to charge their vehicle overnight during off-peak hours when electricity prices are more affordable. Customers often need to cover the upfront cost of installing a second utility meter to enroll in this program which may disincentive participation; however, leveraging smart technology within the charger or EV itself could serve as alternative monitoring methods. Delmarva Power, under its parent company, Exelon, is already providing several EV TOU rates with its EVsmart Program to its customers who choose to charge their electric vehicles at home during off-peak hours. DE Electric Coop also offers a $100 billing credit and a $5 monthly credit for residential customers that participate in their Beat the Peak program to reduce charging demand during peak times. It is recommended that each utility continue developing such programs and offerings for their own customers.

6 EV Charging Infrastructure Deployment

To support the forecasted EV adoption level, significant new public EV charging stations will need to be deployed. Government subsidized charging stations will be critical to cover a portion of the needed infrastructure in the near-term. This section details the methodology employed to identify priority areas for EV charging infrastructure installation and results from the assessment.

6.1 Methodology

A GIS-based tool was used to evaluate priority areas for EV infrastructure by code. The tool consists of four modules, which are detailed in Table 4. Each module has an adjustable weight to align with stakeholder and public priorities.

Table 4: EV Priority Area Modules

Module Name	Description
Early EV Adoption	Demographics correlated with early EV adoption such as income and education levels. This module was examined as it determined where EV adoption is likely to occur and would necessitate EV charging infrastructure. These chargers are expected to be utilized in the near-term.
EV Charging Network	Inequities within traditional public mobility as well as the existing EV charger network to identify gaps in the charging network, opportunities for EV charging to improve mobility access. Locations of existing and planned Level 2 and DCFC were examined in this module along with average annual traffic data and seasonal traffic.
Land Use & Built Environment	Existing land use and opportunities where land use can be used to support EV charging infrastructure and increase EV adoption. Data on population levels and multi-family housing zones are incorporated into this module to identify areas where chargers can be utilized by many drivers. Additionally, multi-family dwelling residents often are unable to install chargers at their homes; thus, making public chargers in these areas appealing to increase EV adoption.
Equity	Socio-economic community disparities that can benefit from the targeted EV charging infrastructure investment to enhance equity among vulnerable populations. This module investigates areas with high rates of asthma, unemployment, pollution, social vulnerability, and more.

6.2 Prioritization of Proposed Charging Stations

Prioritization of the modules was determined through a combination of input from DelDOT, DNREC, and stakeholder and public feedback. As shown in Table 5, the Equity and EV Charging Network modules were assigned as top priorities in order to ensure that recommendations focused on providing new charging stations in underserved areas that face disproportionate impacts of transportation emissions and fill in gaps of the existing charging network. Early EV Adopters and Land Use & Built Environment modules were given medium priority levels as there is still a desire to site new infrastructure where it is expected be utilized in the near-term and able to be accessed by many residents.

Table 5: EV Priority Area Module Weights

Module	Assigned Weight
Early EV Adopters	Medium
Equity	High
Land Use & Built Environment	Medium
EV Charging Network	High

6.3 Findings

As an output of the modeling, four tiers of priority for charging infrastructure implementation were identified. Tier 4 represents areas to be prioritized for near-term deployment with the other

tiers representing decreasing levels of priority. Figure 12 provides the results of the infrastructure deployment assessment. While these results illustrate priority are the zip-code level, rollout could be planned at the corridor level to plan a cohesive network along major roads and highways to facilitate travel.

Figure 12: EV Charging Deployment Priority Areas

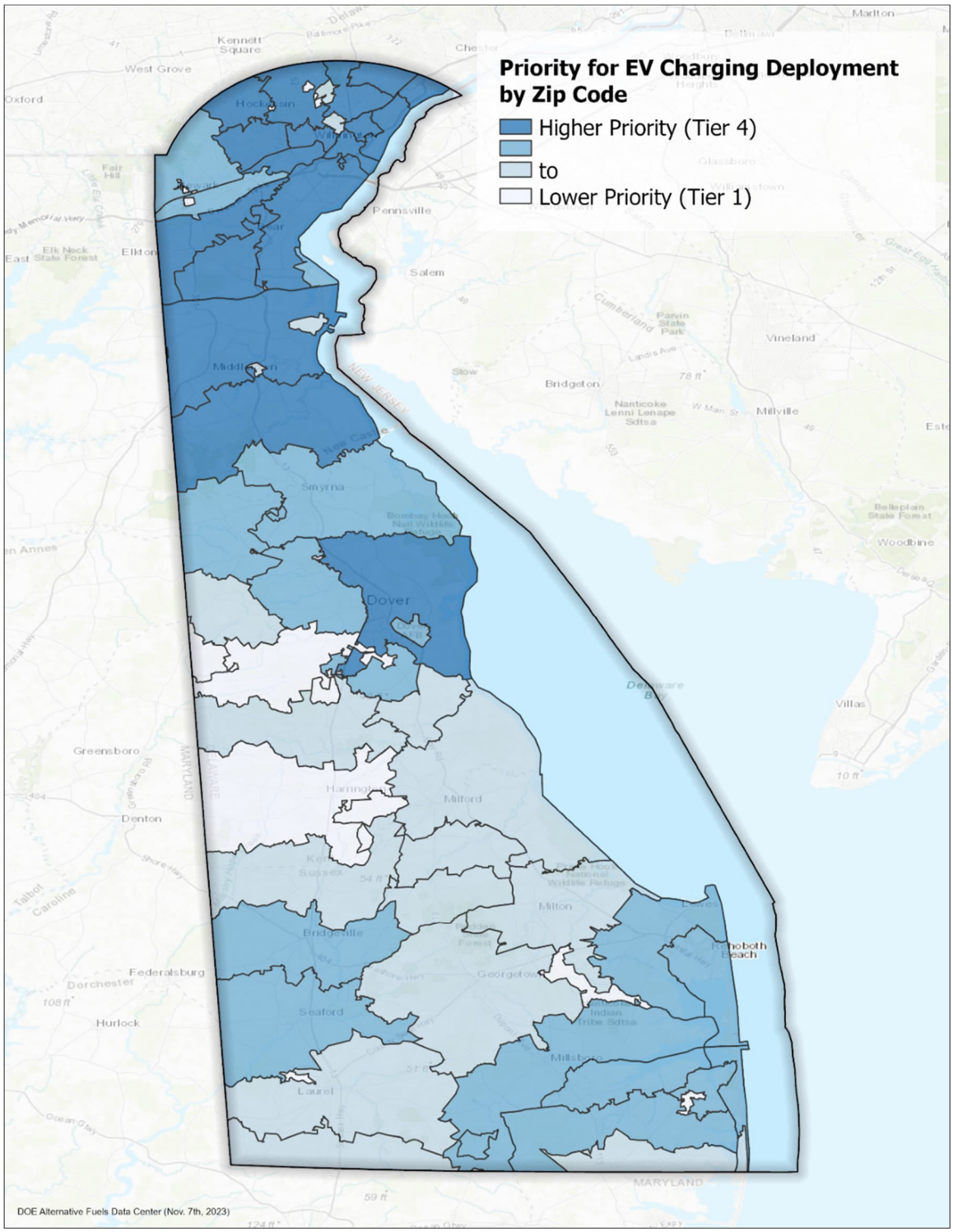
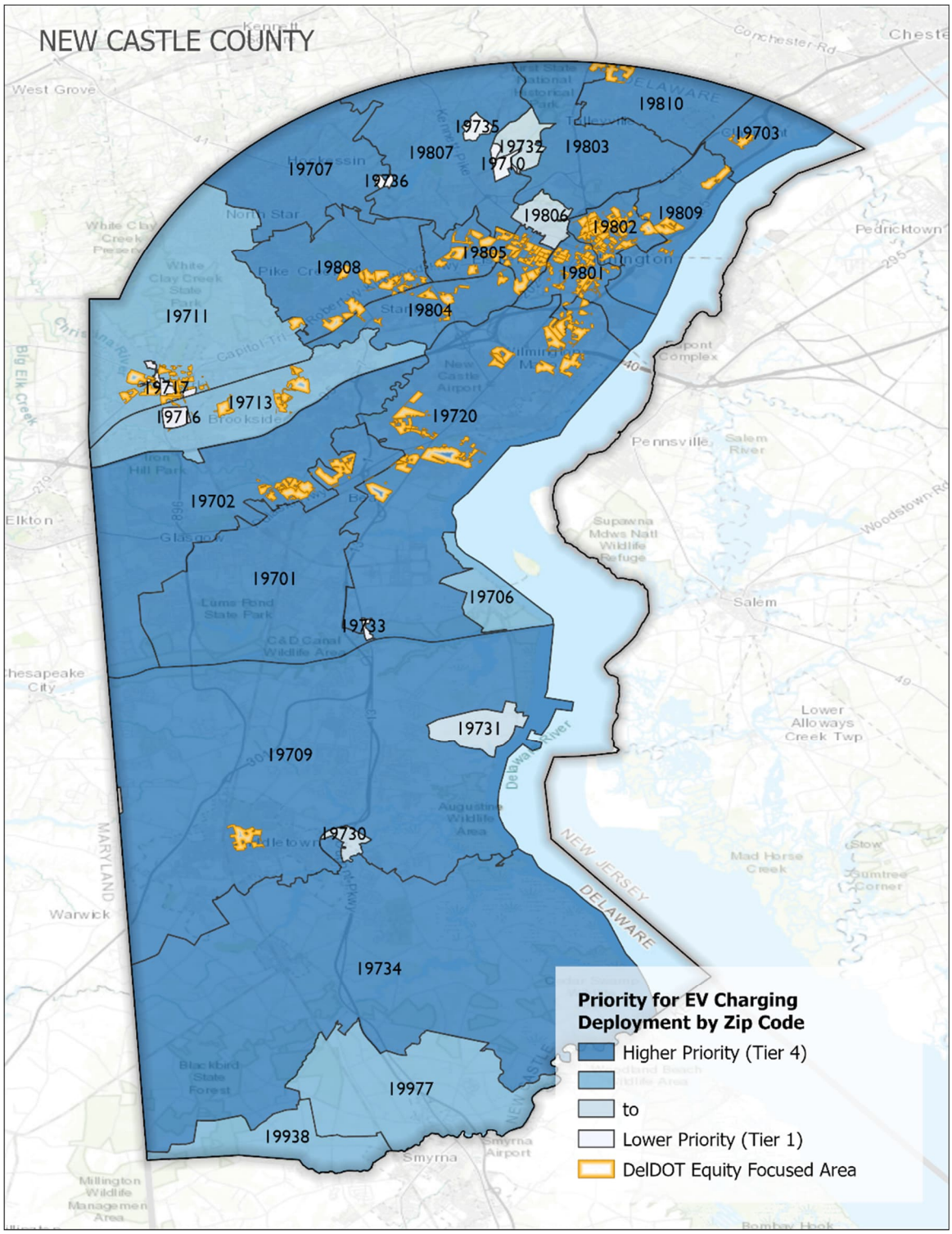


Figure 13: New Castle County EV Charging Deployment Priority Areas



Areas requiring the most near-term deployment, shown in Figures 12 and 13, includes the majority of New Castle County despite having the most existing EV charging infrastructure in the state. Considering factors like population size and projected growth, pockets of disadvantaged communities, multi-family dwellings, and number of early EV-adopters, a more expansive

charging network would be beneficial in areas like the southern end of New Castle County starting from Bear/Glasgow approaching Smyrna and zip codes surrounding Wilmington.

Figure 14: Kent County EV Charging Deployment Priority Areas

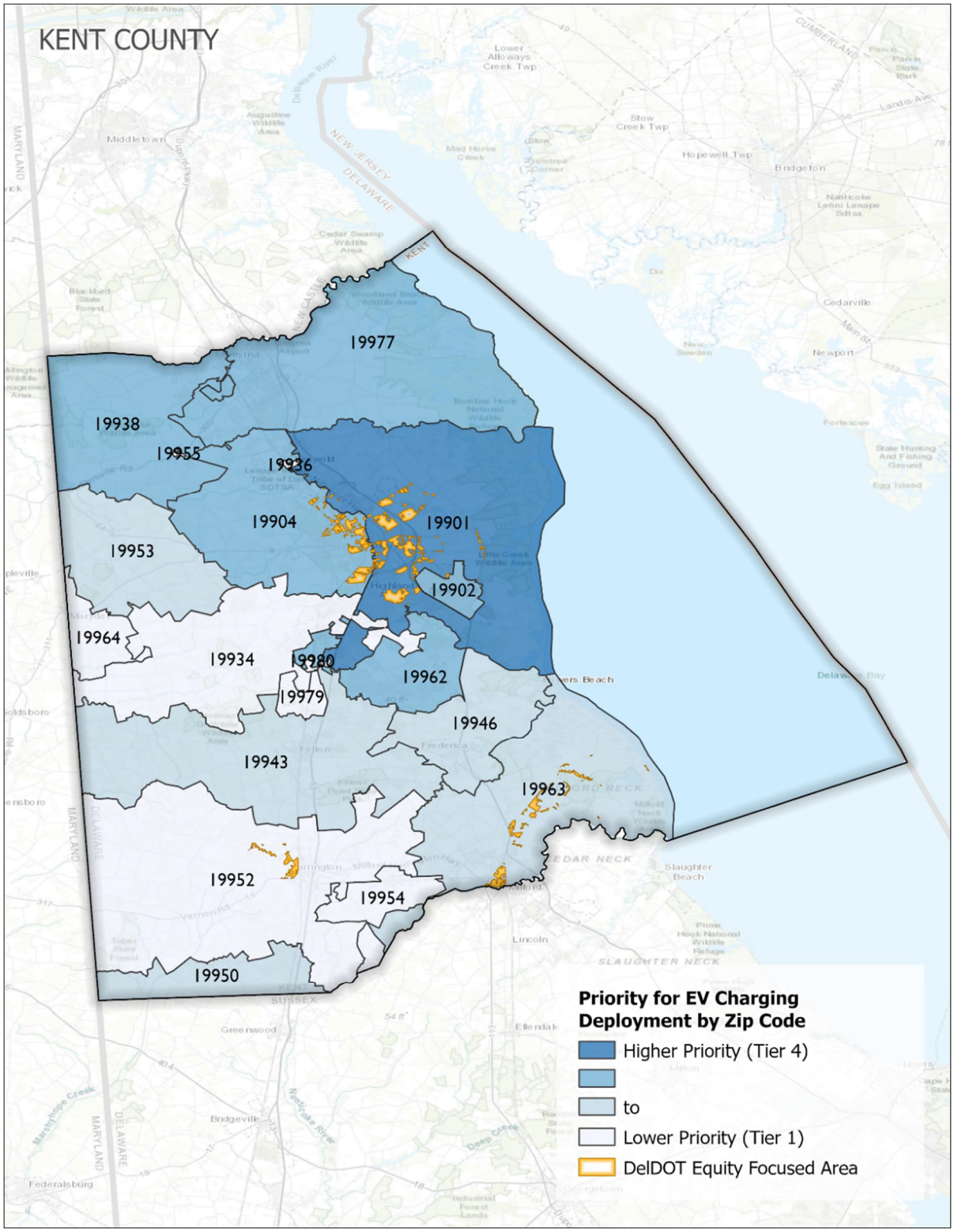
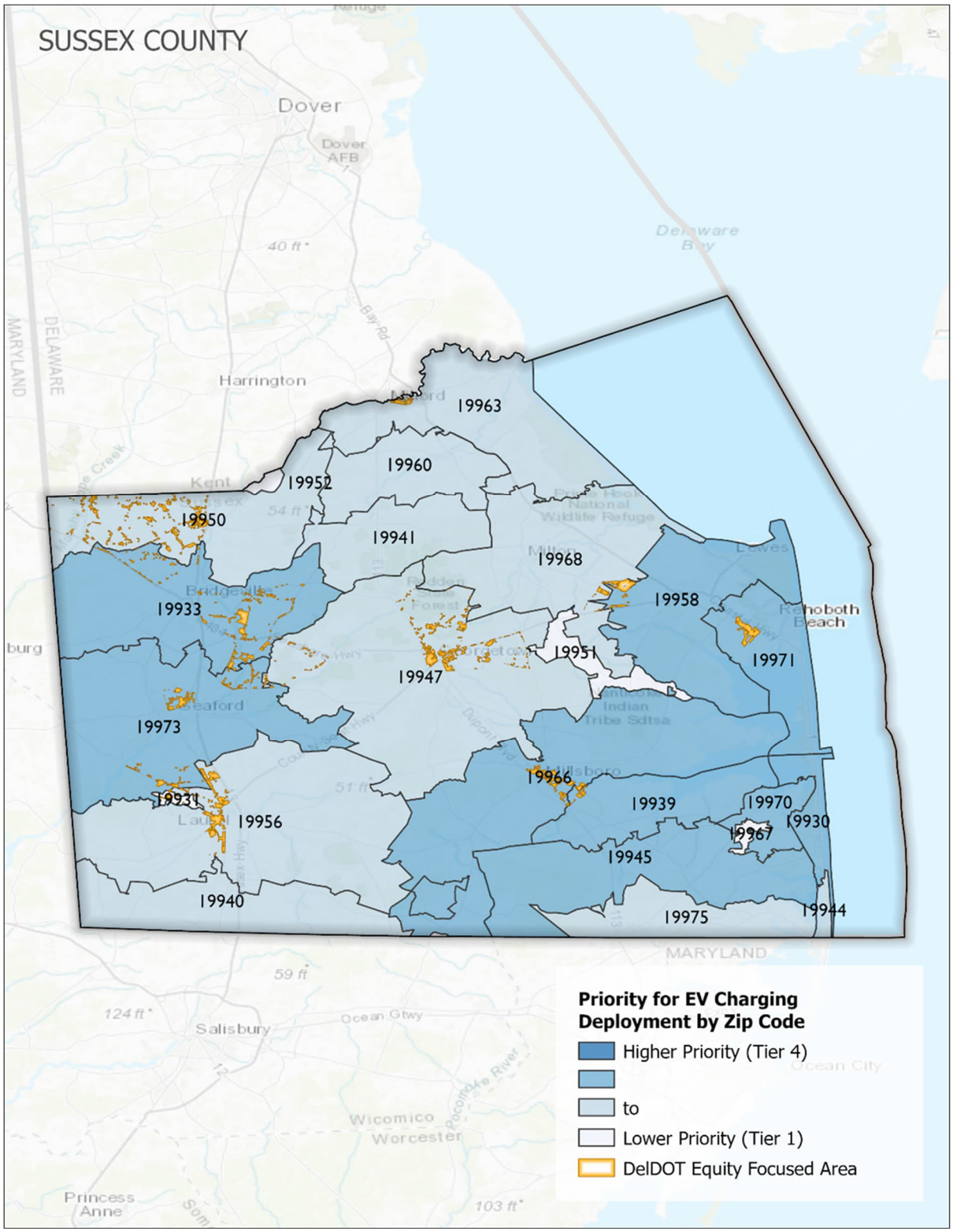


Figure 15: Sussex County EV Charging Deployment Priority Areas



The tool shows that most of the area in Kent and Sussex Counties fall into Tier 2 and 3, with one zip code being categorized into Tier 4 (Figure 14, Figure 15). This is largely due to a lower

population compared to New Castle County and fewer early EV adopters. The only Tier 4 zip code is the geographical east side of Dover, which includes the heavily trafficked DE-1 and US-13 routes. Zip codes in the southeast part of Sussex County received high priority tiers compared to the rest of the County due to seasonal beach traffic. Installing EV charging infrastructure in these zip codes can contribute to the decarbonization of Delaware's tourism sector by offering charging solutions for out-of-state vehicles.

Based on the EV infrastructure needs presented in Table 2, the breakdown of charging ports by tier can be determined as seen in Table 6. This breakdown is intended to support future funding decisions. Consider that funding would only need to cover a portion of the needed infrastructure, as the private sector will continue deployment in sites that have a feasible business case.

Table 6: Total Infrastructure Needs by Tier (2027, 2032)

County	2023		2027		2032	
New Castle	**DCFC**	**L2**	**DCFC**	**L2**	**DCFC**	**L2**
Tier 4	91	104	102	1,529	356	5,334
Tier 3	13	46	18	267	62	930
Tier 2	2	23	2	34	8	117
Tier 1	0	4	0	5	1	17
Kent	**DCFC**	**L2**	**DCFC**	**L2**	**DCFC**	**L2**
Tier 4	13	7	7	110	26	384
Tier 3	3	14	20	300	70	1,046
Tier 2	0	7	6	88	20	306
Tier 1	0	9	8	115	27	402
Sussex	**DCFC**	**L2**	**DCFC**	**L2**	**DCFC**	**L2**
Tier 4	0	0	0	0	0	0
Tier 3	35	73	41	610	142	2,128
Tier 2	19	0	30	451	105	1,573
Tier 1	0	0	1	22	5	77
Grand Total	**176**	**287**	**235**	**3,530**	**821**	**12,313**

6.4 Recommendations

The results of the analysis of this work provide focus areas for charging station implementation which can be leveraged to support budgeting and funding dispersion decisions for EV infrastructure programs in the state. The analysis conducted as a part of this effort ranked areas for charging station implementation and recommendations are presented in this section based on the findings of the analysis.

Short-Term Recommendations (0-3 years)

- Allocate state and federal funds to support priority installations in Tier 3 and 4 zip codes to advance equity and support residents facing the largest barriers to EV adoption. These areas largely include the northern part of the state as well as the lower end of New Castle County, starting from Bear/Glasgow and approaching Smyrna, as well as the southeast part of Sussex County, for its high seasonal tourist traffic. The state will

look to work with local jurisdictions to pursue federal funding opportunities to reduce upfront costs.
- Coordinate with developers to advance EV charging infrastructure installation. Particular sites of interest are public parking lots, tourist destinations, local businesses, workplaces, and multi-family housing sites.

Medium-Term Recommendations (3-5 years)

- Allocate funds to support EV charging infrastructure installation in Tier 2 and 1 areas. Consider innovative policies to drive or streamline installation at local businesses and workplaces.

Long-Term Recommendations (5+ years)

- Re-assess where charging gaps exist in the current network and where state intervention is needed.

7 Existing Funding Sources

EV deployment comes with a high upfront cost, making funding sources vital to the success of these developments. Working to overcome this barrier, policymakers and other stakeholders can explore a variety of funding programs and policies to accelerate transportation electrification. These opportunities might come available through multiple sources, including federal, state, local government agencies and state utilities. As decarbonization is becoming a focus at both the state and federal level, there is a significant amount of funding available now. This section expands upon the available funding sources available to Delaware to aid in infrastructure buildout.

7.1 Federal Funding Sources

Under the National Electric Vehicle Infrastructure Funding Program, Delaware will receive a total of $17.5 million over Fiscal Years 2022-2026 to fund charging infrastructure. Funds will first be utilized for charging along Delaware's designated Alternative Fuel Corridors – I-95, Routes 1, 13, and 113. Once Delaware meets federal requirements for charger deployment along the Alternative Fuel Corridors, remaining funds can be used to incentivize chargers in other priority areas, including those identified in this Strategy. The funding comes from the Bipartisan Infrastructure Law to provide modern and sufficient infrastructure across the United States.

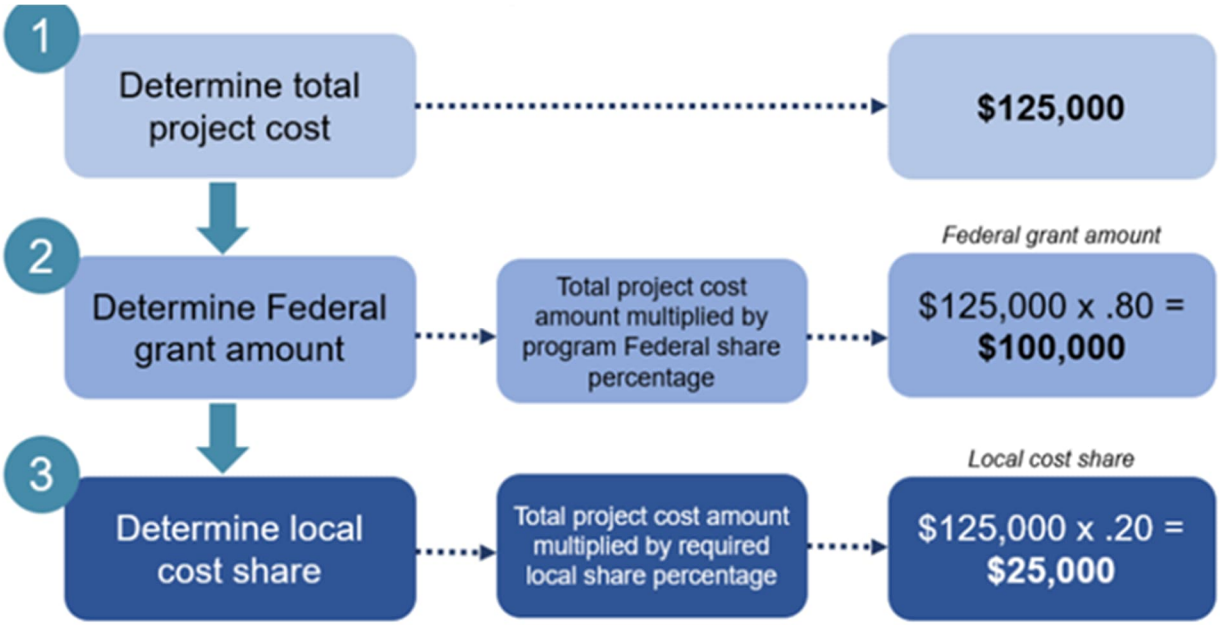
Also under the Bipartisan Infrastructure Law, $2.5 billion in funding was made available under the United States Department of Transportation's (USDOT's) Charging and Fueling Infrastructure Discretionary Grant Program. The Charging and Fueling Infrastructure Grant Program provides funding to strategically deploy publicly accessible electric vehicle charging infrastructure and other alternative fueling infrastructure. This program provides two funding categories of grants:

1. **Corridor Charging:** To deploy electric vehicle charging and hydrogen/propane/natural gas fueling infrastructure along designated alternative fuel corridors.
2. **Community Charging:** To install electric vehicle charging and alternative fuel in locations on public roads, schools, parks, and in publicly accessible parking facilities.

Community Charging grants will prioritize rural areas as well as low-and moderate-income neighborhoods with low ratios of private parking, or high ratios of multi-family dwellings.

Public funding typically requires that USDOT grant programs involve sharing project costs known as non-federal match requirements. Matching funds are typically stated as a percentage of a total project cost. Requirements vary based upon the federal-aid or formula program from which the project receives fundings. Figure 16 displays the matching amount required for a project cost of $125,000 and program federal share percentage of 80%. Some programs allow a reduced match due to the USDOT funding opportunities mission to provide flexibility in cost sharing requirements for rural, tribal, and disadvantaged communities. Likewise, some highway safety and expedited project delivery projects offer a 100% federal match, but not related to the type of community it serves.[23]

Figure 16: Federal Fund Requirement



Federal Tax Credits are another form of federal funds. The Alternative Fuel Vehicle Refueling Property Credit (IRS form 8911) provides tax credit for commercial businesses that install "alternative fuel vehicle refueling properties," such as EV charging stations, and maintain them for no fewer than 5 years. This credit applies retroactively to any expenditures associated with alternative fuel infrastructure starting from 2018.[24]

Table 7: Federal Funding Programs

Program Name	Funding Amount (Nationwide)	Funding Amount (for Delaware)
NEVI Formula Program	$5.0 billion	$17.7 million
CFI Discretionary Grant Program	$2.5 billion	Not applicable Application based

[23] Source: US DOT
[24] Source: LilyPad

Program Name	Funding Amount (Nationwide)	Funding Amount (for Delaware)
Federal Tax Credits	Not applicable	Not applicable Application based

7.2 State Funding Sources

In addition to federal funding sources, as part of Governor Carney's FY 2025 Budget, the Governor is recommending allocating $4.0 million of state funds to expand the electric vehicle infrastructure across the state.

DNREC provides rebate programs to residents and business owners to further vehicle electrification.[25] Under the Clean Vehicle Rebate Program, Delaware businesses and residents qualify for rebates for the purchase of battery EV or plug-in hybrid electric vehicles as part of Delaware's commitment to innovation in the transportation sector, reducing greenhouse gases, and improving Delaware's air quality.

Additionally, DNREC offers rebates to reduce the cost of Level 2 electric vehicle charging stations that can be installed at multi-family dwellings, workplaces, businesses and in other public places.

Charging station rebates are available for public access, fleet and workplace charging. Rebates of up to 60% of the cost of the charging station for commercial projects and up to 80% of the cost of the charging station for government and nonprofit projects are available.

Table 8: Public, Fleet and Workplace Funding Opportunities

Rebate Amount (Max: $2,500 single port/$5,000 dual port)			Limit per Location
	Commercial	Government and Non-profit	10 charging ports (or 5 dual port stations) per location.
Public Access	60%	80%	
Workplace	60%	80%	
Fleet	60%	80%	

Charging station rebates and, for existing locations, installation reimbursement, are available for multi-family projects. Enhanced incentive levels of up to 80% of eligible installation costs are available for projects at existing multi-family dwellings in areas identified as "Priority Areas" — disadvantaged and/or underserved areas where eliminating barriers to electric vehicle deployment is especially important.

[25] Source: DNREC

Table 9: Multi-Family Dwelling Funding Opportunities

Property Type	Charging Station Rebate Amount (Max: $3,500 single port/$7,000 dual port)	Charging Station Installation Reimbursement	Limit per Location
New Multi-Family Dwelling	75% of the cost of the charging station	$0	10 charging ports (or 5 dual port stations)
New Multi-Family Dwelling in Priority Areas	90% of the cost of the charging station	$0	
Existing Multi-Family Dwelling	75% of the cost of the charging station	60% of eligible costs	$50,000 maximum per street address including charging station(s) and installation costs.
Existing Multi-Family Dwelling in Priority Areas	90% of the cost of the charging station	80% of eligible costs	

7.3 Recommendations

When building and executing projects from granted funding, it is best to ensure that the funds are being utilized in the most effective manner. This includes ensuring that statewide outcomes and missions, such as improving accessibility and equity, are being accomplished. Additionally, incorporating the best practices and lessons learned from other projects when using grant funds ensures efficient and effective utilization of funding resources. Best practices include maintaining timeline for achieving milestones, evaluating charging locations and ownership ahead of time (if a third party is involved), engaging various stakeholders along the installation and operation process, and determining equitable access of users mainly located in rural and disadvantaged communities. [26,27,28]

Additionally, as upfront cost is a major barrier to EV adoption, having the state continue to allocate funds for incentive and rebate programs, especially for EV charging stations, will be critical to continue accelerating EV adoption levels. There is an opportunity to encourage collaboration among state organizations to identify where further incentives could be provided for EVs. For example, EV charging stations could be included as part of technologies in an energy efficiency program.

8 Permitting and Building Codes

Strategic modernization of permitting policies and building codes are critical to support effective, safe transportation electrification infrastructure investments that align with community needs. This section details the importance of permitting policies and building codes in deploying EV charging infrastructure and supporting EV adoption. Examples from Delaware jurisdictions are provided as references.

[26] Source: Clean Cities Energy
[27] Source: US DOE, Energy Efficiently & Renewable Energy
[28] Source: Electrification Coalition

8.1 Permitting Policies

Permitting policies and zoning regulations, similar to those in place for any type of development, are also required for charger installations to ensure safety procedures are being upheld and the state is adequately planning for the necessary electrical capacity. In 2021, Volume 83 Chapter 309 151st Generally Assembly, Delaware passed legislation requiring that by July 1, 2023, municipalities with a population of 30,000 or more (Dover, Newark, and Wilmington) must adopt an ordinance that establishes a permitting procedure for the installation of curbside residential EV charging stations. The ordinances must:

- Require EV charging station installation is completed by a licensed electrician;
- Require the written permission of the owner of the property on which the EV charging station will be installed;
- Establish reasonable restrictions on the type of EV charging stations that may be installed;
- Provide that the municipality must approve or deny a permit within 90 days of receipt of a permit application; and
- Provide that an EV charging station may not affect a proposed state right-of-way or easement area without approval by the Department of Transportation.[29]

Recommendations on processes jurisdictions can implement or include in their ordinances to meet these requirements are detailed in Table 10. These recommendations could also be applicable for smaller jurisdictions and applied to permitting procedures for workplace and public EV charger installations, not just residential curbside chargers.

Table 10: Permitting Policy Recommendations

Process / Actions	Description
Provide or reference a database of registered electricians in the state	Providing this information provides applicants information on who is a registered electrician in the state.
Provide a list of approved EV charger types by zoning classification	Providing a catalog or define what charger types are allowed for specific zoning regulations. For example, DCFC are often not permitted in residential zones due to safety concerns and available electric grid infrastructure. On the other hand, outdated zoning ordinances view plug-in electric vehicle chargers in the same light as traditional gas stations, creating limitations on the areas where they can be installed.
Provide education for permit reviews and inspectors	Holding workshops to share lessons learned on permit ordinances and how to properly perform inspections will be critical to effectively implementing EV charger permitting policies, especially for smaller jurisdictions that may lack staffing resources.

[29] Source: Title 22, Chapter 1 – Del. Code

8.2 Building Codes

EV-Ready and EV-Capable building codes ensure safe installation as well as help “future proof” buildings and facilitate electric vehicle adoption. EV-Ready and EV-Capable building codes can help guarantee that every new commercial or residential dwelling has EV charging infrastructure.

“EV-Ready” infrastructure is designed to size electric infrastructure and install conduit for future EV charging stations. Charging stations would simply be placed at the pre-wired location when optimal for the developer. “EV-Ready” infrastructure avoids costly upgrades that would have otherwise been needed from re-trenching and replacing electric infrastructure as EV chargers are added in the future. “EV-Capable” parking spaces prepare the site for the future installation of EV charging stations, though they still require minor retrofitting to make them fully “EV-Ready.”

The state recently passed legislation, Senate Bill 103, requiring new single-family and multi-family dwellings to be EV-capable. The legislation requires a dedicated portion of their parking spaces to be electric vehicle capable spaces. Under this new law, new single-family residences must have at least one electric vehicle capable parking space at either their detached or attached garage. New multi-family residences must install charging infrastructure for 5% of their total parking spaces; 10% of their parking spaces must be EV-capable.[30]

In addition to state legislation, New Castle County passed Ordinance No. 21-116, requiring that all new residential construction be “EV-Capable.” Under this ordinance, 50% of parking spaces at multi-family dwellings must meet this requirement.

Moreover, Delaware is currently in the process of adopting the 2021 International Energy Conservation Code. As an emerging technology, EV charging infrastructure design requirements are not yet accounted for under older building codes. EV charging design requirements are expected to be included in the 2024 International Energy Conservation. Delaware adopts statewide energy codes on a triannual basis and local governments are required to enforce the code. The 2024 IEC will be considered for adoption at the next code adoption cycle.

8.3 Recommendations

Delaware is taking significant steps to advance sustainable infrastructure with the introduction of progressive building codes. The recent amendment of Del. Code Title 16, Chapter 80 stands out as a key milestone, set to play a crucial role in facilitating the widespread deployment of at-home charging solutions for multi-family dwellings throughout the state. This legislative milestone is poised to play a crucial role in facilitating the widespread deployment of at-home charging solutions for multi-family dwellings across the state and lays the foundation for enhanced residential charging accessibility. Through implementation of this amendment, a more extensive and accessible EV charging infrastructure will be deployed to proactively respond to the growing demand for sustainable transportation solutions.

Looking ahead, Delaware's commitment to sustainability suggests the possibility of extending similar charging space requirements to other critical areas. Public buildings and workplaces

[30] Source: Title 16, Chapter 80 – Del. Code

could become focal points for future legislative considerations, echoing the state's dedication to fostering a comprehensive and eco-friendly EV charging network.

9 Public Involvement and Stakeholder Engagement

Public engagement around electric vehicles in Delaware has been ongoing since 2015 under the leadership of DNREC in their Clean Transportation Incentive Program and continued as part of that agency's work on Delaware's Climate Action Plan. A synopsis of public engagement activities for the Clean Transportation Incentive Program and the Climate Action Plan is contained in Delaware's federally required NEVI Plan. [31] These efforts served as a foundation for continued engagement that was conducted to support the Strategy.

Stakeholder and public involvement were key elements of the Strategy development process to ensure that the recommendations established within the Strategy reflect the local priorities and needs in Delaware. As a result of these efforts, the Strategy reflects the input of diverse organizations, communities, and interests.

The objectives for the public involvement and stakeholder engagement efforts were:

- To inform and involve agency representatives, key business interests and other stakeholders in Delaware in the development of the Strategy;
- To provide opportunities for meaningful input and dialogue throughout the Strategy's development process for both stakeholders and the public, focusing on equity;
- To help stakeholders and the public understand the value of electrification of the transportation network to Delaware; and
- To foster positive public relations.

Outreach activities were initiated early in the Strategy development process in the first half of 2022 and will continue through the completion of a draft and final Strategy document. Activities were designed to identify, document and address stakeholder and public comments and feedback, including on the following:

- Vision, outcomes, and objectives;
- EV infrastructure needs in Delaware;
- Recommended policies, strategies and/or programs for EV infrastructure deployment;
- Barriers to electrification; and,
- Proposed or recommended implementation priorities.

Importantly, DelDOT and DNREC commit to and have initiated steps to ensure opportunities for meaningful input and engagement for both stakeholders and the public, and that commitment continues in the next steps taken to implement this plan. As DelDOT and DNREC use federal and state funding and issue grant awards to vendors to create an EV charging network across the state, public involvement and community engagement activities will continue. When

[31] Source: DelDOT

determining where EV charging stations should be located, public involvement will be a key component and engagement with communities, including rural, underserved, and disadvantaged, will occur to ensure that the deployment, installation, operation, and use of EV charging infrastructure can achieve equitable and fair distribution of benefits and services.

9.1 Stakeholder Engagement and Public Involvement Activities

DelDOT and DNREC identified key stakeholders in the state and invited them to join a working group advising the creation of the Strategy. Part of the working group members' role was to also spread the word about the public workshops to their communities and within their organizations, and through public notices and social media. DNREC also invited public individuals who have received rebates for electric vehicles and charging stations. A public workshop was held virtually in the fall of 2022 and additional virtual public workshops held in the winter of 2023. At these virtual public workshops, attendees learned about the Strategy and engaged in its planning process. The public workshop and working group meetings focused on disseminating information regarding the federal NEVI formula funding program for DCFC stations, explaining the current status of EV infrastructure planning and opportunities for growth. Topics also included receiving stakeholder feedback and input on EV charging infrastructure types and locations, equity provisions and the opportunities for small businesses, among others.

The webpage for the Strategy and the federal NEVI formula funding program launched in June 2022: Delaware's Vehicle Electrification Future. To support the public workshops, a virtual public meeting room was created and utilized for hosting the displays for the virtual meetings as shown in Figure 17. Displays are available in English and Spanish. In addition to being convenient for public workshop participants to visit at any time (before, during or after the virtual workshops), the virtual public meeting room aids in collecting public feedback from online surveys/comment forms and hosting public information about both the federal NEVI funding opportunity and the Strategy development: https://aecomviz.com/DelawareEV2022/.

Figure 17: Virtual Public Meeting Room

9.2 Stakeholders Engaged in Strategy Development

In developing the Strategy, DNREC and DelDOT collaborated to invite a diverse group of stakeholders to advise in the creation of the Strategy and to provide input and assistance in the involvement of other stakeholders and the public. This working group first met on June 29, 2022. At this initial meeting, the process to develop the Strategy was explained, and the group was asked to provide comments on a draft vision statement and goals for the plan and other aspects of the proposed planning process, including Delaware's approach for the federal NEVI formula funding program. The second meeting of the Working Group was held on September 14, 2022. The agenda for the meeting encompassed the EV adoption forecast methodology and results, the proposed EV infrastructure (charging) location siting and prioritization methodology and initial results, and an outline of next steps. Working Group meeting presentation material and summaries of the discussions can be found on the webpage for the Strategy: Working Group Meetings.

Following the second Working Group meeting, a focused discussion meeting was held on December 1, 2022, with representatives from electric utility service providers in Delaware seeking feedback on the plan's charging demand analysis and resulting forecasted peak power and energy requirements for each scenario. A follow-up meeting on these same topics to further seek feedback and have a discussion with representatives from electric utility service providers in Delaware was held on January 11, 2023. Additional meetings are planned for the winter of 2024 to share the final Strategy.

Table 11 provides the list of organizations that were invited to participate in the working group for the Strategy.

Table 11: List of Delaware's Infrastructure Plan Working Group Participants

Organization	Organization Type
DNREC, Climate and Sustainability	State Agency
DNREC, Energy Office	State Agency
DelDOT, Transportation Resiliency and Sustainability	State Agency
Delaware Area Rapid Transit	State Agency
Delaware Commute Solutions	State Funded Program
Delaware Electric Vehicle Association	Community Advocacy Organization
WILMAPCO	Metropolitan Planning Organization
Dover/Kent MPO	Metropolitan Planning Organization
Salisbury/Wicomico MPO	Metropolitan Planning Organization
Delaware Electric Cooperative	Electric Utility
Exelon/Delmarva Power	Electric Utility
League of Local Governments	County and Municipal Governments
DEMEC	Electric Utility
Delaware Chamber of Commerce	Business Organization
Office of State Planning Coordination	State Agency
Metropolitan Wilmington Urban League	Community Organization

Organization	Organization Type
Delaware Hispanic Commission	Community Organization
La Esperanza	Community Organization
First State Community Action Agency	Community Organization
Latin American Community Center	Community Organization
League of Women Voters	Environmental Justice, Transportation Advocacy
Interfaith Power and Light	Religious Community Organization
Healthy Communities Delaware	Community Organization
Boys and Girls Club of Delaware	Community Organization
Route 9 Coalition	Environmental Justice, Transportation Advocacy
NAACP Delaware	Environmental Justice Advocacy
Delaware Concerned Residents for Environmental Justice	Environmental Justice Advocacy

9.3 Public Meetings and Feedback Received

A central element of public involvement activities was the convening of public meetings. The first public meeting was held virtually on two different dates: on October 24, 2022 and on November 14, 2022. The virtual meetings were held on the Zoom platform in the evenings with two one-hour presentation sessions offered each day: one at 5:00 pm and the other at 6:00 pm. Each session was identical in content and provided the plan's team members an opportunity to present slides about the plan's development process as well as provided time for a 30-minute portion devoted to questions and answers by the public or for public comment. The material presented at the meeting is available at: Meeting Slides. In addition to the public meeting slides available, the website also provides a link to DelDOT's YouTube channel where the video recording of the Zoom meeting as it occurred live is also available for viewing.

Additionally, an online comment form/survey form in both Spanish and English was available (and remains available) on the plan's website. The virtual public meeting room, with public display content available in both Spanish and English, as well as the online comment form/survey form in both Spanish and English, supported the public meeting content. The virtual public meeting room continues to support public engagement in the planning process at https://aecomviz.com/DelawareEV2022/.

Approximately 120 people attended the October 24, 2022, virtual public meeting held on Zoom as attendees while about 40 people attended the November 14, 2022, virtual meeting.

The virtual public meeting held in October and November 2022 focused on presenting and seeking feedback on the draft vision statement and goals for the plan as well as on the methodology for prioritizing EV charging infrastructure. Feedback could be provided at any time during the virtual meeting using the virtual meeting's Question and Answer function. Participants could also use the online comment form/survey form. At the current time, 47 responses for the English survey have been received with no responses to the Spanish survey. Most respondents agreed with or supported the draft vision statement and outcomes. In terms of feedback on prioritizing EV charging infrastructure criteria in the state, the public indicated that the highest priority should be given to transportation network considerations, followed by equity

considerations. Early EV adopter criteria and land use criteria were both tied for the third priority.

10 Conclusion

CHARGING FORWARD: Delaware's Strategy for Electric Vehicle Charging Infrastructure (2024) identifies focus areas for charging infrastructure throughout the state to plan and execute for an efficient transition to an electrified transportation future. Leveraging the modeling findings presented in the Strategy, the state understands the number of EV charging ports needed to support future EV adoption scenarios and which zip codes in the state should be prioritized for public funds. This information can assist with developing future programs to spur near-term EV adoption, further incentivizing private sector investment, and drive the state to a decarbonized transportation sector. With this information, DelDOT and DNREC can work together with key stakeholders to secure funding to deploy infrastructure in prioritized areas and monitor progress towards achieving the state’s EV adoption goals. The Strategy also provides information and recommendations on complementary incentives, programs, policies, and charging demand management initiatives that can be pursued in parallel to further accelerate and optimize EV charging station deployment in Delaware.

11 Appendices

Table 12 lists the charging infrastructure and EV adoption targets to reach the Advanced Clean Cars II forecast described in Section 4. Zip code forecasted amounts are assumed to be proportionate to the number of registered vehicles to develop this table.

Table 12: Zip Code EV Adoption and EV Infrastructure

Zip	City	County Name	Tier	2027 EVs	2027 L2	2027 DCFC	2032 EVs	2032 L2	2032 DCFC
19701	New Castle	Bear	4	2486	149	10	8673	520	35
19702	New Castle	Newark	4	2966	178	12	10347	621	41
19703	New Castle	Claymont	4	770	46	3	2686	161	11
19706	New Castle	Delaware City	3	116	7	0	404	24	2
19707	New Castle	Hockessin	4	1016	61	4	3544	213	14
19709	New Castle	Middletown	4	3074	184	12	10722	643	43
19710	New Castle	Montchanin	1	10	1	0	36	2	0
19711	New Castle	Newark	3	2576	155	10	8986	539	36
19713	New Castle	Newark	3	1752	105	7	6112	367	24
19716	New Castle	Newark	1	24	1	0	82	5	0
19717	New Castle	Newark	1	2	0	0	6	0	0
19720	New Castle	New Castle	4	3509	211	14	12239	734	49
19730	New Castle	Odessa	2	32	2	0	113	7	0
19731	New Castle	Port Penn	2	15	1	0	51	3	0
19732	New Castle	Rockland	2	13	1	0	46	3	0
19733	New Castle	Saint Georges	1	26	2	0	89	5	0
19734	New Castle	Townsend	4	897	54	4	3128	188	13
19735	New Castle	Winterthur	1	4	0	0	13	1	0
19736	New Castle	Yorklyn	1	15	1	0	54	3	0
19801	New Castle	Wilmington	4	631	38	3	2201	132	9
19802	New Castle	Wilmington	4	997	60	4	3476	209	14
19803	New Castle	Wilmington	4	1251	75	5	4362	262	17

Zip	City	County Name	Tier	2027 EVs	2027 L2	2027 DCFC	2032 EVs	2032 L2	2032 DCFC
19804	New Castle	Wilmington	4	1159	70	5	4044	243	16
19805	New Castle	Wilmington	4	1764	106	7	6153	369	25
19806	New Castle	Wilmington	2	499	30	2	1739	104	7
19807	New Castle	Wilmington	4	525	31	2	1829	110	7
19808	New Castle	Wilmington	4	2259	136	9	7878	473	32
19809	New Castle	Wilmington	4	769	46	3	2681	161	11
19810	New Castle	Wilmington	4	1417	85	6	4944	297	20
19901	Kent	Dover	4	1833	110	7	6392	384	26
19902	Kent	Dover AFB	3	24	1	0	82	5	0
19904	Kent	Dover	3	1955	117	8	6819	409	27
19930	Sussex	Bethany Beach	3	230	14	1	802	48	3
19931	Sussex	Bethel	1	22	1	0	77	5	0
19933	Sussex	Bridgeville	3	735	44	3	2564	154	10
19934	Kent	Camden Wyoming	1	896	54	4	3126	188	13
19936	Kent	Cheswold	1	20	1	0	69	4	0
19938	Kent	Clayton	3	657	39	3	2293	138	9
19939	Sussex	Dagsboro	3	573	34	2	2000	120	8
19940	Sussex	Delmar	2	471	28	2	1642	99	7
19941	Sussex	Ellendale	2	207	12	1	723	43	3
19943	Kent	Felton	2	883	53	4	3079	185	12
19944	Sussex	Fenwick Island	2	49	3	0	172	10	1
19945	Sussex	Frankford	3	704	42	3	2456	147	10
19946	Kent	Frederica	2	295	18	1	1030	62	4
19947	Sussex	Georgetown	2	1341	80	5	4676	281	19
19950	Sussex	Greenwood	2	538	32	2	1876	113	8
19951	Sussex	Harbeson	1	182	11	1	635	38	3
19952	Kent	Harrington	1	712	43	3	2482	149	10

Zip	City	County Name	Tier	2027 EVs	2027 L2	2027 DCFC	2032 EVs	2032 L2	2032 DCFC
19953	Kent	Hartly	2	283	17	1	987	59	4
19954	Kent	Houston	1	116	7	0	406	24	2
19955	Kent	Kenton	1	21	1	0	73	4	0
19956	Sussex	Laurel	2	1132	68	5	3948	237	16
19958	Sussex	Lewes	3	2150	129	9	7500	450	30
19960	Sussex	Lincoln	2	492	30	2	1717	103	7
19962	Kent	Magnolia	3	790	47	3	2757	165	11
19963	Sussex	Milford	2	1404	84	6	4896	294	20
19964	Kent	Marydel	1	91	5	0	319	19	1
19966	Sussex	Millsboro	3	2308	138	9	8049	483	32
19967	Sussex	Millville	1	162	10	1	566	34	2
19968	Sussex	Milton	2	1063	64	4	3709	223	15
19970	Sussex	Ocean View	3	670	40	3	2338	140	9
19971	Sussex	Rehoboth Beach	3	1109	67	4	3868	232	15
19973	Sussex	Seaford	3	1689	101	7	5891	353	24
19975	Sussex	Selbyville	2	819	49	3	2858	171	11
19977	Kent	Smyrna	3	1570	94	6	5474	328	22
19979	Kent	Viola	1	53	3	0	184	11	1
19980	Kent	Woodside	1	13	1	0	44	3	0

Figure 18: Existing Public Level 2 Chargers in Delaware

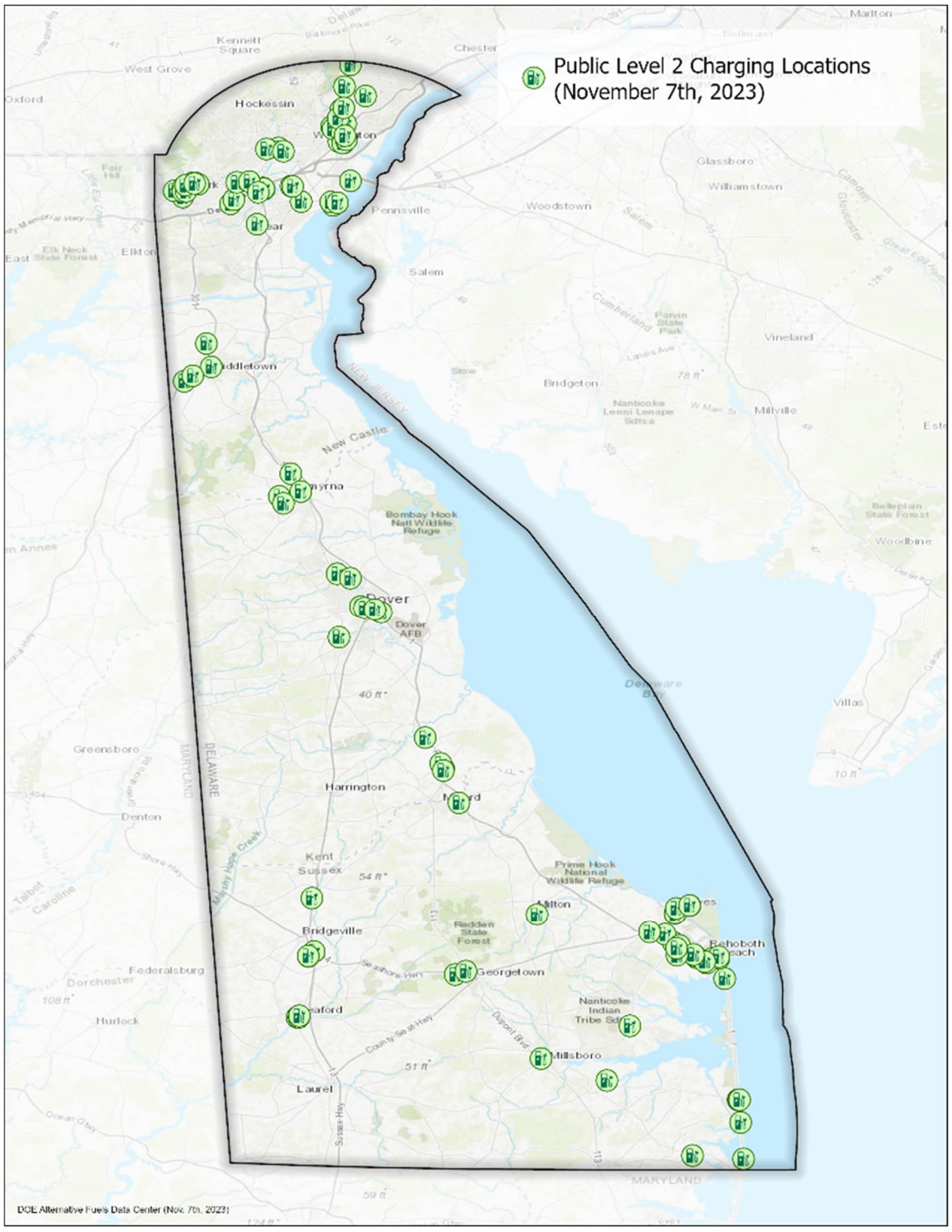


Figure 19: Existing Public DCFC Chargers in Delaware