



## Montclair Township



## Alternative Fuel Vehicle

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# Readiness Plan

December 2017

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## Disclaimer

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## Acknowledgments

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## Executive Summary

### Plan Overview

This Montclair Township Alternative Fuel Vehicle (AFV) Readiness Plan outlines actions that the township can take to reduce and resolve barriers to AFV usage. It includes 28 recommendations across five action areas for community leaders and other stakeholders interested in expanding the use of plug-in electric vehicles (PEVs) and natural gas vehicles (NGVs).

The North Jersey region, including Montclair Township in Essex County, stands to benefit from AFVs, specifically through reduced fuel costs, savings on maintenance, use of advanced technology, support of domestic industries, and promotion of environmental sustainability. The objective of readiness planning is to identify, prioritize, and implement strategies that unlock the potential for vehicle electrification and NGV deployment. If done thoroughly and thoughtfully, AFV readiness planning will set the course for municipalities to effectively accelerate the shift away from reliance on conventional vehicles to AFVs, both in the consumer and fleet markets.

The NJTPA project team, working closely with a stakeholder advisory committee (SAC) made up of municipal decision-makers, residents, and industry representatives, developed the Montclair Township Alternative Fuel Vehicle Readiness Plan. The readiness planning process includes data collection and analysis around the current and future market, barriers to increased adoption, regulatory framework, and existing and planned incentives and funding. The resulting recommendations focus on general plans and policies, zoning and parking codes, permitting and inspection, building codes, and fleet planning.

This study was conducted in keeping with the policies of Plan 2045: Connecting North Jersey to improve mobility, protect the environment, and take advantage of technology developments

### Plug-in Electric Vehicle Readiness

As of July 2017, PEVs made up approximately 0.5 percent of all vehicles registered in the township. That is approximately 140 PEVs. Given the consumer focus, the opportunity for PEVs is closely linked to several socio-economic factors, including income, hybrid electric vehicle (HEV) ownership, home ownership, and housing type. While barriers to usage exist, the number of PEVs traveling in and around Montclair Township will continue to increase. Additional charging infrastructure will be needed to support this growing number of PEVs (see box).

Regulations, policies, and incentives at the municipal, state, and federal levels can play a role in facilitating PEV usage. The project team analyzed existing plans, codes, ordinances, and incentives to inform the recommendations below.

The project team organized both the charging demand analyses and readiness planning recommendations according to the charging infrastructure needs identified for Montclair Township:

- **Residential:** In general, Montclair ranks relatively high with regard to residential charging demand. The demographics associated with households in Upper Montclair, in particular, align very well with key PEV ownership indicators.
- **Multi-Unit Dwelling (MUD):** Focusing on residential buildings with 10 or more units, the greatest estimated demand for MUD charging correlates with the central neighborhoods where the majority of apartment and other multi-unit buildings are located.
- **Workplace:** Workplace charging demand is estimated to be highest in two distinct areas: within the commercial district along Bloomfield Avenue, and in the portions of Upper Montclair closest to Montclair State University.
- **Public:** The commercial districts around the Bay Street transit station and along Bloomfield Avenue ranked high and medium/high, respectively for public charging

## Natural Gas Vehicle Readiness

Given that NGVs are typically medium- and heavy-duty vehicles, both market penetration and opportunities for municipal NGV readiness planning is more limited than for PEVs. Montclair Township has experience with NGVs in the municipal fleet, and owns and operates one private compressed natural gas (CNG) station, which is located at the Department of Community Services Yard on North Fullerton Avenue. The NGV market outlook in Montclair is tied to both national (e.g., price differential) and local (e.g., resource constraints) barriers.

## Recommendations

The plan's recommendations correlate with goals set by the SAC, as well as the demand analysis, existing municipal plans and policies, and incentives. The recommendations are organized by the type of infrastructure demand (general, residential, MUD, workplace, and public). In addition, for each recommendation, a lead organization or stakeholder is identified. The time horizon for the actions is 10 years, with actions that may be ongoing, as well as those to be implemented in the near-term (1-2 years), medium-term (3-5 years), and long-term (6-10 years). Below is a summary of the recommendations for Montclair Township:

- **General Plans & Policies:** The township has two long-range plans that consider transportation. In addition to the Montclair Township Unified Land Use and Circulation Element, the proposed Sustainability Element to Master Plan is expected to include an AFV component. Also, recent redevelopment plans for discreet areas of the Township include requirements for accommodating PEVs. This readiness plan includes the following recommendations to further incorporate AFV preparedness into local plans and policies:

- Integrate AFV readiness into local planning efforts, including **general plans** and **climate action plans**
- Create **cross-jurisdictional opportunities** for sharing lessons learned
- Update the **PEV infrastructure demand analysis**
- Establish **design criteria** for AFV infrastructure
- Collaborate with **utilities** to share market information and facilitate necessary electricity distribution infrastructure upgrades
- Conduct **community education and outreach** to increase awareness about the benefits of AFVs and the role they can play in decreasing transportation costs and achieving environmental goals.
- Conduct **targeted outreach** to MUD managers, developers, employers, and other landowners to install chargers at high-priority locations.
- Collaborate with MUDs to create and implement policies that **allow residents to install** PEV charging infrastructure
- Identify **AFV grants and other funding opportunities** for workplace and public charging infrastructure development
- Pursue **public-private partnerships** to fund publicly accessible charger installations
- **Zoning & Parking Codes:** Montclair’s zoning code does not address PEV charging infrastructure. Yet, it does require more detailed site design review for all parking lots, decks, and garages. This gives the zoning authority the opportunity to examine any planned developments for inclusion of PEV parking spaces and charging stations. The township has several parking ordinances and codes that reference PEVs. Collaboration is ongoing with the Montclair Parking Utility to ensure adequate charging spaces for PEVs in the township. This readiness plan includes the following recommendations for zoning and parking codes:
  - Amend zoning codes to **require or incentivize PEV charging stations or pre-wiring** in new MUD and commercial developments
  - Establish **preferential parking policies** for PEVs, **amend parking codes** to regulate the use of PEV charging spaces, and allow PEV parking to **count towards minimum requirements** for developers
- **Permitting & Inspection:** Municipalities are responsible for administering and enforcing New Jersey codes through the state-mandated permitting and inspection processes. The New Jersey Department of Community Affairs (NJDOCA) has been working to streamline the installation of PEV charging stations, including developing guidance on when construction permits and inspections are required and expediting the permitting process. Montclair Township has not yet developed processes for administering building codes or electrical subcodes specific to the installation of PEV charging infrastructure. The plan includes the following recommendations for permitting and inspection:

- **Streamline and expedite** approval processes
  - **Educate** permitting officials, inspection officials, and first responders in AFV station basics
  - Produce **guidance documents outlining permitting requirements** for residential and commercial PEV charging station installations
- **Building Codes:** The NJDCA establishes and enforces statewide building codes — referred to as the Uniform Construction Code (UCC). Municipalities like Montclair Township are limited to the statewide UCC, and are therefore not in a position to take a more progressive approach to building codes as they are related to PEVs or other issues. To that end, the plan includes only one recommendation for building codes:
  - **Work with the state to amend the building code** to require PEV station readiness in new single-family developments
- **Fleet Planning:** While often overshadowed by the consumer focus for PEVs, fleet planning is important to AFV readiness, particularly for NGVs. The plan includes the following recommendations related to fleet planning:
  - Assess **the existing municipal fleet**, develop a **fleet management plan**, and **explore opportunities** for fleet AFVs
  - Provide **technical assistance, training, and educational resources** to local fleet managers regarding AFV and infrastructure deployment

## Conclusions and Next Steps

By following the recommendations outlined here, Montclair Township will be well-equipped to support AFV use within the municipality, thereby reducing fossil fuel use, supporting a healthy environment, increasing economic development, attracting residents and businesses, and demonstrating leadership.

This is a comprehensive plan, but it only provides a snapshot in time. AFV readiness planning is an iterative and ongoing process. The alternative fuel industry is dynamic and this plan should be a “living” document that Montclair Township revisits and updates as goals are achieved, new challenges arise, or circumstances change. In order to accomplish this, Montclair Township should continue to engage stakeholders and solicit feedback on areas that may need additional attention.

There are numerous technical assistance resources available to provide Montclair Township with ongoing support and direction, including the NJTPA and other organizations. The NJTPA project team also developed an AFV readiness guidebook to assist Montclair and other municipalities with future planning efforts.



## Introduction to Alternative Fuel Vehicle Readiness Planning

With the increased availability of and attention paid to AFVs in recent years, the NJTPA is supporting local and regional efforts to deploy these vehicles and related infrastructure for both the consumer and fleet markets. This report focuses on municipal readiness planning in Montclair Township in Essex County, New Jersey.

Municipalities can benefit from AFVs, particularly PEVs and NGVs. Benefits include reduced fuel costs for consumers, savings on maintenance, supporting domestic industries, and promoting environmental sustainability. The objective of readiness planning is to identify, prioritize, and implement strategies that unlock the potential of transportation electrification and NGV deployment. More specifically, AFV readiness planning lays out the path to make municipalities “AFV ready” by identifying the barriers to widespread deployment of infrastructure and vehicles, and outlining actions that will reduce and resolve these barriers. This plan also includes recommended actions community leaders and other stakeholders can take to help expand the use of PEVs and NGVs.

The value of AFV readiness planning is highlighted by work from the U.S. Department of Energy (DOE) and the International Council on Clean Transportation (ICCT). Researchers at DOE national laboratories demonstrated a correlation between higher PEV deployments and readiness planning, even after factoring in cold weather and incentive availability.<sup>1</sup> Meanwhile, the ICCT assessed actions taken at the municipal level and concluded that there is quantitative support for the “ecosystem approach” as a best practice, where many stakeholders (including local municipalities) have key roles in enabling PEV growth; and that “cities are focal points for collaboration among governments, the auto industry, utilities, and advocates on electric vehicles.”<sup>2</sup>

Most readiness planning to date has been focused at the regional or state level. For instance, DOE awarded 16 projects in 2011, referred to as the Clean Cities Community Readiness and Planning for Plug-in Electric Vehicles and Charging Infrastructure,<sup>3</sup> at the multi-state, state, regional, and metropolitan levels. This plan takes readiness planning to the municipal level, in an effort to accelerate the shift away from reliance on conventional vehicles to AFVs. This plan focuses on PEVs and NGVs. Both plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs) make up the broader PEV category.

To the extent practicable, this plan considers the unique attributes that influence AFV adoption in Montclair, providing customized insights and recommendations. This plan can help decision-makers in Montclair identify and prioritize the most effective ways to catalyze AFV deployment.

This effort was sponsored by the NJTPA, the Metropolitan Planning Organization (MPO) for the 13 counties of northern and central New Jersey. Working with local stakeholders and drawing on national examples, three readiness plans were developed to understand existing conditions and recommend

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<sup>1</sup> DJ Santini, Electric Drive Technology Market Trends, 2015 Clean Cities Strategy,

[http://www.eere.energy.gov/cleancities/pdfs/2015\\_strategic\\_planning\\_presentation\\_electric\\_drive.pdf](http://www.eere.energy.gov/cleancities/pdfs/2015_strategic_planning_presentation_electric_drive.pdf)

<sup>2</sup> ICCT White Paper, Assessment of leading electric vehicle promotion activities in United States cities, 2015,

[http://theicct.org/sites/default/files/publications/ICCT\\_EV-promotion-US-cities\\_20150729.pdf](http://theicct.org/sites/default/files/publications/ICCT_EV-promotion-US-cities_20150729.pdf)

<sup>3</sup> More information about these projects is available online at <https://cleancities.energy.gov/partnerships/projects#electric-vehicle-projects>.

implementation strategies related to AFV readiness. The other plans were developed for the Town of Secaucus and Woodbridge Township.

### Relevant Regional Planning Efforts

The NJTPA has been involved in developing and implementing two related northern New Jersey plans that provide long-term, regional context to the development of local readiness plans for AFV infrastructure.

#### Together North Jersey Plan

The Together North Jersey (TNJ) Regional Plan for Sustainable Development, completed in 2015, is the result of three years of planning activities by a coalition of diverse partners. The Plan provides detailed strategies and specific actions, serving as a technical guide for implementation.

The TNJ plan has 15 focus areas, including *Focus Area 11: Transition to a clean energy economy*. Within Focus Area 11, there are four strategies, one of which is *Strategy 11.4: Reduce transportation petroleum use*, which in turn recommends actions in two categories: *travel optimization* and *advanced vehicles* actions. The advanced vehicles actions involve regional and local governments “...working with state officials and the private sector to speed the adoption of new vehicle technologies, especially electric, hybrid and other alternative fuel vehicles by implementing incentive programs, investments and other measures to encourage the purchase and use of these vehicles by individuals and fleet owners and significantly expanding the number public and private electric vehicle charging stations and alternative fuel vehicle refueling stations available in our region and statewide.”

There are nearly a dozen AFV related actions recommended. Of these, two are related directly to the development of AFV infrastructure and local readiness plans: (1) “Incentivize and support municipalities to develop and adopt alternative fuel readiness plans... Implement a variety of programs that encourage development of public charging infrastructure for electric vehicles across the region, with particular focus on the involvement of municipal governments...”; and (2) “Incentivize, support, and promote the development of private EV charging infrastructure at commercial (for employees or visitors), and residential properties...” The TNJ plan outlines several steps to implement these actions.

Source: [togethernorthjersey.com](http://togethernorthjersey.com)

#### Plan 2045

*Plan 2045: Connecting North Jersey* is the NJTPA’s Regional Transportation Plan for northern New Jersey. The plan considers how AFVs, as well as other “game changing” technologies will shape transportation while offering a long-term vision to support the region’s economy and quality of life. Developed with extensive public and stakeholder input, the plan addresses infrastructure and transportation needs that ultimately will shape a positive, productive future for North Jersey.

Source: <https://apps.nitpa.org/plan2045>

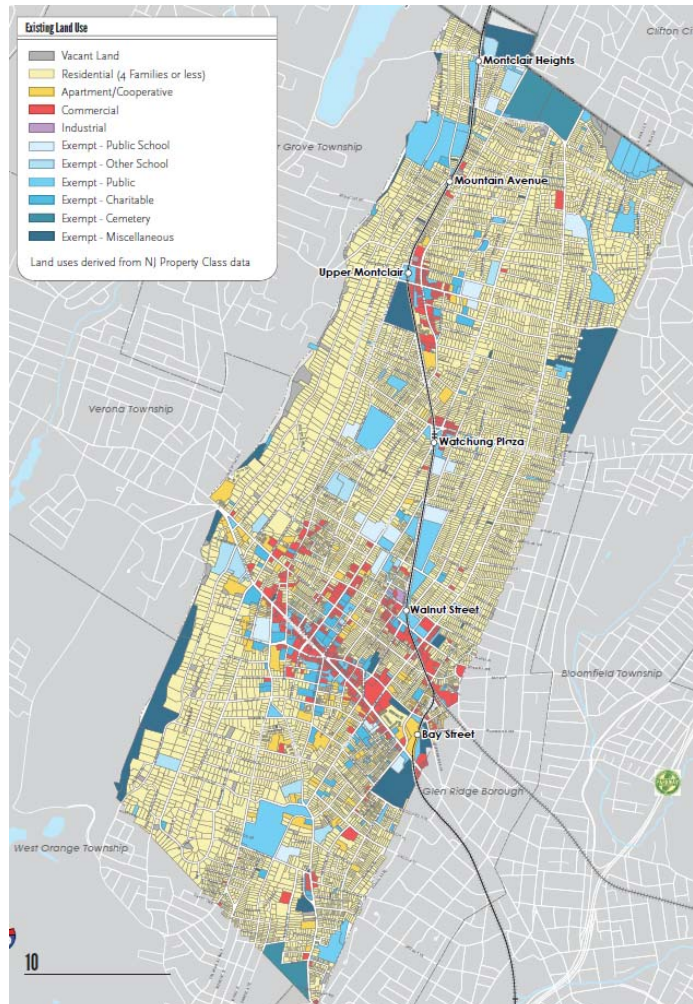
## Montclair Township

Located in Essex County, one of the 13 counties in the NJTPA region (see [Appendix G](#)), Montclair Township is home to more than 38,000 residents and spans 6.3 square miles (see Figure 1).<sup>4</sup> Montclair is primarily a residential community with vibrant business districts and convenient commuter transit options.

The township includes several unofficial neighborhoods that are loosely based on transit stops and commercial areas: Montclair Heights, Upper Montclair, Watchung Plaza, Walnut Street/Montclair Center, Bay Street/Bloomfield Avenue, and South End District. Upper Montclair is comprised of all of Montclair north of Watchung Avenue and is its own Census Designated Place (CDP).

Approximately 75 percent of the land area in Montclair Township is residential, 15 percent is other uses such as civic and open space and just over 10 percent is commercial. Single-family houses make up 48 percent of the housing stock. While diverse in ethnicities and income levels, Montclair's population is considered to be among the higher income and education levels in New Jersey.

There are more than 15,000 housing units within the township, 57 percent of which are owner-occupied. About half of the housing units are single-unit structures and the other half are multi-unit.<sup>5</sup> The average commute time for Montclair residents is 36.6 minutes. The majority (62 percent) of commuters report driving to work and a quarter take public transit.<sup>6</sup> The rate of car ownership has increased over the past 10 years in the township and there are more cars per household today.



**Figure 1. Map of Montclair Township with Existing Land Uses**

<sup>4</sup> U.S. Census Bureau (2011-2015), Total Population American Community Survey 5-year estimates, [https://censusreporter.org/data/table/?table=B01003&geo\\_ids=06000US3401347500&primary\\_geo\\_id=06000US340134750](https://censusreporter.org/data/table/?table=B01003&geo_ids=06000US3401347500&primary_geo_id=06000US340134750). Accessed April 10, 2017.

<sup>5</sup> U.S. Census Bureau (2011-2015), Units in Structure American Community Survey 5-year estimates, [https://censusreporter.org/data/table/?table=B25024&primary\\_geo\\_id=06000US3401347500&geo\\_ids=06000US3401347500,05000US34013,04000US34,01000US](https://censusreporter.org/data/table/?table=B25024&primary_geo_id=06000US3401347500&geo_ids=06000US3401347500,05000US34013,04000US34,01000US). Accessed April 10, 2017.

<sup>6</sup> U.S. Census Bureau (2011-2015), Means of Transportation to Work American Community Survey 5-year estimates, [https://censusreporter.org/data/table/?table=B08006&primary\\_geo\\_id=06000US3401347500&geo\\_ids=06000US3401347500,05000US34013,04000US34,01000US](https://censusreporter.org/data/table/?table=B08006&primary_geo_id=06000US3401347500&geo_ids=06000US3401347500,05000US34013,04000US34,01000US). Accessed April 10, 2017.

A key component of Montclair's 2015 Unified Land Use and Circulation Plan is to concentrate new mixed-use development in areas served by public transportation in the form of transit-oriented development, thereby preserving existing residential neighborhoods.<sup>7</sup> The township is using redevelopment as a tool for revitalization and rehabilitation in many areas of Montclair. The objective of redevelopment is to allow for a flexible mix of commercial, retail, office, and residential use.

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<sup>7</sup> Montclair Township, *2016 Master Plan Reexamination Report*, <http://www.montclairnjusa.org/dmdocuments/Draft-Master-Plan-Reexam-2016.pdf>.

## Alternative Fuel Vehicle Readiness Planning Goals

The project team and Montclair staff met throughout the course of the project. Municipal officials were key members of the stakeholder advisory committee (SAC), which also included representatives from the Montclair Parking Utility, Planning Board, Environmental Commission, Township Council, Montclair Center Business Improvement District, local businesses, Essex County, and EZ Ride Transportation Management Association (TMA). SAC members provided valuable background data and critical review throughout the project. SAC meetings helped to articulate Montclair's vision for AFV readiness, to provide sufficient background material to stakeholders, and to gather input about the challenges, barriers, and opportunities related to AFV readiness. Montclair considered stakeholder input and community priorities in developing the following goals:

- Facilitate increased public access to AFV infrastructure, as well as a balance of home, workplace, and public charging in Montclair.
- Encourage businesses to collaborate on providing infrastructure in commercial districts.
- Educate local officials and municipal staff to help inform the departmental purchasing process.
- Promote a positive mindset for AFV use and supporting infrastructure.
- Establish a benchmark for progress so the township can assess how AFV goals are being met.

## Structure of the Readiness Plan

The Montclair Township readiness plan is structured as follows:

[Section 1. Plug-In Electric Vehicles and Charging Infrastructure](#): This section begins with an overview of the PEV market today, including the type and number of PEVs registered in Montclair Township; the location, quantity, and level of available charging infrastructure; a market outlook; a review of barriers to increased PEV adoption; a review of the regulatory framework in Montclair and the region that impacts PEVs and charging infrastructure deployment; and a review of the incentives available.

[Section 2. Natural Gas Vehicles and Fueling Infrastructure](#): This section provides an overview of the status of NGVs and natural gas fueling infrastructure in Montclair, a discussion of barriers to increased NGV adoption, and a natural gas market outlook.

[Section 3. Recommendations and Steps to Implementation](#): This section lays out the roadmap and recommended actions to achieve the township's AFV readiness goals. Recommendations are presented in a way that aligns with the types of infrastructure demand. Each recommendation references an entity or entities best suited to take responsibility for leading actions.

[Appendix A. Acronyms](#): This appendix lists the acronyms used in this document.

[Appendix B. Plug-in Electric Vehicle Forecasting Methodology](#): This appendix describes the methodology and assumptions used for the PEV forecasts presented in the plan.

[Appendix C. Charging Infrastructure Demand Forecasting Methodology](#): This appendix describes the methodology and assumptions used for the charging infrastructure siting analysis presented in the plan.

[Appendix D. Municipal Policy Examples](#): This appendix includes additional detail on policy examples mentioned in this plan.

[Appendix E. Plug-in Electric Vehicle Community Readiness Resources](#): This appendix is adapted from a compilation developed by the DOE and links to relevant documents, websites, case studies, and other resources.

[Appendix F. Additional Information on Parking](#): This appendix includes municipality-specific parking information beyond the scope of the main discussion.

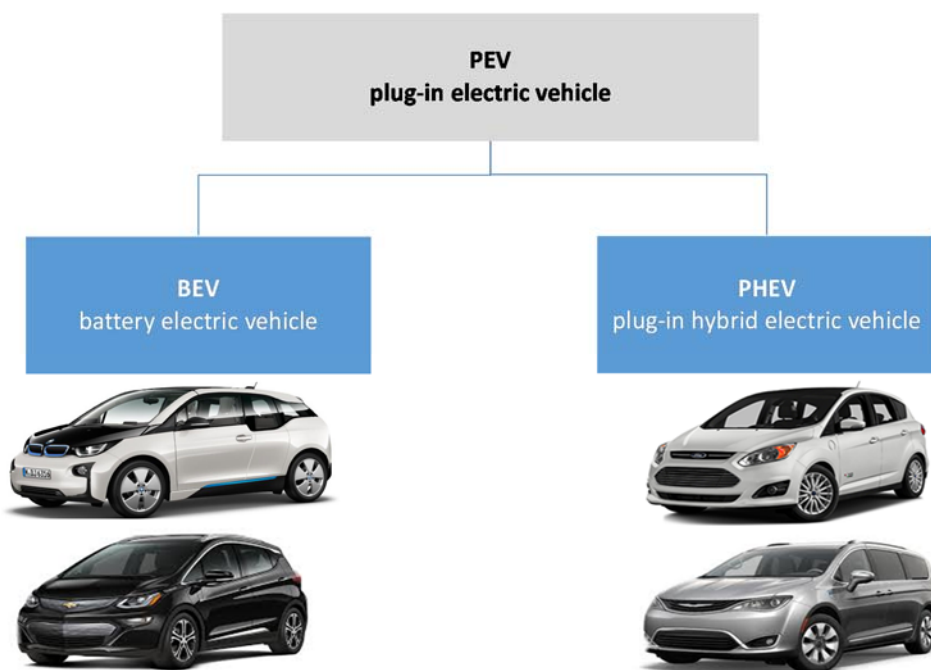
[Appendix G. Regional Planning Area](#): This appendix provides a description of the NJTPA region.

# 1 Plug-in Electric Vehicles and Charging Infrastructure

## Overview

The national PEV market has expanded in scale, geography, and technology since manufacturers released the first modern PEVs in 2011. Driven by incentives, mandates, investment from industry, and enthusiasm from early adopters, new PEV sales in the United States grew from approximately 17,000 vehicles in 2011 to nearly 160,000 in 2016.<sup>8</sup> Over that same period, charging infrastructure increased nearly 10 times.<sup>9</sup> While California has historically led in PEV adoption, the Northeast and Mid-Atlantic regions are quickly becoming primary markets for PEVs. However, PEVs still account for less than 1 percent of the total light-duty vehicle market nationwide. There are many potential benefits associated with an increase in PEVs on the road, including lower operating and maintenance costs, improved air quality, and economic growth.

Both plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs) make up the broader PEV category. PHEVs have both a battery-powered motor and an internal combustion engine (that uses gasoline) capable of powering the wheels; BEVs are powered exclusively by a battery-powered motor and do not use gasoline. The BMW i3 and Chevy Bolt (BEVs) and the Ford C-Max Energi and the Chrysler Pacifica (PHEVs), shown below, are examples of vehicles available to consumers.



<sup>8</sup> Argonne National Laboratory, Light Duty Electric Drive Vehicles Monthly Sales Updates, <https://www.anl.gov/energy-systems/project/light-duty-electric-drive-vehicles-monthly-sales-updates>. Accessed April 3, 2017.

<sup>9</sup> U.S. DOE, U.S. Alternative Fueling Stations by Fuel Type, <http://www.afdc.energy.gov/data/10332>. Accessed April 3, 2017.



In 2017, there were upwards of 25 light-duty PEVs to choose from, and the market continues to expand as automobile manufacturers roll out additional models. Longer range BEVs – such as Tesla models and the Chevy Bolt – can drive 200 miles or more on a single charge. Other BEV models, like the Nissan Leaf and Volkswagen eGolf, have an electric range of 80-100 miles. There are a variety of PHEVs available that can travel 13-50 miles (depending on the model) in all-electric mode, after which the gasoline engine kicks in to provide additional range. Over the past several years, technological advancements (largely in batteries) have extended the electric range significantly. Continued advancements are likely to result in longer vehicle ranges and reduced purchase prices.

PEV charging infrastructure is typically differentiated by the maximum amount of power that can be delivered to a vehicle's battery. This determines the time that it takes to fully charge. Three categories of charging stations are dominating the market:

- **Level 1** chargers consist of a standard 110-volt alternating current (AC) outlet that provides 2-5 miles of range per hour of charging, depending on the vehicle and other factors. Level 1 is most commonly found in residential applications but can be suitable for some fleet and workplace charging applications.
- **Level 2** is a 220 or 240-volt AC outlet, and provides 10-20 miles of range per hour of charging. Level 2 can also be used at the home and workplace.
- **Direct current (DC) fast chargers** are more in line with the typical gas station refueling model, and provide 50-70 miles of range per 20 minutes of charging through different types of connectors – J1772 combo, CHAdeMO, and Tesla. The connectors for DC fast charging units are not standardized across vehicle manufacturers in the same way that Level 2 charging hardware is (via the J1772 standard). Furthermore, there are no PHEVs on the market today that can use a DC fast charger.<sup>10</sup> In other words, not all PEVs currently available can use DC fast chargers, and even those that are equipped for fast charging may not have on-vehicle hardware compatible with the charging unit.

Just as vehicle and battery technology is advancing, so is charging infrastructure technology. For example, wireless charging is gaining attention as an option in certain applications, like home and fleet charging. Higher powered DC fast charging technology, providing up to 20 miles of range per minute of charging, is also in the works.

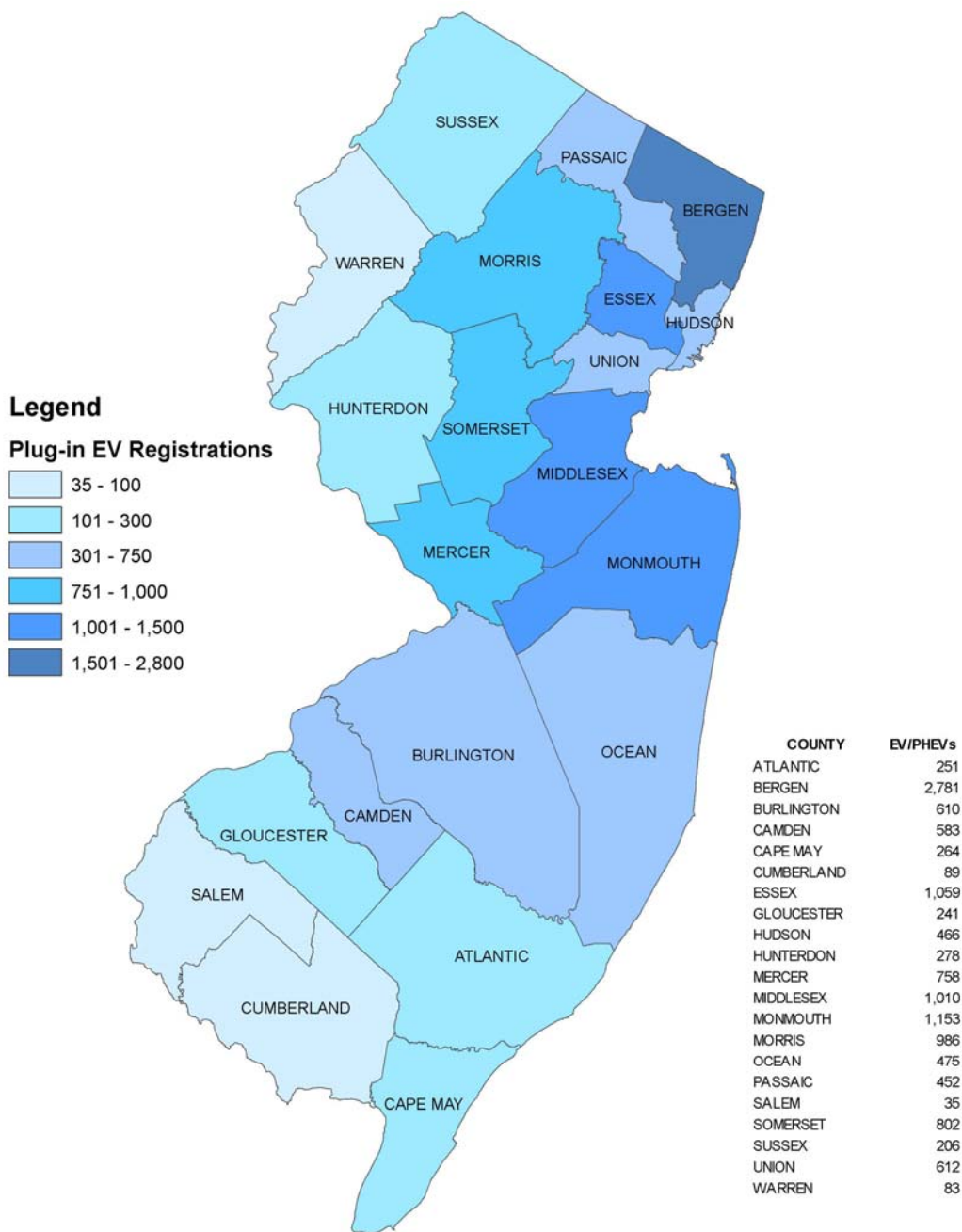
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<sup>10</sup> A potential exception to this is the “range extender” or REx. For the sake of simplicity, this plan refers to BEVs and PHEVs; the REx is a kind of hybridized powertrain. Range extenders typically have an engine powered by gasoline that is used to drive an electric generator, which supplies the vehicle's motor with electricity.



## Vehicles and Infrastructure in New Jersey and Montclair

Figure 2 shows PEV counts by county in New Jersey as of July 2017. Essex County is among the five leading counties, with more than 1,000 PEVs.



**Figure 2. New Jersey PEV Registrations by County, July 2017<sup>11</sup>**

<sup>11</sup> Figure provided by the New Jersey Department of Environmental Protection (NJDEP) in August 2017. Data shown here may differ from the final version posted to the NJDEP Clean Vehicles website, <http://www.nj.gov/dep/cleanvehicles/>. Note that other PEV data sources exist, which may present different estimates.

Table 1 below provides data on the types of vehicles being used in Montclair Township, as of July 2017. This data serves as an important baseline both in terms of tracking growth in ownership and forecasting future PEV demand in the township.

**Table 1. Vehicle Population in Montclair Township, July 2017<sup>12</sup>**

	PHEV	BEV	Total Vehicles	PEV Percentage of Total
<b>Montclair</b>	86	53	26,320	0.53%

PEVs make up 0.53 percent of total vehicles registered in Montclair Township. This share is more than double the PEV percentage in Essex County (0.22 percent), and is not far off the national PEV penetration rate, which is less than 1 percent.

Providing adequate charging infrastructure can help accommodate and encourage increased use of PEVs. The DOE's Alternative Fuels Data Center (AFDC) Station Locator<sup>13</sup> provides data on charging infrastructure availability across the country.

As of October 2017, New Jersey had 216 public charging locations (14 Level 1, 186 Level 2, and 49 DC fast charging stations), with a combined total of 513 charging outlets (note that some locations have more than one charger type). There are an additional 45 private access locations with Level 2 charging stations, many of which are at Nissan dealership service departments.

Table 2 below includes the operational charging stations in Montclair, according to the AFDC Station Locator, as of October 2017. The stations are also shown on the demand maps beginning with [Figure 3](#). Montclair has one publicly available DC fast charger, which is an asset in terms of quick, public charging.

**Table 2. Charging Infrastructure in Montclair, October 2017**

Charging Station Host/Name	Address	Accessibility	Access Type	Charging Stations		
				L1	L2	DC Fast
<b>Nauna's Bella Casa</b>	148 Valley Rd	Public	Public		1	1
<b>ProPark - Crescent Parking Garage</b>	13 The Crescent	Public	Public		2	
<b>ProPark - Valley &amp; Bloom Garage</b>	34 Valley Rd	Public	Public		3	
<b>Fullerton Parking Deck</b>	20 Park St	Public	Public		2	
<b>Upper Montclair Parking Plaza</b>	580 Valley Rd	Public	Public		2	
<b>Hillside Square</b>	8 Hillside Ave	Private	Workplace		1	
<b>Brassworks on Grove</b>	105 Grove St	Private	Workplace/Fleet		1	

<sup>12</sup> PEV counts were provided by the NJDEP, based on registration data from the Motor Vehicle Commission (NJMVC).

<sup>13</sup> U.S. DOE, Alternative Fueling Station Locator, <http://www.afdc.energy.gov/locator/stations/>.

## Barriers to Increased Plug-in Electric Vehicle Use

While there are significant benefits to increased PEV use, certain barriers exist which could limit the market's expansion.

- **Vehicle Cost** — Upfront vehicle cost is likely one of the largest barriers to widespread PEV use. Battery costs comprise the largest percentage of a PEV's price; however, that cost has been decreasing per unit of energy and will continue to do so as manufacturers achieve additional technological breakthroughs and economies of scale in the future. Incentives are available at the federal and state levels to help reduce vehicle costs.

- **Charging Station Build-out and Range Anxiety** — The majority of PEV charging occurs at residential locations when drivers plug in their vehicles after finishing a trip. The distance of some trips require additional charging — either at work or around town when visiting shops, restaurants, and other destinations. While public charging station network development can help with this (particularly DC fast charging for long-distance trips), the perceived lack of charging infrastructure may contribute to “range anxiety,” the fear that a vehicle may leave a driver stranded because it runs out of charge before reaching the intended destination.

There are several challenges associated with the deployment of publicly accessible charging infrastructure including funding, siting, permitting, and operational costs. On the municipal side, permitting and inspection processes can be a barrier. These issues are addressed further below and recommendations to overcome these barriers are included in [Section 3](#).

- **Consumer Awareness** — The introduction of new technologies such as PEVs requires continuous outreach to consumers to deliver messaging that highlights PEV availability and benefits, including long-term cost savings as well as environmental, health, and community benefits. Furthermore, it is important to communicate the direct financial and nonfinancial benefits to drivers including tax credits, grants, and the PEV driving experience (e.g., fast acceleration and quiet vehicle operation) and the differences associated with fueling from the grid rather than from a gas station.

### Key Consideration: Charging Infrastructure Costs

The high costs of the infrastructure to provide publicly accessible charging infrastructure make it difficult to earn a profit because the commodity (i.e., electricity) being sold is comparatively inexpensive. While highly dependent upon specific site conditions, publicly accessible installations of Level 2 charging infrastructure can cost in excess of \$10,000; whereas DC fast charger installations can cost more than \$150,000. A [2015 National Academies Consensus Study Report](#) states that the high cost of installing public charging stations and the minimal revenue obtained from providing electricity present challenges for developing business models for profitable charging stations.

## Market Outlook in Montclair

As part of PEV readiness planning, it is important to understand the existing deployment of PEVs and charging infrastructure, as well as the market outlook, including factors such as who is buying PEVs, what type of PEVs are likely to be purchased, and projected market growth. Tracking the market using available data and through partnerships at the local, regional, and state level are means by which the township can stay informed and in touch. The type of PEVs that are on the roads and the locations in which they are registered can help characterize the demand for the different types of charging and applications (such as residential, workplace, and public charging). For instance, a market that is dominated by BEVs is likely to need more DC fast charging than a market that is dominated by PHEVs because BEV charging demands will likely be higher as a result of the larger batteries. This section provides a summary of the potential rate of PEV adoption in the township and areas within where PEV demand might be highest.

## Forecasted Plug-in Electric Vehicle Populations in Montclair

For the purposes of this plan, residential PEV ownership forecasts in Montclair Township were projected over a planning horizon from 2016-2030. Projecting PEV ownership at a local level beyond 2030 is not practical given the rapidly changing nature of the technology, demographics, land use changes, and local economic conditions. The forecasts are meant to guide the planning process, to help support deployment of PEV infrastructure, and guide local policy and regulatory changes as appropriate.

Three PEV projections for Montclair Township were developed based on varying assumptions around adoption trends. Table 3 summarizes the approach used to forecast PEVs in low and high usage scenarios. It also includes a greenhouse gas (GHG) stretch scenario in which the state meets the emissions reductions set forth in the New Jersey Global Warming Response Act.<sup>14</sup>

**Table 3. PEV Forecast Scenario Descriptions**

Scenario	Description
<b>Low</b>	Reflects usage trends comparable to the Reference Case in the Energy Information Administration's (EIA) Annual Energy Outlook (AEO) 2016, <sup>15</sup> adjusted slightly for increased potential indicated in the Mid-Atlantic region.
<b>High</b>	Assumes that PEV usage rates in Montclair will be consistent with the Zero Emission Vehicle (ZEV) mandate in place for New Jersey, <sup>16</sup> with a fair-share assumption (i.e., that ZEV deployment will occur in the state on a population-weighted basis in the long-term).
<b>GHG Stretch</b>	The PEV strategy of the NJTPA Regional GHG Mitigation Plan calls for a 60 percent market share of PEVs by 2040. The GHG stretch scenario assumes that PEV adoption rates will be slightly lower than the plan, with a 50 percent market share by 2040.

<sup>14</sup> Public Law 2007, c.112, N.J.S.A 26:2C-37

<sup>15</sup> U.S. EIA, AEO 2016, [https://www.eia.gov/outlooks/aeo/pdf/0383\(2016\).pdf](https://www.eia.gov/outlooks/aeo/pdf/0383(2016).pdf), August 2016.

<sup>16</sup> ZEV programs aim to increase sales of ZEVs, which include PEVs and fuel cell electric vehicles, by requiring that some portion of vehicle manufacturer sales in the state be ZEVs. More information on New Jersey's ZEV mandate is available on the NJDEP website at <http://www.nj.gov/dep/cleanvehicles/LEV.pdf>.

A more detailed description of the forecasting methodology, as well as corresponding graphs, are provided in [Appendix B](#). The results of these three forecast scenarios are as follows:

- Low Scenario: Approximately 875 PEVs on the road in Montclair in 2030 (400 PHEVs and 475 BEVs).
- High Scenario: 2,500 PEVs on the road in 2030 (1,750 PHEVs and 750 BEVs).
- GHG Stretch Scenario: About 15,000 EVs on the road in Montclair by 2040.

To provide context, forecasts project that total light-duty vehicles will increase by about 10-12 percent in Montclair by 2030, with about 29,000 vehicles of all types registered. The forecasts indicate that PEVs will comprise 6-17 percent of registered vehicles in Montclair by 2030, up from the current 0.53 percent. PEV market penetration will also increase across the region, with perhaps a larger number of PEVs driven by people working in and visiting the municipality. This will likely increase demand for charging infrastructure, positioning the township to be an important contributor to a regional network supporting and reinforcing PEV market growth opportunities.

It is worth noting that the AEO is the source of adoption trends for the low case. The EIA is generally conservative in its electrification outlook, and the outlook does not force compliance with regulations like the ZEV program. Despite these limitations, the AEO is a useful source because it is transparent and typically consistent with national-level assessments. Further, it is updated annually, allowing Montclair Township and others to review updates to the outlook from one year to the next. The EIA's 2017 AEO is considerably more bullish on BEVs than the 2016 version. This type of update and change to the forecast can help planning processes and reinforces the notion of a flexible planning process than a deterministic one.

### Forecasted Charging Infrastructure Demand in Montclair

As part of this plan, a charging infrastructure demand analysis was conducted to broadly identify the areas within Montclair Township that are most likely to see an increased demand for charging infrastructure. This analysis complements the vehicle forecasting discussed above, and introduces an important geographic component that can guide municipal policy and investments to meet the increased demand for charging infrastructure. [Appendix C](#) includes a detailed methodology of the charging infrastructure demand analysis.

The analysis uses PEV ownership indicators and regional travel patterns to identify areas where there is potential demand for charging stations. Montclair Township can use these results to identify areas where charging station deployment is projected to have the greatest potential to be cost effective, as chargers located in areas where PEV drivers are most likely to travel will be utilized more. Recent research by Idaho National Laboratory demonstrates that charging equipment deployed as a result of a planning process, similar to this plan, experiences nearly 90 percent greater utilization (as measured by charging events per week) compared to charging equipment deployed in a sporadic, unplanned manner.<sup>17</sup> However, it is important to note that the results of the demand analysis should not exclude areas from charging as their demographics evolve.

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<sup>17</sup> Idaho National Laboratory, *How Does Utilization of Non-Residential EVSE Compare Between those*

There are four primary types of charging to consider:

- Residential Charging – Highlights areas that will likely experience high demand for residential charging. Since residential charging takes place at home, these are locations in which likely PEV owners live. Residential charging is limited to Level 1 and Level 2 charging infrastructure. Today, the average PEV driver charges at home about 70-90 percent of the time. Most residential charging occurs at Level 1, as it typically does not require any additional investment on the part of the PEV owner. Level 2 charging is more common at residences for BEVs compared to PHEVs, especially those vehicles with ranges above 150 miles.
- Multi-Unit Dwelling Charging – Highlights areas in the region that will likely experience high demand for residential charging and have high incidence of multi-family units. Like residential charging, MUD charging is expected to be a combination of Level 1 and Level 2 charging. The market for MUD charging is in very early stages, and it is unclear which level of charging is most appropriate for this application.
- Workplace Charging – Highlights areas that will likely experience high demand for workplace charging, particularly areas where likely PEV owners work and vehicles are parked for several hours during the day. Level 1 and Level 2 charging are appropriate for workplace charging; ultimately, the appropriate level of charging is something that should be dictated by the facilities management, funding, and demand.
- Public Charging – Highlights areas that will likely experience high demand for public charging (i.e., other non-home or non-work charging), also referred to as opportunity charging. This includes areas where likely PEV owners shop, dine, and travel for recreational activities. Level 1, Level 2, and DC fast charging are all options for public charging, with dwell times (i.e., how long are drivers likely to be parked) and local site conditions (e.g., accessibility to sufficient electrical power) the most important factors in determining which strategy is appropriate.

The resulting analysis illustrates charging demand. Areas shown as warmer colors represent higher demand for charging while the cooler colored areas rank lower for charging demand. Each separate area is a traffic analysis zone (TAZ). The rankings and corresponding colors are based on the TAZ's demand score relative to the entire NJTPA region. For example, a TAZ ranked high (red) on the workplace charging demand map means that area scored in the top 5 percent for workplace charging demand across the NJTPA region. Similarly, a TAZ with a public/opportunity charging ranking of low (blue) scored among the bottom 40 percent for public charging in the region. Additional information about these percentiles can be found in [Appendix C](#).

## **Residential Charging**

The infrastructure demand analysis is based on vehicle registration data and key socio-economic indicators that are positively correlated with PEV ownership, such as income, hybrid vehicle ownership rates, and property characteristics.

Figure 3 presents the results of the residential charging demand analysis. These areas will likely experience high demand for residential charging. Since most PEV charging takes place at home, the map indicates the areas where likely PEV adopters live. While most of Montclair ranks relatively high with regard to residential charging demand, the demographics associated with households in Upper Montclair, in particular, align very well with the key PEV ownership indicators mentioned above. The portion of the township directly south of Watchung Avenue also ranked in the high demand category.

Residential charging demand is the most market-driven of the four charging types, as the number of chargers installed at residences throughout Montclair Township will grow as more PEVs are purchased or leased. [Section 3](#) includes recommendations to support the growth of residential charging in Montclair, primarily through consumer education and outreach.



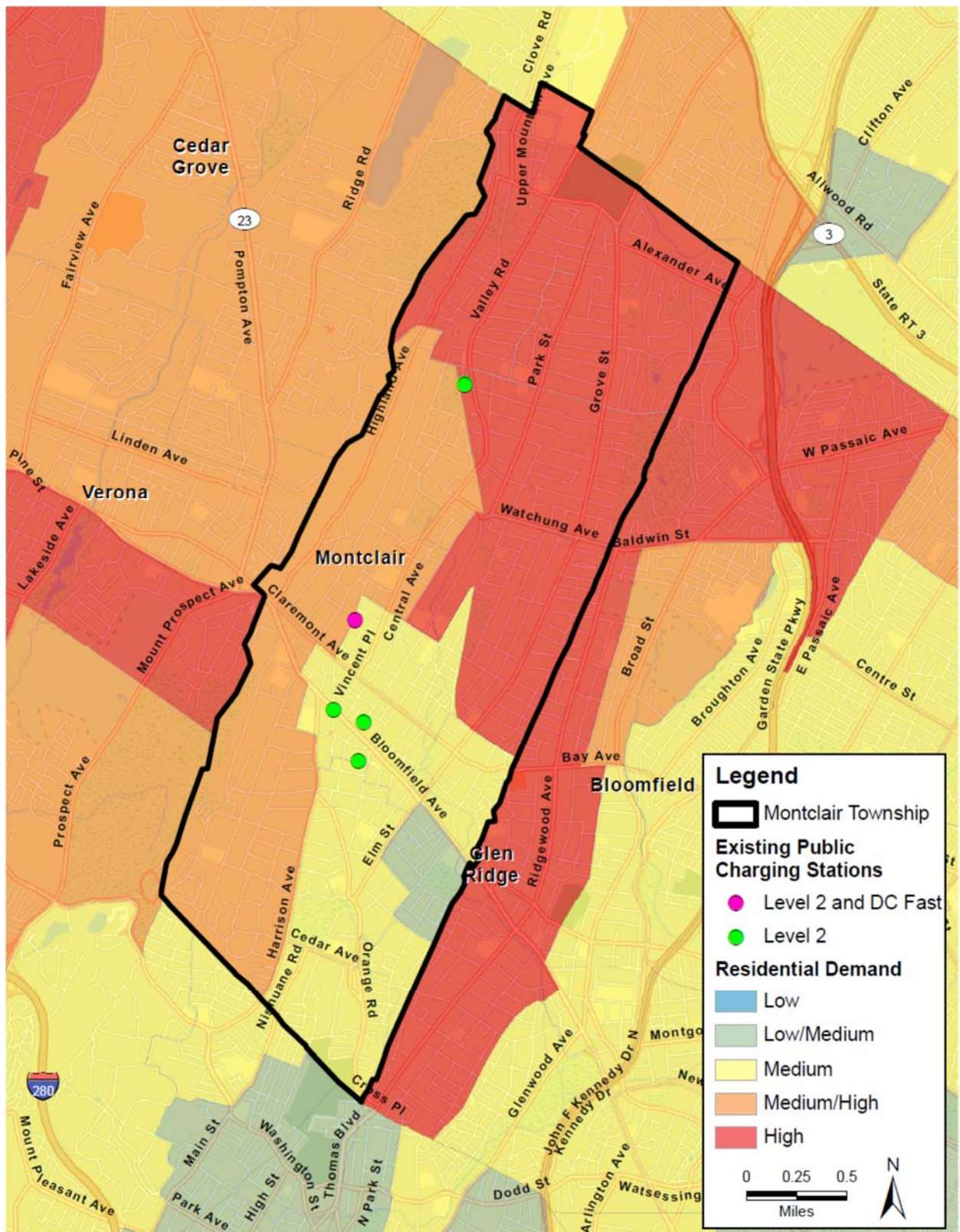


Figure 3. Residential Charging Demand Ranking



### **Multi-Unit Dwelling Charging**

Given that roughly 50 percent of the housing stock in Montclair is multi-family, MUD charging is a key consideration for the township. While many of the MUDs are comprised of two and four units, this plan focuses on MUDs with 10 or more units. In Montclair, these developments house approximately 15 percent of residents.<sup>18</sup>

Figure 4 presents the results of the MUD charging demand analysis. These areas will likely experience high demand for individual or shared charging infrastructure in condominium and housing developments as well as apartment buildings. For Montclair, the greatest estimated demand for MUD charging correlates with the central neighborhoods where the majority of apartment and other multi-unit buildings are located.

Conversations with MUD management companies suggest there is limited demand for PEV charging at older, established buildings (e.g., garden-style apartments). Future demand for MUD charging will be driven by new developments and significantly renovated buildings that may draw higher income tenants who view PEV charging as an attractive amenity. [Section 3](#) includes recommendations specific to MUD charging, including outreach to property managers to gauge demand.

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<sup>18</sup> Graham Petto, Montclair Township, Stakeholder Advisory Committee meeting, September 12, 2017.

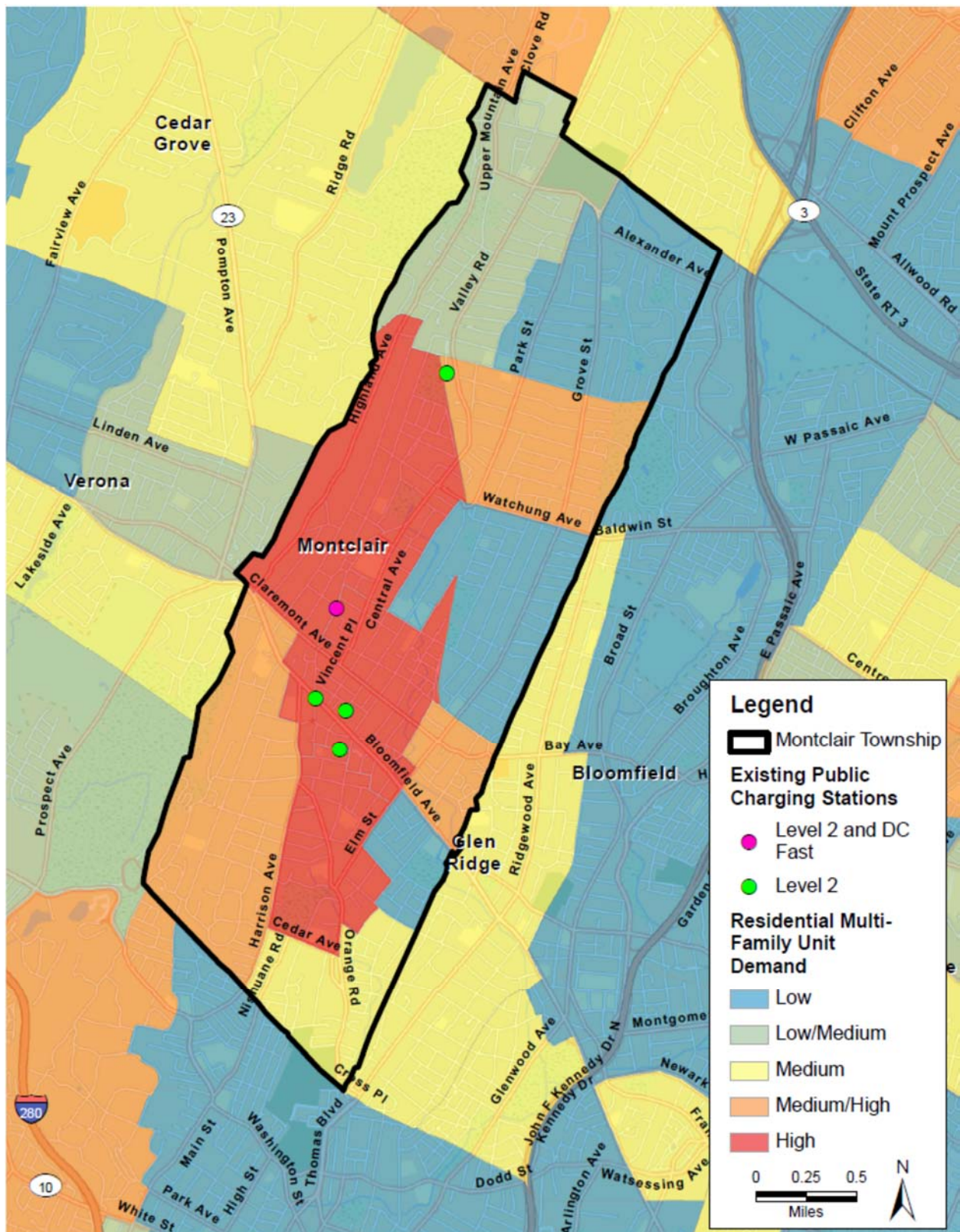


Figure 4. MUD Charging Demand Ranking

### **Workplace Charging**

Figure 5 presents the results of the workplace charging demand analysis. Areas likely to experience high demand for workplace charging are typically found around employment clusters or centers. For Montclair, workplace charging demand is estimated to be highest in two distinct areas: the commercial district along Bloomfield Avenue, and in the portions of Upper Montclair closest to Montclair State University. The high opportunity zone analysis and resulting map (Figure 7) presented later in this section will be a useful tool to help the township target businesses and other organizations, including the university, with employee charging demand. [Section 3](#) includes specific recommendations to support workplace charging, primarily through employer outreach.



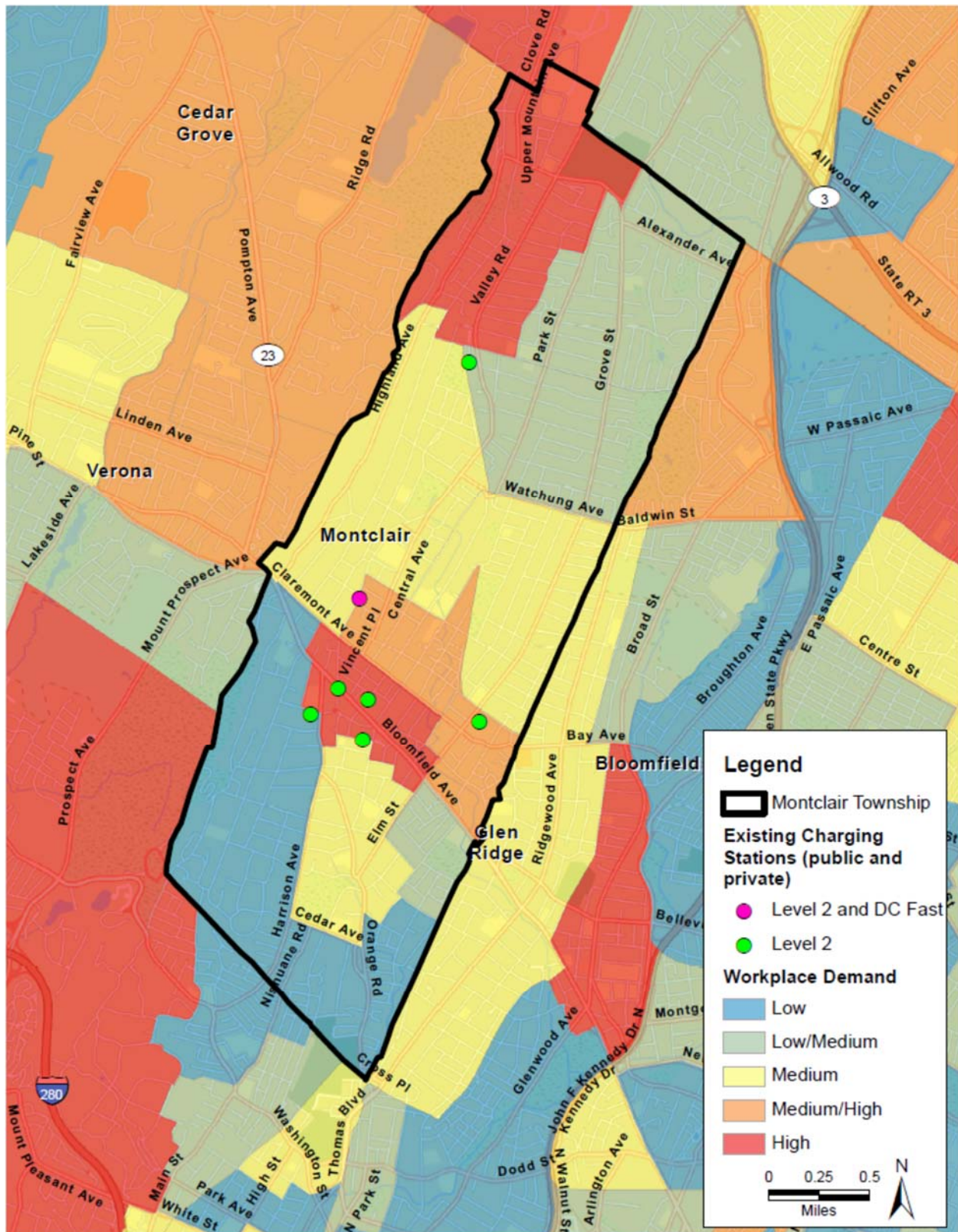


Figure 5. Workplace Charging Demand Ranking

## Public Charging

Public charging, also referred to as opportunity charging, covers a wide range of potential charging situations (or opportunities) for a PEV driver away from home or work. Unlike residential and workplace charging, where vehicles are parked for long enough that they achieve a significant charge even with Level 1 charging, public charging will take place at locations where drivers are parked for varying times; therefore, it is important to consider the level of charging the stations offer. Table 4 shows the recommended charging method based on the available charging time at different venues.

**Table 4. Available Charging Time and Recommended Charging Level for Different Venues<sup>19</sup>**

Typical Venue	Available Charging Time	Charging Level (Primary/Secondary)
Shopping Centers	0.5–2 hours	Level 2/DC Fast
Other (e.g., stand-alone retail)	< 1 hour	Level 2/DC Fast
Street/Meters	1–2 hours	Level 1/Level 2
Parking Garages	2–10 hours	Level 2/Level 1
Hotels/Recreation Sites	8–72 hours	Level 2/Level 1

Public charging will consist of predominantly Level 2 and DC fast stations, as it is more convenient for drivers to spend less time charging their vehicles.<sup>20</sup> The Montclair public charging analysis focuses primarily on Level 2 charging infrastructure. Figure 6 shows the location of areas that are likely to experience high demand for public charging— these are locations where likely PEV owners shop, dine, and visit for recreational activities. In Montclair, the commercial districts around the Bay Street transit station and along Bloomfield Avenue ranked high and medium/high, respectively for public charging demand. Interestingly, the area north of Claremont Avenue ranked the lowest for public charging demand, which is likely because the majority of commercial parking is located to the south, along Bloomfield Avenue. The high opportunity zone analysis and resulting map (Figure 7) presented later in this section provides additional considerations for building out public charging infrastructure in Montclair. [Section 3](#) includes specific recommendations to support the deployment and use of public charging infrastructure.

<sup>19</sup> Source: ICF

<sup>20</sup> The Association of Electrical and Medical Imaging Equipment Manufacturers (NEMA), “EVSE: Powering the Electric Vehicle.” <https://www.nema.org/Products/Documents/nema+evse+presentation+for+communities.pdf>. Accessed February 1, 2017.



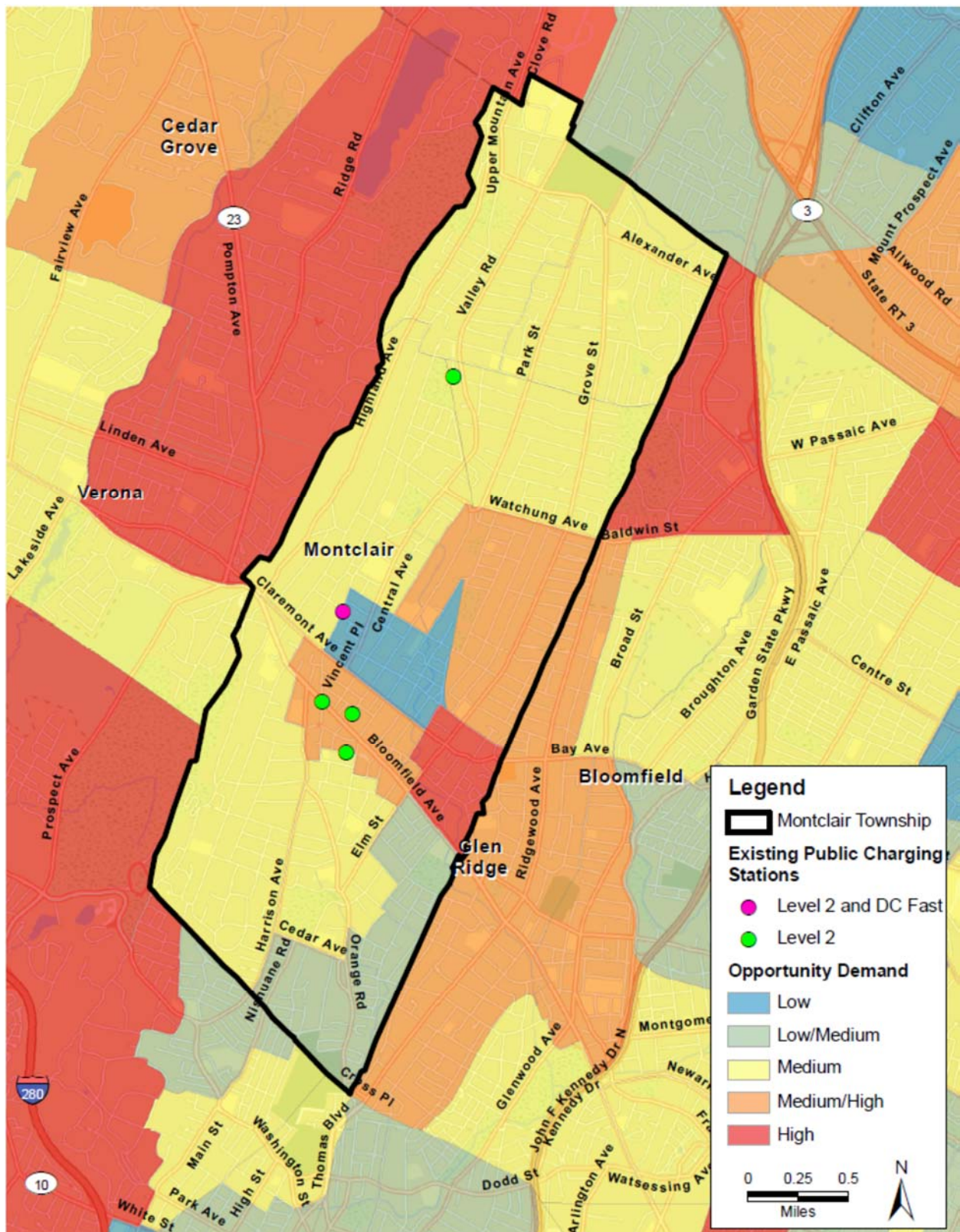


Figure 6. Public Charging Demand Ranking

While not a focus of the public charging analysis, DC fast charging is present in North Jersey and is seeing a great deal of growth in the Mid-Atlantic and across the country. DC fast charging is particularly well-suited for long-distance travel along corridors, as it provides a greater charge in a shorter period of time and correlates with the gas station way of fueling. This corridor approach has become the foundation of numerous infrastructure deployment efforts, such as the Express Charging Corridors Initiative,<sup>21</sup> and other private partnerships.

### **High Opportunity Zones for Public and Workplace Charging**

It can be challenging to select locations for public charging stations. Workplaces and homes typically have dedicated parking spaces for each worker or resident, vehicles spend the majority of time at work or at home, and commute trips are long, which means PEVs can often use a charge when they arrive at work or home. It is therefore easy to determine the right amount of charging stations at workplaces and homes; ideally these locations have at least one charger for every two PEVs. By contrast, demand for public charging, which currently accounts for less than 10 percent of all charging, is much more sporadic, and in locations where parking is either undersupplied (e.g., a bustling downtown commercial center) or oversupplied (e.g., a big-box retail store on a weekday morning). Furthermore, public charging can be expensive or labor-intensive to install, since charging stations may be in the public right-of-way, far from electrical panels, or in locations where adding a charging space means also adding a parking space in order to meet minimum parking requirements. Though public chargers can send a message to residents and others considering purchasing a PEV that charging is available, those charging stations can also end up as high-profile failures if they are underutilized or consistently occupied by non-charging vehicles.

Although public charging only accounts for a small share of the market today, this will likely change over time with increased access to DC fast charging. National and corridor-based infrastructure deployment efforts, such as Electrify America, are likely to increase opportunities for DC fast charging, or utilities may seek to support market expansion. Together, these types of market developments may help increase access to charging for MUD residents or enable more inter-regional travel, thereby increasing the share of public charging.

All that said, public charging is a key component to PEV readiness and deployment. For this reason, it is important to be thoughtful in placing charging infrastructure. In addition to looking at where demand for charging is likely to be located, an effective public charging analysis identifies high opportunity zones where the environment supports successful charging stations. These zones are often busy commercial areas with high demand for parking and ample turnover, which is conducive to well-utilized, highly-visible chargers. They can also be redevelopment areas or areas with public land uses where local governments have more control over development and therefore greater ability to place charging stations in the right location.

The high opportunity zone analysis for Montclair leveraged municipal zoning data to identify commercial areas, redevelopment areas, and public land uses that could serve as an initial set of high opportunity zones for public charging. The second step was to overlay the high opportunity zones with the demand maps for workplace and public charging, confirming that the zones aligned with the demand analysis.

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<sup>21</sup> For more information, see ChargePoint's press release at <https://www.chargepoint.com/about/news/bmw-volkswagen-and-chargepoint-announce-completion-electric-vehicle-express-charging/>, as well as various news articles.

Montclair Township staff reviewed the zones and provided input to help eliminate areas that may not be suitable, such as parks, schools, and other public spaces.

Figure 7 identifies the resulting high opportunity zones for public charging and workplace charging. The high opportunity zones for public charging generally correlate with Montclair's commercial districts and public parking lots meant for retail/commercial activity versus transit service. Note that some areas provide opportunities for both types of charging while others are more suitable for one or the other. The central business district along Bloomfield Avenue is a focus area for both public and workplace charging. Visitors and employees of the businesses located in Montclair Center would benefit from access to charging stations, and that area includes multiple municipal lots. Another more specific focus area is the Mountainside Hospital.<sup>22</sup> The healthcare industry has been actively installing charging infrastructure that primarily serves employees, but may also be accessible to visitors. The high opportunity zone for workplace charging surrounds Montclair State University. Chargers installed here would primarily serve university employees, but could also be made available to students and visitors, providing some public charging.

Upper Montclair already has multiple public chargers, and parking is at a premium, so it is not identified as a high opportunity zone. [Section 3](#) notes the importance of gauging demand over time, as there will likely come a time when more chargers are needed in Upper Montclair.

[Section 3](#) includes specific recommendations for how the township can use this analysis to focus effort and investment in a way that will support public and workplace charging infrastructure.

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<sup>22</sup> The New Jersey Board of Public Utilities (NJBPU) funded a microgrid feasibility study at the same location, see <http://www.state.nj.us/bpu/pdf/boardorders/2017/20170630/6-30-17-9I.pdf>. According to Mike Hornsby, NJBPU, the project may incorporate PEV charging (noted during the Technical Advisory Committee meeting held October 17, 2017).



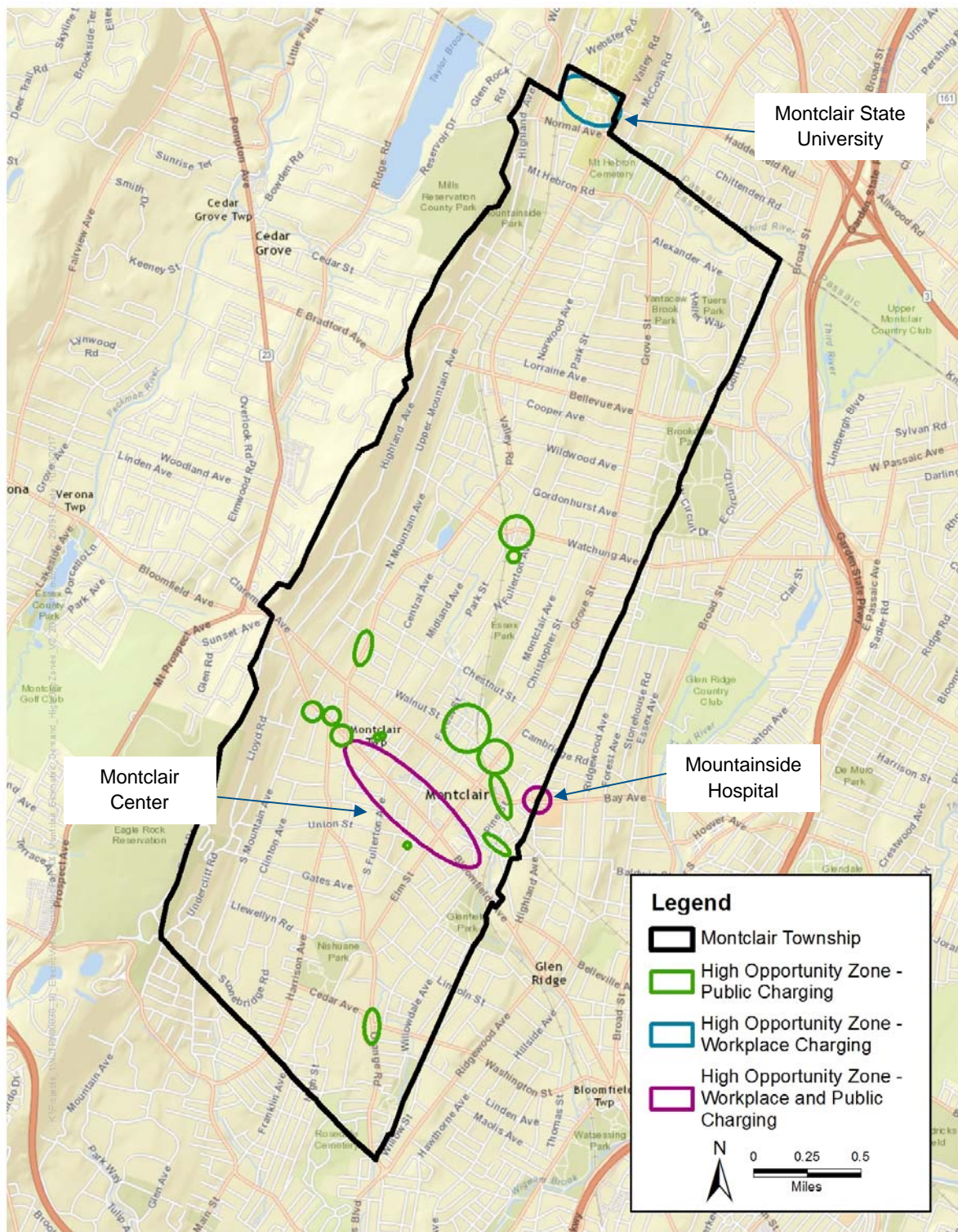


Figure 7. High Opportunity Zones – Public and Workplace

## Regulations

Regulations and policies at the municipal, state, and federal levels can play a role in facilitating increased PEV use. Regulations that can support the deployment of PEV charging infrastructure include building, electrical, and zoning codes; parking rules; permitting processes; and incentives.<sup>23</sup> This section provides an overview of Montclair’s community plans as they relate to facilitating AFVs, PEVs in particular. It also addresses Montclair’s local zoning regulations and analyzes their potential to affect PEV charging station installation, including sections on parking, site plans and site development, and environmental performance standards (noise, air quality, etc.). The relevant language and provisions related primarily to PEVs are described below. Regulatory information specific to NGVs and natural gas fueling infrastructure can be found in [Section 2](#).

### Local Community Plans

Local community plans are forward-looking documents that both define a community’s vision for the future and respond to anticipated future conditions with strategies and related actions. Community plans can proactively facilitate and encourage AFV use. They can do so by establishing policies that encourage inclusion of PEV charging infrastructure in new development or that support charging stations as a key element of the local transportation system.

Montclair Township has two relevant long-range plans that consider transportation, which contain some language supportive of AFV use:

***Montclair Township Unified Land Use and Circulation Element*** (2015, Municipal Land Use Center at The College of New Jersey): This plan focuses, in large part, on ways to enhance non-automobile travel. It does, however, have the following relevant goals and policies:

- “Ensure that future growth and development in the township is met with supportive infrastructural (sic) improvements.”
- “Build on and expand transportation choices that ensure convenience, safety, and access.”

***Proposed Sustainability Element to Master Plan***: This document is being developed through the Montclair Township Environmental Affairs Office. It is expected to include an AFV component. The township has been active in promoting sustainability in the past and is looking to advance AFV use as part of its Master Plan and to reflect those efforts in the Sustainability Element.

### Zoning and Parking Codes

Through zoning codes, design standards, and parking rules, local governments have the opportunity to ensure both that there are sufficient charging opportunities to meet projected PEV demand and that PEV parking spaces are effectively designed and regulated to accommodate charging vehicles. Zoning codes can allow, encourage, or require appropriate placement of charging infrastructure in certain land use designations. Zoning code provisions, design standards, and parking rules can also specify

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<sup>23</sup> Note that incentives are addressed in more depth in the Incentives and Funding section below.

requirements for design and installation, signage, accessibility, fees, time limits, lighting, and maintenance.

Local zoning provides for the direct implementation of land use policy in a community by setting standards and guidelines for land development. While PEV charging stations are generally not considered independent land uses in and of themselves, they have implications for site function and character. In terms of site functionality, they are a distinct element of the parking supply, impacting site circulation, including pedestrian circulation and safety and handicap access. Infrastructure for charging PEVs is, therefore, an important element of site planning and design in terms of location, scale, and relationship to overall site use. Consequently, it is to a community's advantage to address charging infrastructure in the course of zoning language in general and parking requirements and site plan review in particular. Zoning also offers an opportunity to include incentives for site design as a tool to encourage accommodations for PEV use.

The township's forms for requesting a zoning permit and submitting a development application do not include any references or requirements to indicate the intent to provide PEV charging infrastructure. Zoning codes and related redevelopment plans are laid out below:

**Montclair Zoning Code:** The Montclair regulations have no specific language relative to charging infrastructure. Yet, they do require more detailed site design review for all parking lots, decks, and garages. This gives the zoning authority the opportunity to examine any planned developments for inclusion of PEV parking spaces and charging stations. More explicitly, when a site plan is submitted as part of a conditional use application, it requires that information on any planned parking facilities is shown in the plan. While proposed PEV charging stations are not specifically mentioned in the regulations, any plans for parking lots or facilities would need to identify them if the charging stations are intended to help meet parking supply requirements.

Chapter 281 for Site Plan Review in the Montclair zoning ordinance has a dedicated section for parking areas and driveways, which governs the requirements for such spaces. Additionally, Planning Board applications, under § 202-29.2 "Checklists" requires parking information for major site plan and subdivision applications.

**Redevelopment Plans:** There are three redevelopment plans for discreet areas of Montclair Township that include requirements for accommodating PEVs. Each does so in a somewhat different way with the distinctions among them noted below. As these plans serve as the zoning requirements for these areas, they directly affect efforts to incorporate PEV charging infrastructure in those areas. Each of these plans has similar parking requirements relative to PEVs:

- **Hackensack University Medical Center (HUMC)/Mountainside Hospital Redevelopment Plan (2016):** At least two spaces must be provided for PEV charging. It does not require that the charging stations be installed, just that the spaces be provided.
- **Seymour Street Redevelopment Plan (2016):** PEV charging stations are a stated permitted use. All parking facilities within the Redevelopment Area must include a minimum of two PEV charging stations as well as the infrastructure necessary to support additional charging facilities to accommodate future demand (e.g., conduit). The car-charging facilities are the responsibility of the redeveloper.



- **Montclair Center Gateway Phase 1 Redevelopment Plan (2011):** Public or private parking structures, owned or operated by a public agency or private entity, including parking, docking, and charging stations for PEVs or shared vehicles, are considered an accessory use and are regulated as such. This means they are a permitted land use in association with and in addition to the principal land use on a lot. There are development standards which apply to accessory uses, relative to size and location in relation to the principal use. In the case of this plan, a PEV charging station, as an accessory use, may be located on another lot separate from the lot where the principal use is situated; so a building may have its parking lot on a separate parcel and the PEV charging stations also are permitted to be located on that separate lot.

### **Parking Ordinances & Codes**

Local parking ordinances and codes are used to regulate parking structures and parking behavior. Montclair has several parking ordinances and codes that reference PEVs. Chapter 230: Parking Lots (Montclair Township Code of Ordinances) governs parking lots overall, and Article I under this chapter governs parking permits, which are authorized by the Montclair Parking Utility. Sequential Articles under Chapter 230 addresses Crescent Deck, Church Street Parking Lot, and Lloyd Road Parking Lot, with no specific reference to PEVs for these lots.

However, Chapter 230 does specifically cite PEVs:

- The township, from time to time, shall set aside and designate for each said permit parking area in each of the respective parking lots such number of parking spaces as may be reasonably necessary to accommodate the needs of the public, with due regard for the requirements of the public for metered parking spaces and for recharging of PEVs. Reference: § 230-3 “Number of spaces.”
- Regulation regarding the use of PEV spaces and required signage. Reference: § 230-3.1 “Reserved parking for recharging electric vehicles.”
- A PEV is defined as “Any car, truck, or other vehicle that does not produce tailpipe or evaporative emissions or is a plug-in hybrid electric vehicle (PHEV).” Reference: § 230-9 “Definitions.”

There are several issues within these ordinances that may become obstacles in the future. The first is the restriction on accessory structures or any off-street parking area found in the zoning ordinances. This limits the location of structures or areas between the main building and the street, which may affect potential to provide charging infrastructure in the future. Additionally, the installation of PEV charging stations may fall under electrical fixtures and devices under § 121-4, Fee schedule. That said, if this does happen, the associated fees do not seem overly prohibitive.

As discussed later as part of the recommendations in [Section 3](#), there are a number of opportunities inherent in partnering with the Montclair Center Special Improvement District (Montclair Center Corporation). Similar to other improvement areas found throughout New Jersey, Montclair Center Corporation is a district management corporation. It has the power to undertake improvements for parking areas and facilities, as well as provide special parking arrangements for the district subject to prior Township Council approval.

### **Parking Authorities**

Parking authorities are generally established to manage the public parking supply – set rates for parking space use and time limits – and conduct enforcement. Ideally, one municipal agency oversees the use of PEV parking and enforcement. The Montclair Parking Utility (Article XIVB – Montclair Township Code of Ordinances) could serve this role. The Montclair Parking Utility has been engaged in the readiness planning process and is committed to collaborating with the township and other stakeholders to enable additional charging stations within municipal parking lots.

### **Permitting and Inspection**

Streamlined permitting and inspection processes are key to PEV planning. These processes can help expedite the installation of charging stations at appropriate locations, provide the service at a reasonable cost to consumers, and maintain the safety of consumers and the public.

The New Jersey Clean Cities Coalition (NJCCC) has worked with the New Jersey Department of Community Affairs (NJCA), the agency that oversees the statewide code, to clarify and, where possible, streamline the permitting process for PEV charging stations. In 2011-2012, NJCA published an article, *“Electric Vehicle Charging Stations – What you need to know,”* which is the most recent guidance available from the state on the installation of PEV charging stations at residential locations. The article includes Table 5 showing when construction permits and inspections are required for the installation of PEV charging infrastructure.

**Table 5. New Jersey Permit Requirements for Charging Stations<sup>24</sup>**

Project	Permit Required	Inspection Required	Classification
Existing outlet is sized correctly but plug configuration is not compatible with equipment plug necessitating the replacement of the outlet to one with proper configuration.	No	No	Ordinary Maintenance NJAC 5:23-2.7(e)3 <a href="http://www.state.nj.us/dca/divisions/codes/codereg/ucc.html">http://www.state.nj.us/dca/divisions/codes/codereg/ucc.html</a>
Upgrade circuit breaker and wire to higher rating (15 amp to 20 amp)	Yes <sup>1</sup>	Yes <sup>2</sup>	Minor Work NJAC 5:23-2.17A <a href="http://www.state.nj.us/dca/divisions/codes/codereg/ucc.html">http://www.state.nj.us/dca/divisions/codes/codereg/ucc.html</a>
Vehicle charging system being installed that requires new 120 or 240 volt outlet or an electrical line that will be directly connected to the system.	Yes <sup>1</sup>	Yes <sup>2</sup>	Minor Work NJAC 5:23-2.17A <a href="http://www.state.nj.us/dca/divisions/codes/codereg/ucc.html">http://www.state.nj.us/dca/divisions/codes/codereg/ucc.html</a>
1 - The issuance of a construction permit is not required before the work may proceed. However, the owner or electrical contractor acting on behalf of the owner must notify the local code enforcing agency before the work begins. Also, a permit application must be filed and must be delivered in person or by mail within five business days from the date of oral notice.			
2 - An inspection must be performed within 30 days of the request for inspection and is based upon what is visible at the time of the inspection with the certificate of approval stating so.			

Another NJDCA article provides more detailed information on permitting for residential PEV charging stations: *“Electric Vehicle Charging Stations – Installation and Permit Requirements”* (in NJDCA’s Construction Code Communicator, Vol. 23, Number 1, Spring 2011). NJDCA provides contacts for additional information regarding the installation of PEV charging stations: NJDCA, Division of Codes and Standards, Code Assistance Unit at (609) 984-7609.

In June 2011, NJDCA announced the results of its review of applicable state codes and regulations and determined that installation of residential PEV charging equipment is considered “minor work”, i.e., the homeowner or contractor need only provide verbal notification to the local code enforcement agency prior to starting the installation and submit the permit application within five days of notification, so they do not have to wait up to three weeks for permit approval.

The challenges associated with local permitting and inspection of PEV charging infrastructure vary depending on the type of property at which the infrastructure will be located. For PEV charging, factors include whether it is at a single-family residence, at a MUD, or a commercial property. Since the majority of demand for PEV charging infrastructure is likely to be at privately owned residences and workplaces, local governments can support successful large-scale deployment of PEVs by being

<sup>24</sup> NJDCA, *Electric Vehicle Charging Stations – What you need to know*, [http://www.state.nj.us/dca/divisions/codes/publications/pdf\\_other/homeowners\\_guide\\_electric\\_vehicles\\_charging\\_stations.pdf](http://www.state.nj.us/dca/divisions/codes/publications/pdf_other/homeowners_guide_electric_vehicles_charging_stations.pdf). Accessed April 3, 2017.

prepared to handle increased volumes of permit requests for charging infrastructure installations in an efficient and safe manner.

The main approval process applicable to AFV infrastructure installation is the issuance of permits relative to the building code, and sub-codes relating to electrical, fire, etc., whose application contents and process requirements are set out in state law. New Jersey municipalities are responsible for administering and enforcing the state codes through state-mandated permitting and inspection processes.

Montclair has not yet developed processes for administering building codes or electrical subcodes specific to the installation of PEV charging infrastructure. The list below summarizes key permitting process characteristics for Montclair Township:

- **Time to Issue Permit:** 20 business days, typically (which does not include necessary prior approvals)
- **Permit Fee:** Dependent on sub-code and installation type
- **Permit Availability:** Applications are online; must be accompanied by a construction permit folder, which is available over the counter only
- **Permit Staff Training:** Electrical Inspector is aware of the guidelines; no additional training specific to PEV charging infrastructure

## Building Codes

Building codes contain safety standards and specifications that guide new construction and renovations. NJDCA, specifically the Division of Codes and Standards, establishes and enforces statewide building codes—referred to as the Uniform Construction Code (UCC). There are two major opportunities to create building codes that support PEV deployment. The first is to specify standards for PEV charging infrastructure in the building code to ensure that any charging station installations are safe and accessible. The second is to require pre-wiring for charging stations to lower the cost of future installations. Pre-wiring refers to the practice of providing sufficient basic infrastructure, such as conduits, junction boxes, outlets serving garages and parking spaces, adequate wall or lot space for future charging infrastructure, and adequate electrical panel and circuitry capacity, to meet anticipated future charging demand.

Municipalities like Montclair are limited to the statewide UCC, and are therefore not in a position to take a more progressive approach to building codes as they are related to PEVs or other issues. Some municipalities have taken steps to advocate for UCC updates that incorporate PEVs where appropriate and feasible.

## Incentives and Funding

There is a variety of financial support at the federal, state, and local levels for individuals and local fleets interested in investing in PEVs and charging infrastructure. These include financial incentives, such as tax credits, vehicle rebates, and insurance discounts, as well as non-financial incentives, like high occupancy vehicle (HOV) lane access. This section provides an overview of each primary form of financial support as

well as who the funding is available for (consumers, businesses, non-profits, and/or public entities may be eligible for any given program).

Additional funding opportunities and incentives may emerge in the future, such as state-level programs funded through the Volkswagen Clean Air Act Settlement and auto manufacturer partnerships to offer vehicle purchase price discounts. The New Jersey Department of Environmental Protection (NJDEP) has established a website to provide more information for New Jersey.<sup>25</sup>

#### **Volkswagen Clean Air Act Settlement**

The Volkswagen (VW) Settlement established two funding sources that may result in AFV deployment and infrastructure support in and around Montclair Township.

- ZEV Investment Plan: VW, through a newly formed entity called Electrify America, will install, operate, and maintain ZEV infrastructure nationwide, initially focusing on 11 major metropolitan areas. The New York City metro area, which includes Montclair Township, will receive the following benefits:
  - Level 2 charging installation at MUDs, workplaces, and public sites
  - DC fast charging facility installation on highway and other transportation corridors
  - Education and outreach that builds or increases public awareness of ZEVs
- Environmental Mitigation Trust: The State of New Jersey is eligible to receive and use approximately \$72 million in funding. While the specific program in New Jersey has yet to be established or implemented, these funds could be used to replace polluting diesel equipment with cleaner vehicles, including local freight trucks, transit buses, school buses, shuttle buses, and refuse trucks. A certain portion of these funds could also be used to install PEV charging stations.

For more information, see [www.epa.gov/enforcement/volkswagen-clean-air-act-civil-settlement](http://www.epa.gov/enforcement/volkswagen-clean-air-act-civil-settlement).

#### **Incentives for Vehicle Purchasers**

Vehicle purchase incentives typically help to reduce the upfront cost of a qualified PEV, either at the point-of-sale or later. Other variations of vehicle purchase incentives include cost reductions, fee waivers, and other special privileges associated with the vehicle. Some utilities, for example, offer reduced charging rates for eligible PEV drivers. Table 6 provides an overview of the available incentives for PEV purchasers in New Jersey.

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<sup>25</sup> See <http://www.state.nj.us/dep/vw/>.



**Table 6. Incentives for PEVs**

Type	Incentive/Program	Funder/Administrator	Eligible Entities	Timeline	Incentive Summary
Federal	Plug-In Electric Drive Vehicle Tax Credit	IRS	Individuals, businesses, government entities	Available, deadline not specified; phases out based on sales	\$2,500-7,500, depending upon battery capacity. Tax credit can be combined with state level rebates.
Federal	Congestion Mitigation and Air Quality Improvement Program (CMAQ)	Federal Highway Administration	State DOTs, MPOs, local governments, transit agencies	As funds are available	The CMAQ program provides funding (via DOTs and MPOs, including the NJTPA) for eligible transportation projects that contribute to air quality improvement and congestion relief. Publicly owned AFVs, such as PEVs, are eligible for CMAQ funding; however, vehicles must provide a dominant transportation function.
State	ZEV Tax Exemption	NJ Division of Taxation	Individuals, businesses	Timeline not specified	ZEVs sold, rented, or leased in New Jersey are exempt from state sales and use tax. This exemption is not applicable to partial ZEVs, including HEVs.
State	HOV Lane Exemption and Toll Discount	NJ Turnpike Authority (NJTA)	Individuals, businesses, government entities	Expires September 30, 2019	The NJTA allows qualified PEVs to travel in the HOV lanes located between Interchange 11 and Interchange 14 on the New Jersey Turnpike. The NJTA offers a 10 percent discount on off-peak New Jersey Turnpike and Garden State Parkway toll rates through NJ EZ-Pass for drivers of vehicles that have a fuel economy of 45 miles per gallon or higher and meet the California Super Ultra Low Emission Vehicle standard.

## Incentives for Charging Infrastructure Deployment

Incentives and financing options are available to help defray the costs of deploying charging infrastructure. Some programs aim to reduce or eliminate the cost of eligible equipment (e.g., Level 2 charging station) while others provide funding for equipment and installation costs. Table 7 includes an overview of the available incentives for PEV charging infrastructure deployment in New Jersey. In addition, programs such as the NJDEP NJ Charging Challenge provide special recognition to employers making their workplaces PEV ready.<sup>26</sup>

<sup>26</sup> For more information, see [www.drivegreen.nj.gov/programs.html](http://www.drivegreen.nj.gov/programs.html).

**Table 7. Incentives for PEV Charging Infrastructure**

Type	Incentive/ Program	Funder/ Administrator	Eligible Entities	Timeline	Incentive Summary
Federal	Congestion Mitigation and Air Quality Improvement Program (CMAQ)	Federal Highway Administration	State DOTs, MPOs, local governments, transit agencies	As funds are available	The CMAQ program provides funding (via DOTs and MPOs, including the NJTPA) for eligible transportation projects that contribute to air quality improvement and congestion relief. PEV charging infrastructure may be eligible for CMAQ funding.
Federal	Low and Zero Emission Vehicle Research, Demonstration, and Deployment Funding	Federal Transit Administration	Local, state, and federal government entities; public transportation providers; private and non-profit organizations; and higher education institutions	Not specified	Financial assistance is available for research, demonstration, and deployment projects involving low or zero emission public transportation vehicles. Funding may cover up to 80% of project costs, with a required 20% non-federal cost share requirement. Eligible vehicles must be designated for public transportation use and significantly reduce energy consumption or harmful emissions compared to a comparable standard vehicle.
State	Workplace Charging Station Grants	NJDEP and New Jersey Board of Public Utilities (NJBPU)	Businesses, nonprofits, government entities	As funds are available	Reimbursement grants are offered on a first-come, first-served basis for the cost and installation of eligible charging stations at workplaces, government and educational facilities, nonprofits, and parking facilities. Funding up to \$250 is available for each Level 1 charging stations installed and up to \$5,000 for each Level 2 charging stations installed. Current funding has been allocated as of January 2017, though interested applicants may be put on a waitlist in anticipation of additional funding.
Utility	Workplace Charging Station Incentives	PSE&G	Businesses, nonprofits, government entities	As funds are available	PSE&G provides free charging stations to companies in their service territory for the purpose of workplace charging. Chargers are available on a first-come, first-served basis to companies that secure a commitment from at least five employees who will use a PEV for their commute. PSE&G will own the chargers and collect usage data.
Nonprofit	Sustainable Jersey Small Grants	Sustainable Jersey	Municipal governments	As funds are available	Grants are available to help municipalities achieve progress toward Sustainable Jersey certification and general sustainability. Eligible projects must align with actions for which municipalities could score points toward certification, such as “Make Your Town Electric Vehicle Ready” and “Public Electric Vehicle Charging Infrastructure.”

## 2 Natural Gas Vehicles and Fueling Infrastructure

### Overview

While PEVs primarily serve the light-duty consumer market, the NGV industry targets the medium- and heavy-duty fleet sectors. Following an initial surge in NGV interest in the mid- to late-1990s, natural gas fueling infrastructure increased steadily from approximately 750 stations across the country in 2007 to more than 1,800 in 2016.<sup>27</sup> The use of natural gas as a vehicle fuel grew by 75 percent in that same period.<sup>28</sup> Incentives and investment from industry have been important drivers for this growth. Natural gas only accounts for 3 percent of transportation fuel (based on energy content).<sup>29</sup> Additional development of this market is focused on strategic deployment of NGVs in appropriate fleets. For example, nationwide, CNG vehicles account for 35 percent and 55 percent of the transit bus and refuse truck markets, respectively.<sup>30,31</sup>

The deployment potential for natural gas vehicles is mainly linked to the medium- and heavy-duty truck fleet market sectors. For instance, as part of the American Recovery and Reinvestment Act, the NJCCC led a statewide public/private partnership — including Clean Energy, Atlantic County Utilities Authority, Waste Management of New Jersey, Atlantic City Jitney Association, Central Jersey Waste & Recycling, and others — that put more than 300 NGVs on the road in refuse and shuttle bus applications, and included the development of six CNG fueling stations. There are significant market barriers to more widespread use of natural gas in the transportation sector. These are not unique to any particular township or municipality. Rather, they are a function of issues outside the purview of local governments.

### Vehicles and Infrastructure in New Jersey and Montclair

Given that the primary market sectors for NGVs are medium- and heavy-duty vehicles, municipal NGV readiness planning is more limited than the consumer focus of PEVs. That said, NGV readiness involves close coordination with the gas utility; adopting policy language that will support natural gas (and, more broadly, alternative) fueling stations; creating a regulatory framework for NGV fueling infrastructure; and possibly incentivizing or requiring NGVs. Several locations across New Jersey, for example, have provided bid preferences for municipal contractors (e.g., trash collection) who use natural gas or other AFVs. Montclair Township has had light-duty CNG vehicles for use by traffic enforcement personnel, however those vehicles are no longer supported by the manufacturer and are being phased out of the municipal fleet.

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<sup>27</sup> U.S. DOE, U.S. Alternative Fueling Stations by Fuel Type, <http://www.afdc.energy.gov/data/10332>. Accessed April 3, 2017.

<sup>28</sup> U.S. Energy Information Administration (EIA), U.S. Natural Gas Vehicle Fuel Consumption, <https://www.eia.gov/dnav/ng/hist/n3025us2m.htm>. Accessed April 3, 2017.

<sup>29</sup> U.S. EIA, Energy Use in Transportation, [http://www.eia.gov/energyexplained/?page=us\\_energy\\_transportation](http://www.eia.gov/energyexplained/?page=us_energy_transportation). Accessed April 3, 2017.

<sup>30</sup> NGVAmerica, Transit, <http://www.ngvamerica.org/vehicles/for-fleets/transit/>. Accessed April 3, 2017.

<sup>31</sup> NGVAmerica, Refuse, <http://www.ngvamerica.org/vehicles/for-fleets/refuse/>. Accessed April 3, 2017.

According to the most recent report by the NJCCC,<sup>32</sup> there are just over 1,000 light- and heavy-duty NGVs in New Jersey. Although this list is not exhaustive, it represents a robust estimate of the NGVs registered statewide. As mentioned above, two of these NGVs are owned by Montclair Township, but are being phased out. Of the vehicles reported, more than 85 percent are heavy-duty vehicles; and of those heavy-duty vehicles, more than 50 percent are refuse or transit vehicles. More granular data, specifically at the municipal level, is not readily available. The NJDEP provides NGV estimates, but the counts are inclusive of propane vehicles.<sup>33</sup>

Of the 28 CNG fueling stations in New Jersey as of October 2017, 13 are accessible to the public and 15 are meant for private (i.e., fleet only) use. There are no liquefied natural gas (LNG) fueling stations in New Jersey.<sup>34</sup>

Montclair Township owns and operates one private CNG station at the Department of Community Services Yard on North Fullerton Avenue. This time-fill CNG station was used to fuel the township's two light-duty NGVs, which are now out of commission. It is the only natural gas fueling station in the township.

## Barriers to Increased Natural Gas Vehicle Use

Deploying NGV technology offers numerous benefits as compared to gasoline and diesel vehicles, including emissions reductions and improved air quality. However, there are substantial barriers to NGV implementation that impede progress towards more significant deployment. Understanding the key barriers below can help municipalities and fleet owners plan wisely and act accordingly.

### Low Gas Quality for Transportation Applications

Natural gas in common carrier pipelines has a variety of end uses — space heating, industrial processes, electricity generation, and as a transportation fuel (after compression). Natural gas quality in the pipeline transmission system can vary depending on a number of factors. In the northern PSE&G territory, including Montclair Township, there have been gas quality issues linked to the presence of refinery gas in the pipeline, a function of an agreement between PSE&G and the Bayway Refinery (Phillips 66) in Linden, New Jersey. Furthermore, during periods of peak gas demand (i.e., extremely cold winter days), PSE&G often supplements its natural gas supply by adding propane to the distribution system. Both of these issues hinder the use of pipeline natural gas as a transportation fuel since higher quality gas is required for combustion in heavy-duty CNG vehicles. Similarly, the combustion engines in CNG vehicles are not designed to manage the potential blend of propane and natural gas.

As of September 2017, PSE&G no longer accepts Bayway Refinery gas into its system.<sup>35</sup> However, it is unclear if this alone will resolve the gas quality issue hampering NGV adoption in the region.

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<sup>32</sup> U.S. DOE, 2016 Transportation Technology Deployment Report: NJCCC, March 2017.

<sup>33</sup> NJDEP, Natural Gas Vehicle Distribution, <http://www.nj.gov/dep/cleanvehicles/Alt-Fuel%20Vehicles%20&%20Stations%20-%20Natural%20Gas.pdf>. Accessed October 20, 2017.

<sup>34</sup> U.S. DOE, Alternative Fuels Data Center, Station Locator, <http://www.afdc.energy.gov/locator/stations/>.

<sup>35</sup> Kenny Esser, PSE&G, via email communication, September 6, 2017.

## Lack of Incentives

Although there are certain applications of NGVs that provide attractive payback periods compared to their diesel counterparts (after accounting for fuel and operational savings), the incremental cost of purchasing an NGV compared to a diesel or gasoline vehicle remains an impediment to increased use. Part of this is due to the lack of sustained state incentives for the purchase of cleaner-burning NGVs. Across the country, states are encouraging increased use of AFVs and AFV infrastructure through incentives, such as vouchers, rebates, and grants. In addition, many jurisdictions allow preferences in public procurements for those bidders that use, or pledge to use, AFVs in executing their contract. Funding resulting from the VW Environmental Mitigation Trust mentioned previously may be used for NGVs and fueling infrastructure, depending on the state's implementation approach. The NJBPU has also provided grants for commercial NGVs in specific counties.<sup>36</sup>

## Fuel Price Differential

The increase in accessible supply of natural gas in the 2010-2011 timeframe contributed to a significant price differential between diesel and natural gas. Because NGVs have a higher incremental cost due to the expense of specialized fuel systems and fuel tanks, the payback period is greatly dependent upon the lower cost of natural gas relative to diesel and gasoline. While the low price of diesel has extended this payback period, as diesel prices rise, the price differential will help improve deployment potential. The diesel fuel tax increase in New Jersey, enacted in October 2016, gives a further advantage to NGVs. One clear economic advantage of natural gas is the relative price stability, which is an important factor to consider for a fleet manager or business owner. The commodity price for natural gas makes up a relatively small portion of the price for CNG at the pump. For example, an increase of \$1.50 per million British thermal units (MMBtu) in the cost of natural gas translates to only a \$0.25 increase per diesel gallon equivalent (DGE) at the pump. Diesel, on the other hand, suffers price spikes because the raw commodity makes up a much larger portion of the price at the pump. Although the price of natural gas is much more stable than that of petroleum fuels, the price differential is often not sufficient to offset the higher upfront cost. Absent incentives and improved accessibility to fueling infrastructure, truck owners and fleets have been reluctant to convert to CNG vehicles.

## Market Outlook in Montclair

The NGV market outlook in Montclair is inextricably tied to the three barriers outlined above. Further, these three issues are linked to market forces beyond the purview of municipal governments: Local governments like Montclair have no control over gas quality (this is under the purview of the gas utility); resource constraints at the local level limit the ability of municipalities to incentivize NGVs to spur adoption; and lastly, local governments have no influence over commodity energy prices. Until these issues are addressed by other market actors, Montclair, and communities like it, will likely be best served by relying on local partners, such as the NJCCC, for relevant information and updates.

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<sup>36</sup> NJBPU. CNG Vehicle Grant Program. <http://www.nj.gov/bpu/commercial/cng.html>. Accessed October 23, 2017.



## Potential for Renewable Natural Gas

Renewable natural gas (RNG) is produced over a series of steps — namely collection of a feedstock (such as waste or manure), delivery to a processing facility for biomass-to-gas conversion, gas conditioning, compression, and injection into a common carrier pipeline. RNG can be combusted to generate on-site electricity and be used to fulfill renewable energy goals and requirements. Over the last several years, however, there has been considerable growth in the use of RNG in the transportation sector. This is linked in large part to the U.S. Environmental Protection Agency's (EPA) determination in 2013 that RNG is an eligible fuel under the federal Renewable Fuel Standard (RFS).<sup>37</sup> Feedstocks for RNG include, but are not necessarily limited to landfill gas, municipal solid waste, animal manure, agricultural residue, and forestry or forest product residues.

The introduction of RNG into the transportation sector has the potential to allay some of the local and regional concerns linked to the GHG emissions and other potential environmental impacts from fossil natural gas use. The GHG footprint of RNG is linked to the feedstock, location of the facility relative to the end user, and the type of vehicle in which the fuel is used. RNG from landfill gas, for instance, reduces GHG emissions by about a factor of two to three when compared to conventional diesel fuel on a lifecycle basis. RNG from animal manure can reduce GHG emissions even more by capturing methane — a GHG pollutant with 25 times the global warming potential of carbon dioxide — that would have otherwise been vented into the atmosphere.

The NGV industry and the RNG industry are advocating around the prospects of pairing the low carbon fuel with a recently certified engine for medium- and heavy-duty vehicles from Cummins Westport, the ISL G 8.9 liter engine. This engine is appropriate for many applications in the goods movement sector, including short and regional haul applications, as well as in refuse hauling applications. This engine received certification from the EPA at levels 90 percent lower than the current standard for nitrogen oxide (NOx) emissions of 0.20 g/bhp-hr.<sup>38</sup> In other words, pairing RNG with the so-called low NOx engine has the potential to reduce criteria pollutant emission reductions, reduce GHG emissions, and decrease petroleum consumption.

## Regulations

This section provides an overview of Montclair's community plans as they relate to facilitating AFVs in the community and to identify any language that supports the use of AFVs — NGVs in particular. It also reviews provisions in Montclair's local zoning regulations for their potential to affect installation of AFV infrastructure, such as parking, site plans and site development, and environmental performance standards (noise, air quality, etc.). While most of the relevant language and provisions are related primarily to PEVs (described in [Section 1](#)), there is also some regulatory language that applies more broadly to AFVs, including NGVs and natural gas fueling infrastructure.

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<sup>37</sup> In 2015 the EPA determined that RNG from landfill gas (LFG) is eligible to generate renewable identification numbers (RINs; the currency of the federal RFS program) in the category labeled as cellulosic biofuels or D3 RINs. These are the highest value RINs in the RFS market.

<sup>38</sup> The NOx emission standards for engines are established in units of grams of pollutant per brake horsepower hour (g/bhp-hr).

## Local Community Plans

Local community plans are forward-looking documents that both define a community's vision for the future and respond to anticipated future conditions with strategies and related actions. Community plans can proactively facilitate and encourage AFV use. They can do so by establishing policies that support AFV fueling stations as a key element of the local transportation system.

Montclair Township has two relevant long-range plans that consider transportation, which contain some language supportive of AFV use:

**Montclair Township Unified Land Use and Circulation Element** (2015, Municipal Land Use Center at the College of New Jersey): This plan focuses, in large part, on ways to enhance non-automobile travel. It does, however, have the following relevant goals and policies:

- “Ensure that future growth and development in the Township is met with supportive infrastructural (sic) improvements.”
- “Ensure a variety of land uses and transportation modes that pursue a balanced mix of activities and vibrancy.”
- “Build on and expand transportation choices that ensure convenience, safety, and access.”
- “Advance an interconnected travel system utilizing all forms and combinations of travel to access key destinations in and outside the community.”

**Proposed Sustainability Element to Master Plan:** This document is being developed through the Montclair Township Environmental Affairs Office. It is expected to include an AFV component. The Township has been active in promoting sustainability in the past and is looking to advance AFV use as part of its Master Plan and to reflect those efforts in the Sustainability Element.

## Zoning Codes

Local zoning provides for the direct implementation of land use policy in a community by setting standards and guidelines for land development. Fueling stations for NGVs can be complex, particularly those with public accessibility. Natural gas fueling stations are often included with other large scale fueling facilities or complexes in terms of defined land uses and would be considered part of both allowable uses and site design for those facilities. Infrastructure for fueling NGVs is, therefore, an important element of site planning and design in terms of location, scale, and relationship to overall site use. Consequently, it is to a community's advantage to address AFV infrastructure in the course of zoning language in general and parking requirements and site plan review in particular. Zoning also offers an opportunity to include incentives for site design as a tool to encourage accommodations for AFV use.

The township's forms for requesting a zoning permit and submitting a development application do not include any references or requirements to indicate the intent to provide AFV infrastructure. The zoning code is as follows:

**Montclair Zoning Code:** The Montclair regulations have no specific language relative to AFV infrastructure. Yet, they do require more detailed site design review for all parking lots, decks, and garages. This gives the zoning authority the opportunity to examine any planned developments for

inclusion of AFV parking spaces and fueling or charging stations. More explicitly, when a site plan is submitted as part of a conditional use application, information on any planned parking facilities is required to be shown on the plan.

Chapter 281 for Site Plan Review in the Montclair zoning ordinance has a dedicated section for parking areas and driveways, which governs the requirements for such spaces. Additionally, Planning Board applications, under § 202-29.2 “Checklists” requires parking information for major site plan and subdivision applications.

### 3 Recommendations and Steps to Implementation

This section recommends actions Montclair Township can take in order to facilitate AFV use and meet the future infrastructure demands.

Each recommendation correlates with the demand for charging or fueling infrastructure discussed throughout the previous sections of this plan. In the case of PEVs, recommendations are distinguished by their role in residential charging, MUD charging, workplace charging, and public charging. The recommendations are similarly distinguished by planning areas — general plans and policies, building codes, zoning and parking codes, permitting and inspection, and fleet planning. Furthermore, for each recommendation, a lead organization or stakeholder has been identified, distinguishing largely between local government, regional agencies, and utilities.

The time horizon for the recommended actions is 10 years, with actions that may be ongoing, as well as those to be implemented in the near-term (1-2 years), medium-term (3-5 years), and long-term (6-10 years). Montclair Township and its stakeholders should refer to their AFV readiness goals as they determine which activities are priorities now and in the future.

Several recommendations appear multiple times, though with different steps to implementation depending on the targeted infrastructure. These recommendations include the identification of grants and other funding opportunities, and conducting targeted outreach to install charging infrastructure at high-priority locations.

Stakeholder input has helped to shape the recommendations in this section. During the interactive portion of Montclair’s second SAC meeting, participants provided input on and discussed a series of strategies that could be included in the readiness plan. This exercise aimed to:

- Broaden stakeholders’ understanding of the strategies available to enhance AFV readiness;
- Gather feedback on the AFV strategies that may be best suited to the community; and
- Help determine priority areas and areas of emphasis to be highlighted in the Montclair readiness plan.

#### Technical Assistance Resources

New Jersey is home to several established organizations that are well-versed in AFVs, community planning, sustainability, and other topics relevant to AFV readiness. These groups can provide technical assistance to support many of the recommended activities. They include:

**New Jersey Clean Cities Coalition** – a fuel neutral, nonprofit organization promoting partnerships that advance the use of alternative fuels. See [www.njcleancities.com](http://www.njcleancities.com).

**Sustainable Jersey** – a nonprofit organization supporting community sustainability efforts through tools, training, and incentives. See [www.sustainablejersey.com](http://www.sustainablejersey.com).

Stakeholders considered five groups of strategies, described in detail below. Prior to voting, participants were asked to briefly evaluate the strategies based on the following three criteria as they pertained to Montclair:

- The strategy is/strategies are feasible.
- The strategy/strategies could be implemented in a timely fashion.
- The strategy/strategies could be effective at increasing AFV opportunities in the community.

The Montclair SAC input can be summarized as follows:

1. Conduct Community Education and Outreach – Stakeholders thought these strategies met all three criteria. Education and outreach would likely target MUD owners/managers and employers.
2. Adopt Community-wide Policies – Stakeholders agreed these strategies met all three criteria, and the Township is already implementing some of the recommended policies, or planning to do so.
3. Facilitate Municipal Infrastructure and/or Public-Private Collaboration – Stakeholders thought these strategies met all three criteria, and that the business improvement district would need to play a central coordination role.
4. Amend the Zoning Code to Include Requirements or Incentives for AFV Infrastructure – Stakeholder responses indicated these strategies would meet all three criteria, depending on the strategy and implementation. The Township is supportive of zoning code amendments that encourage AFV infrastructure.
5. Modify Approval Processes – Stakeholders indicated these strategies could meet multiple criteria, though streamlining processes for multi-family buildings would take priority over single-family residences.

The priorities, opportunities, and challenges identified and discussed helped determine the recommendations presented in this section.

Whenever possible, recommendations point to specific resources that are available to help guide and assist the township's implementation. See the examples mentioned throughout this section, as well as [Appendix E](#), which is a collection of PEV readiness resources developed by or in partnership with the DOE. The forthcoming NJTPA guidebook on AFV readiness will serve as a key resource for Montclair Township and other municipalities throughout North Jersey.



## General Market Support

Due to the myriad considerations involved in PEV adoption — consumer behavior, gasoline pricing, vehicle pricing, etc. — deployment will be linked to factors beyond the purview of local and regional governments, utilities, and other stakeholders. Similarly, NGV adoption is closely linked to fuel prices and vehicle cost. However, Montclair Township has an opportunity to support infrastructure development through planning, coordinating education and outreach efforts, collaborating with utilities, and leading by example. Table 8 highlights the recommendations that will provide general market support to AFVs.

**Table 8. General Recommendations to Support the Market for Montclair AFV Readiness**

Action Area	Recommendation	Timeframe	Responsible Stakeholders
General Plans & Policies	Create cross-jurisdictional opportunities for sharing lessons learned	Ongoing	Montclair Township in partnership with neighboring municipalities
	Update the PEV infrastructure demand analysis	Ongoing	Montclair Township
	Collaborate with PSE&G to share market information	Ongoing	Montclair Township, PSE&G
	Conduct community education and outreach to increase awareness about the benefits of AFVs and the role they can play in decreasing transportation costs and achieving environmental goals	Near-term	Montclair Township
	Establish design criteria for AFV infrastructure	Near-term	Montclair Township
	Integrate AFV readiness into local planning efforts, including general plans and climate action plans, to support AFV infrastructure development	Near- to medium-term	Montclair Township
Permitting & Inspection	Streamline and expedite approval processes	Near-term	Montclair Township
	Educate permitting, inspection, and first responders in AFV station basics	Near-term	Montclair Township
Fleet Planning	Assess the existing municipal fleet, develop a fleet management plan, and explore opportunities for fleet AFVs	Medium-term	Montclair Township
	Provide technical assistance and training to local fleet managers	Medium-term	Montclair Township

### General Plans & Policies

#### Create cross-jurisdictional opportunities for sharing lessons learned

The NJTPA region encompasses many local governments, each with its own challenges and experiences with AFV adoption. Montclair stands to benefit from sharing best practices and lessons learned from stakeholders. Successful collaboration and information-sharing will require Montclair to invest the time and resources necessary to actively engage with its neighbors, and creating and sustaining a network of stakeholders who work on AFV-related issues will help strengthen AFV readiness in both the municipality and throughout the region. Sustainable Jersey provides one such forum, and Montclair is already a leader in their participation. The township can leverage Sustainable Jersey's network and engage with the Essex County Hub, a group of green team and environmental commission members, as

well as government, business, and community leaders. This group and Montclair Township can potentially learn from each other and support efforts going forward.

There are two broader initiatives of which Montclair and its partners should be aware related to AFVs and AFV readiness, namely:

- At the state level, ChargeEVC was recently formed as a coalition of car manufacturers, technology companies, utilities, consumer advocates and non-governmental organizations to promote PEV use in New Jersey.
- The NJCCC formed the New Jersey Natural Gas Vehicle Workgroup committee. Participating members include representatives from gas distribution utilities; vehicle and engine manufacturers; fuel infrastructure providers; transit, refuse haulers and other fleet users of natural gas; and others interested in increasing and strengthening the deployment of low-emission NGVs throughout New Jersey.

Both initiatives provide Montclair with a means to stay updated on developments and opportunities related to complementary activities at the state and regional level, such as alternative fuel corridor planning and utility rate filings.

### **Update the PEV infrastructure demand analysis**

The goal of a demand analysis is to help guide and coordinate future PEV charging infrastructure placement efforts based on anticipated or projected demand for charging infrastructure. The demand analysis included in this plan combines various parameters such as characteristics of PEV ownership and usage, land use, and regional travel patterns. As these characteristics change over time, Montclair Township can work with the NJTPA, the NJDEP, and other stakeholders to regularly update (every three to five years) the analysis with the latest vehicle registration, demographic, and travel demand data so the results remain current and relevant in the context of the likely demand for residential charging, workplace charging, MUD charging, and public charging.

Redevelopment and other projects may result in new parking facilities, so this development should also be considered as part of the ongoing analysis and planning process. Montclair Township's requirement to include PEV charging in redevelopment plans will result in additional infrastructure that will help meet demand for multiple charging demand types.

#### **AFV Registration Data**

The NJDEP maintains AFV registration data, coordinating with the NJMVC to provide updated statistics twice a year (January and July). A spreadsheet containing this data is available upon request by sending an email to [drivegreen@dep.nj.gov](mailto:drivegreen@dep.nj.gov), using the subject line "Vehicle Registration Data Request."

### **Collaborate with PSE&G to share market information**

Montclair Township can take a leading role in the support of PEVs and charging infrastructure by collaborating with the local utility to share relevant market information. This can occur in a variety of ways. For instance, Montclair could integrate the permitting system with a notification protocol for PSE&G. This would help the utility understand where PEVs are being deployed and how they are being charged and plan accordingly.

Moving forward, Montclair Township can seek more proactive ways to engage and collaborate with PSE&G. The regional impacts on the electrical grid (in terms of greater demand for electricity as more vehicles are charging) will likely be negligible for many years. However, unmanaged charging station installations and increased regional PEV ownership in specific areas could negatively affect local electrical distribution systems. One of the primary causes of concern for PEVs is clustering of the load associated with vehicle charging. Utilities generally have a transformer replacement program to regularly target transformers that have reached the end of their useful life or have been identified as grossly overloaded. However, the adoption of PEVs may occur faster in some areas, such as Upper Montclair, thereby potentially altering the utility's transformer replacement program target areas and schedule.

Montclair Township should maintain open lines of communication with the utility as it evaluates its electricity distribution infrastructure and provide insights wherever helpful. When PSE&G upgrades or adds distribution infrastructure, it should consider potential PEV charging demand impacts as part of the analysis and, where possible, make strategic and cost-effective investments. The township can assist in this process by providing valuable perspective and advanced notice regarding anticipated PEV clustering, new construction, and DC fast charging corridors along the way.

**Conduct community education and outreach to increase awareness about the benefits of AFVs, PEVs in particular, and the role they can play in decreasing transportation costs and achieving environmental goals**

Montclair should develop and distribute educational resources that target the range of relevant audiences: residents, multi-family building owners, employers, fleet owners and managers, and commercial and other developers. Residents of multi-family units are often overlooked for targeted awareness and education activities related to PEVs because it is not often within a resident's power to install charging infrastructure. The township should therefore consider creating materials to inform developers and property managers about the benefits and costs of installing AFV fueling infrastructure during construction as well as the overall benefit of providing the spaces. Additionally, Montclair should consider developing resources that target younger residents, such as student drivers, to teach them about AFV options, particularly PEVs. Even basic information about how much it costs to fuel a PEV can be helpful to start the conversation with any audience.<sup>39</sup> Housing all of these resources in one place online will also enable residents to seek out the information on demand beyond active outreach events. While there are no vehicle dealerships located within Montclair Township, those in neighboring communities are likely to serve Montclair residents and would benefit from basic education.

Executing this recommendation would require some financial resources and staff time to prepare materials and conduct outreach, and to maintain the online resource database, but it would be relatively low cost to build upon existing outreach efforts and could be highly impactful over the long-term.

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<sup>39</sup> One simple yet useful tool is the U.S. DOE's eGallon calculator, which shows the cost of fueling a PEV compared to a similar gasoline vehicle. See <https://energy.gov/maps/egallon>.

Separate recommendations introduced later in this section provide additional detail about more targeted education and outreach specific to MUD, workplace, and public charging.

### **Establish design criteria for AFV Infrastructure**

Adopting AFV infrastructure design guidelines that address the many unique considerations associated with them can go a long way to help charging station and fueling station hosts determine the best configuration for their installations and ensure that installations are safe, follow industry-recommended standards, and are consistent with other community development goals.

Montclair is considering a more specific definition for “electric vehicle charging station” in its regulations in order to be more explicit and informative for developers and others including charging infrastructure in redevelopment plans.<sup>40</sup> The New Jersey code includes a streamlined permitting process and definitions for PEV charging stations, which Montclair could adapt based on local conditions. Design guidelines will likely vary depending upon the configuration of parking and upon the context in which parking is located, so Montclair will likely need to create multiple sets of PEV parking guidelines that apply to a variety of scenarios.

At a minimum, charging station design criteria should address the following issues:

- Minimum dimensions of PEV parking spaces
- Parking configurations, including guidance on whether it is preferable to locate chargers in perpendicular, parallel, or angled parking spaces, and on the location of wheel stops, guard posts, and signage
- Adopted technical standards that apply to PEV charging stations
- Regulatory signage and signs directing drivers to available PEV parking
- Area lighting
- Clearances, including minimum clearances around chargers to maintain access to controls, as well as on adjacent walkways to maintain pedestrian access. Pedestrian clearance guidelines should include recommendations for keeping sidewalks and walkways clear of cords and cables. Clearance recommendations should also address needs for snow plowing during the winter months.
- Landscaping
- Location relative to other spaces, adjacent land uses, and electrical infrastructure. For example, guidance on locating on-street parking could include language such as “the last space on the block in the direction of travel will usually minimize cord management issues, and places user closer to crosswalks and curb ramps.”
- Additional considerations that apply in overlay zones, such as flood control zones
- Design of disabled access spaces, including requirements for the number of spaces in areas that must be accessible in areas with multiple PEV parking spaces and design standards for accessible spaces.

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<sup>40</sup> Montclair SAC Meeting Minutes. March 7, 2017.

## **Integrate AFV readiness into local planning efforts, including general plans and climate action plans, to support AFV infrastructure development**

Montclair Township should integrate AFV readiness policies and goals into local planning efforts, including general plans, transportation plans, sustainable community strategies, or similar documents. These plans are broader and less detailed than building codes and zoning ordinances, so policies calling for increased charging opportunities typically do not contain specific details on where chargers are needed or on how much charging should be provided. However, even voluntary or broad policies can provide a basis for local governments to negotiate with developers to install chargers during discretionary review, as well as set the stage for more detailed implementation through building codes or zoning ordinances. One example is Woodbridge Township's *Sustainable Community Plan and Climate Action Plan*, included in [Appendix D](#), which could serve as a model for Montclair to develop its own action plan. The township should also consider incorporating this readiness plan and follow-up efforts into its Sustainable Jersey participation, both for recognition and to provide an example to other municipalities.

Taking steps to amend municipal general plans and codes to encourage PEV deployment can be an important step in building consensus among policymakers and the public to support more specific PEV readiness implementation measures. The exact policies that local governments choose to include can range from broadly encouraging increased adoption of PEVs to requiring charging stations at specific land uses or sites where local agencies see development opportunities or anticipate high demand for charging. These policies can also help pave the way to fund plans and capital projects that accelerate the deployment of PEVs. The incremental cost of PEV readiness planning is lower if it is part of a larger-scale effort. For example, tying PEV readiness to local policies can make it easier to allocate different funding streams toward PEV plans and projects. Montclair is already a leader in this regard given the requirements the township has incorporated into redevelopment plans. The township should continue to move in the direction of incorporating explicit language that encourages PEV and charging infrastructure deployment, as well as natural gas. Refer to [Appendix D](#) for example language related to pre-wiring.

## **Permitting & Inspection**

### **Streamline and expedite approval processes**

To remove barriers to charging station installation, Montclair Township should create approval processes that are easy to navigate, fast, and affordable. In the case of commercial and workplace charging stations, reducing permitting fees is particularly effective to incentivize installations by property owners and employers. For both residential and non-residential installations, minimizing permit requirements will reduce the amount of staff time devoted to permit review, which will enable the township to expedite processing and levy lower fees to recover costs.

In particular, the following actions will streamline and expedite the charging station approval process:

- Make permits available online or have copies out and available for people to take;
- Issue required permits within 48 hours;
- Reduce fees for both residential and non-residential installations;



- Issue supplementary guidance, such as residential and non-residential-specific permitting checklists, to help applicants through the permitting process, and post it online for easy access;
- Limit the number of required inspections to one;
- Focus requirements for supporting materials that provide information about the PEV charging system itself (i.e., level of charger, compliance with national standards, proposed location) and electrical service (i.e., existing electrical panel service information, load calculations, whether panel upgrades or a new meter installation are required);
- Do not require site plans for PEV charging station installations in single-family residences;
- Integrate permits with a utility notification protocol to help PSE&G understand where PEVs are being deployed and how they are being charged.

Where possible, Montclair Township should work together with neighboring municipalities to make their processes, fees, and requirements consistent with the rest of the region. Consistency between municipalities will also make it easier and faster for electrical contractors who work throughout the region to permit and install charging stations.

### **Educate permitting officials, inspection officials, and first responders on the basics of AFV station installation**

Providing permitting staff with basic information about PEV charging stations and installations will help them process permits more efficiently and ensure staff can provide property owners with additional information about safety practices and other requirements. Similarly, inspectors would benefit from access to factual information and relevant details specific to Montclair (e.g., public charging locations) since they interface with residents, businesses, and others. The township may consider organizing an educational session focused on codes, safety, standards, site assessments, electric load calculations, permitting processes, and utility notification. Training first responders will ensure that safety procedures are in place in the case of any AFV or fueling/charging station-related emergencies.

The township could work with organizations such as the Electric Vehicle Infrastructure Training Program (EVITP)<sup>41</sup> to organize training sessions on charging station installations and outreach to share local best practices among staff. Montclair Township should also collaborate with neighboring communities, the county, the NJTPA, and others to create an ongoing region-wide schedule of training and outreach events so that stakeholders can stay informed on educational opportunities across the region.

## **Fleet Planning**

### **Assess the existing municipal fleet, develop a fleet management plan, and explore opportunities for fleet AFVs**

Montclair's municipal fleet included NGVs for many years and, while these vehicles have been phased out, the township has an interest in continuing to support AFVs in its fleet.

Montclair Township should develop a comprehensive fleet management plan that can provide a framework for decision making and investments. The fleet management plan should pull together

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<sup>41</sup> Electric Vehicle Infrastructure Training Program. See <http://evitp.org/training/>.

relevant goals and activities (e.g., Sustainable Jersey Green Fleet actions) and include meaningful metrics for measuring progress toward goals. If the township decides to procure vehicles, it should be aware of aggregated purchase options for both vehicles and infrastructure, including the Mid-Atlantic Region initiative under Fleets for the Future as well as EV Smart Fleets.<sup>42</sup>

### **Provide technical assistance and training to local fleet managers**

Fleet managers often require assistance navigating and weighing the various considerations associated with AFV ownership as compared to conventional vehicle ownership. Local governments can take part in trainings offered by Clean Cities coalitions such as the NJCCC. Beyond providing educational materials, Montclair Township could also organize technical assistance and training workshops in collaboration with the NJTPA and other partners.

## **Residential Charging**

In the near- to mid-term, most PEV charging will occur at drivers' residences. Today, for instance, about 70-90 percent of charging occurs at home. Furthermore, the majority of residential charging occurs at Level 1 charging, which is particularly attractive because it requires little to no consumer investment. However, as the market evolves, there are a variety of factors that will likely increase the need for more investments in residential charging. For instance, as batteries in vehicles become larger and as utilities seek to play an increased role in managed charging, higher level charging equipment will likely be required. As a result, Montclair Township should monitor and coordinate with PSE&G and other relevant agencies on the electricity demands and potential impacts to the local grid. Table 9 includes this and other key actions the township can take to help support the expansion of residential charging.

It is worth restating that residential charging demand is very market-driven, so Montclair Township's role in increasing this demand will be limited, allowing the township to focus its efforts on MUD, workplace, and public charging.

**Table 9. Recommendations to Support Residential Charging for Montclair AFV Readiness**

Action Area	Recommendation	Timeframe	Responsible Stakeholders
Permitting & Inspection	Produce guidance documents outlining permitting requirements for residential PEV charging station installations	Near-term	Montclair Township
Building Codes	Work with the state to amend the building code to require PEV station readiness in new single-family developments	Medium-term	Montclair Township
General Plans & Policies	Collaborate with PSE&G to facilitate necessary electricity distribution infrastructure upgrades	Ongoing	Montclair Township

<sup>42</sup> For more information see <http://www.fleetsforthefuture.org/> and <http://evsmartfleets.com/>.

## Permitting & Inspection

### **Produce guidance documents outlining permitting requirements for residential PEV charging station installations**

Providing information to local residents about the requirements to permit their residential charging station installation will both make the installation/permitting process more accessible and streamline the process. Montclair Township should consider developing a permitting checklist that helps applicants through the process and post it online for easy access. While this will require some staff time and resources up front, the time savings down the road will be significant, and NJDCA's "Electric Vehicle Charging Stations – What you need to know" can serve as a starting point for the checklist.<sup>43</sup>

## Building Codes

### **Work with the state to amend the building code to require PEV station readiness in new single-family developments**

Amendments to the UCC can only be made at the state level. Therefore, Montclair Township should consider coordinating with other municipalities to work with the state to amend the building code to require that new single-family residential developments with off-street parking include pre-wiring for PEV charging station installations. The township should also collaborate with its neighboring municipalities to work with the state to amend the New Jersey State Residential Site Improvement Standards (RSIS) to apply this requirement to property redevelopment.

## General Plans & Policies

### **Collaborate with PSE&G to facilitate necessary electricity distribution infrastructure upgrades**

Although sales of PEVs are forecasted to grow, regional impacts on the electrical grid (in terms of greater demand for electricity as more vehicles are charging) will likely be negligible for many years. However, unmanaged charging station installations and increased regional PEV ownership in specific areas could negatively affect local electrical distribution systems.

One of the primary causes of concern for PEVs is clustering of the load associated with vehicle charging. Utilities generally have a transformer replacement program to regularly target transformers that have reached the end of their useful life or have been identified as grossly overloaded. However, the adoption of PEVs may occur faster in some areas, thereby causing gaps in the information that utilities would generally use to inform their replacement programs. Utilities need to know where the vehicles are being used and how they are being charged (e.g., Level 1 vs. Level 2) so that they can evaluate whether the local distribution system is adequate to serve PEV charging needs. One simple, but not always utilized, solution to this potential challenge is for utilities to establish a clear notification protocol so that utilities are aware of new chargers being added to the grid. There may be unique grid impacts in Montclair because of the older homes in the area, even more reason for communication with PSE&G.

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<sup>43</sup> NJDCA, *Electric Vehicle Charging Stations – What you need to know*, [http://www.state.nj.us/dca/divisions/codes/publications/pdf\\_other/homeowners\\_guide\\_electric\\_vehicles\\_charging\\_stations.pdf](http://www.state.nj.us/dca/divisions/codes/publications/pdf_other/homeowners_guide_electric_vehicles_charging_stations.pdf). Accessed April 3, 2017.

## Multi-Unit Dwelling Charging

Most PEV charging is likely to occur at home. However, with a large portion of Montclair residents living in MUDs without dedicated garages like single-family homes, the purchase of a PEV may not make sense. Further, MUD owners and management companies will need to respond to tenant interest as the number of PEVs on the road increases. The recommendations in Table 10 represent the key actions Montclair can take to help address current and future demands for MUD charging.

As noted in [Section 1](#), much of the opportunity to expand charging infrastructure at MUDs will be through new developments or possibly as part of renovations to upgrade existing buildings. The established garden-style apartment complexes, for example, are less likely to have demand for charging given the socio-economic characteristics of the average tenant. MUD decision makers are not likely to pursue PEV charging infrastructure unless residents express an interest or the management company recognizes charging as an amenity to attract tenants. Therefore, it will be necessary for Montclair to be proactive with regard to targeted outreach and education.

**Table 10. Recommendations to Support MUD Charging for Montclair AFV Readiness**

Action Area	Recommendation	Timeframe	Responsible Stakeholders
General Plans & Policies	Conduct targeted outreach to MUD managers and developers to install chargers at high-priority locations	Near-term	Montclair Township
	Collaborate with MUDs to create and implement policies that allow residents to install PEV charging infrastructure	Medium-term	Montclair Township
Zoning & Parking Ordinances	Amend zoning codes to require or incentivize PEV charging stations or pre-wiring in new MUD developments	Medium-term	Montclair Township

### General Plans & Policies

#### **Conduct targeted outreach to MUD managers and developers to install chargers at high-priority locations**

Property owners and developers, and home owner associations (HOA) can have a tangible impact on PEV deployment in the region by providing charging for multi-family housing residents. In the case of MUDs, decision makers will need to consider the logistics of providing charging equipment, including who pays for the electricity and charging station upkeep, how to determine resident access/parking space sharing between resident PEV owners, and particular zoning and permitting considerations. They will also need to understand the approval process for new development versus existing development installations, and what activities would require a permit/approval from the Montclair Planning Board versus being done independently. Montclair Township can facilitate this discussion by providing targeted outreach and educational materials that address the specific questions and challenges these communities will face in the context of PEV and charging station deployment.

Montclair Township is proactive in its environmental and sustainability outreach, so it would be feasible and require little additional cost to build upon that foundation by developing a variety of situation- or user-specific PEV materials for distribution. Strategic outreach can take additional time, but it can also

be highly impactful, particularly given the presence of existing MUDs and new developments. The MUD demand map provided in [Section 1](#) (Figure 4) will be helpful as Montclair Township prioritizes target developments and areas. The township should also make educational information available to companies developing new or enhancing existing MUDs. See the resources in [Appendix E](#), particularly the link to an AFDC web page providing case studies, guidelines, and other information.

#### **Collaborate with MUDs to create and implement policies that allow residents to install PEV charging infrastructure**

Montclair Township has many residents that own or rent property in MUDs, where they might have a dedicated parking space but do not technically own the property on which they park. This presents unique challenges for PEV owners seeking to access a charging station at their home. Given the proportion of Montclair's population that might face such issues, the township can have a very tangible impact on PEV deployment by working with multi-family developments to develop policies that allow residents to install PEV charging infrastructure or provide shared charging for residents. Refer to [Appendix D](#) for an example of "right to charge" language. The township might also consider accompanying these policies with education materials for landlords about the benefits (i.e., added property value) of providing PEV charging infrastructure for tenants.

### **Zoning & Parking Ordinances**

#### **Amend zoning codes to require or incentivize PEV charging stations in new MUD developments**

Zoning codes, if developed thoughtfully, can facilitate PEV and charging infrastructure deployment. Montclair Township should consider amending zoning codes to require or incentivize pre-wiring or charging station installations at new MUD developments, including guidance on locating and installing PEV charging stations in such settings. Ideally, requirements should specify the number of chargers or pre-wired spaces to be provided at developments of different sizes. Pre-wiring can help developers avoid unnecessary costs later on. Anecdotal industry experience indicates the cost to pre-wire a space during construction is several hundred dollars compared to thousands of dollars if the required upgrade is done once construction is completed. While Montclair Township has implemented a requirement for redevelopment plans to include PEV charging stations and their necessary infrastructure, there is opportunity to strengthen the language to ensure that the requirements are more comprehensive, consistent across all redevelopment areas, and will not unintentionally impede charging station installations.



## Workplace Charging

The PEV charging infrastructure market has focused considerable attention on workplace charging—through funding, outreach, and pilot programs. Although most PEV charging occurs at home, and is expected to for the next several years, PEVs are still parked for many hours as part of regular commuting. The availability of charging as part of a regular commute can help increase the electric vehicle miles traveled by PHEVs, while also helping demonstrate to potential drivers that there is sufficient infrastructure to maintain driving habits in a BEV (i.e., overcome range anxiety). Table 11 highlights the key recommendations to help meet the demand for workplace charging, as well as private fleet AFV adoption, as part of Montclair’s AFV readiness planning.

**Table 11. Recommendations to Support Workplace Charging for Montclair AFV Readiness**

Action Area	Recommendation	Timeframe	Responsible Stakeholders
General Plans & Policies	Identify AFV grants and other funding opportunities for workplace charging infrastructure development	Ongoing	Montclair Township
	Conduct targeted outreach to employers to install chargers at high-priority locations	Near-term	Montclair Township, EZ Ride
Fleet Planning	Provide educational resources to local fleet managers regarding AFV and infrastructure deployment	Near-term	Montclair Township, EZ Ride
Permitting & Inspection	Produce guidance documents outlining permitting requirements for commercial PEV charging station installations	Near-term	Montclair Township
Zoning & Parking Ordinances	Amend zoning codes to require or incentivize PEV charging stations or pre-wiring in new commercial developments	Medium-term	Montclair Township

### General Plans & Policies

#### Identify AFV grants and other funding opportunities for workplace charging infrastructure development and other opportunities

Montclair Township can play an important role in accelerating regional AFV adoption by helping stakeholders identify and pursue grant funding, both for AFVs and for workplace and fleet fueling/charging infrastructure. Table 6 and Table 7 (in [Section 1](#)) summarize available incentives for PEVs and charging infrastructure, respectively. Each opportunity varies in terms of eligibility and timelines, though several are suitable for employers and fleets in Montclair.

Montclair can maximize the number of electric miles traveled by supporting charging for those commuting to and working in the township. Montclair is a particularly strong candidate for grant funding if it can show that it has identified particular areas or facilities that are well suited for charging stations. The high opportunity zone map in [Section 1](#) (Figure 7) provides a starting point to identify specific areas best suited for workplace charging. This analysis is backed by the workplace charging demand illustrated in Figure 5.

While PEVs and charging infrastructure apply to the broader population, natural gas technology is still predominantly applicable only to fleets since commercially available vehicles are medium- to heavy-

duty. Fleets operating in and around Montclair may be interested in funding for NGVs and natural gas fueling stations, should it become available in the future. Montclair Township can point fleet managers and other stakeholders to the NJCCC and other organizations closely tracking funding solicitations and other incentives.

Funding could also be used for workshops, trainings, outreach campaigns and events. These may be specific to Montclair, or coordinated with other municipalities in the region to conserve costs and increase the reach and impact. Depending on resource availability, Montclair might also consider participating in an information sharing process in order to assist – and receive assistance from – neighboring municipalities in these efforts. Organizations such as Sustainable Jersey are in an ideal position to facilitate information sharing among engaged municipalities.

### **Conduct targeted outreach to employers and commercial developers to install chargers at high-priority locations**

Building on the previous recommendation, Montclair Township should leverage the high opportunity zones and workplace charging demand maps in [Section 1](#) (Figure 7 and Figure 5, respectively) as resources to target workplace charging station development outreach. Commercial property owners and developers can have a tangible impact on PEV deployment in the region by providing charging for employees. Employers will need to gauge demand (current and future) and consider the logistics of providing charging equipment, including the etiquette for moving vehicles once the charging session is complete. They will also need to understand the approval process for new development versus existing development installations, and what activities would require a permit/approval from the Montclair Planning Board. The township can facilitate this discussion by providing targeted outreach and educational materials that address the specific questions and challenges employers may face in the context of PEV and charging station deployment.

Montclair Township has already been proactive in its environmental and sustainability outreach, so it would be very feasible and require little additional cost to build upon that foundation by developing a variety of situation- or user-specific PEV materials for distribution. Strategic outreach can take additional time, but it can also be highly impactful. This is an area in which EZ Ride can serve a key role, reaching out to its network of employers to provide factual and relevant information. The workplace charging demand map provided in [Section 1](#) (Figure 5) will be helpful as Montclair Township prioritizes target employers and areas. An obvious potential workplace charging location is Montclair State University, where PEV chargers could serve university employees, students, and visitors. Given the township's relationship with the university, this may be a natural partnership and area of focus. Primary education schools may be good candidates for workplace charging to serve teachers and other staff, particularly if they can leverage grant funding to offset costs.

## **Fleet Planning**

### **Provide educational resources to fleet managers**

Public and private fleets can provide opportunities for AFV introduction. However, fleets often require assistance navigating and weighing the various considerations associated with AFV ownership as

compared to conventional vehicle ownership. For this reason, information sharing can encourage investment in AFVs among corporate and government fleets alike.

Montclair Township should consider providing educational resources (e.g., toolkits or guidebooks) to fleet managers and employers to educate them regarding the total cost of AFV ownership, operating considerations, and fueling/charging station installation costs and guidelines. In particular, Montclair will need to educate the purchasing officer and should consider developing a comprehensive fleet management plan that incorporates AFV technology. It can also work with EZ Ride to effectively reach employers in the area.

In the case of electrification, since most PEVs available today are passenger cars, Montclair's near-term focus should include fleets with light-duty vehicle applications. As more medium and heavy-duty PEV technology develops, Montclair can provide additional resources that draw upon best practices and lessons learned from local and regional case studies of fleets deploying such vehicle models. The opposite is true with NGVs: most natural gas technology is available for medium- and heavy-duty vehicles. Montclair should therefore focus on fleets with these applications in the near-term, which may include shuttle buses/vans and trash collection and recycling fleets that serve commercial entities throughout the municipality. Should light-duty NGVs become more readily available in the future, the township can provide additional resources that draw upon best practices and lessons learned in light-duty scenarios in order to support further expansion of the technology.

## Permitting & Inspection

### **Produce guidance documents outlining permitting requirements for commercial PEV charging station installations**

Providing information to employers and other site hosts about the requirements to permit charging station installation will streamline the process. Montclair Township should consider developing a permitting checklist that details the process and post it online for easy access. While this will require some staff time and resources up front, the time savings down the road will be significant, and NJDCA's "Electric Vehicle Charging Stations – What you need to know" can serve as a starting point for the checklist.<sup>44</sup> The NJTPA could also provide support in this area by creating a template for municipalities to use.

## Zoning & Parking Ordinances

### **Amend zoning codes to require or incentivize PEV charging stations in new commercial developments**

Zoning codes, if developed thoughtfully, can facilitate PEV and charging infrastructure deployment. Montclair Township should consider amending zoning codes to require or incentivize pre-wiring or charging station installations at new commercial developments (e.g., office buildings serving multiple employers), including guidance on identifying locations for and installing charging stations in such

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<sup>44</sup> NJDCA, *Electric Vehicle Charging Stations – What you need to know*, [http://www.state.nj.us/dca/divisions/codes/publications/pdf\\_other/homeowners\\_guide\\_electric\\_vehicles\\_charging\\_stations.pdf](http://www.state.nj.us/dca/divisions/codes/publications/pdf_other/homeowners_guide_electric_vehicles_charging_stations.pdf). Accessed April 3, 2017.

settings. Ideally, requirements should specify the number of chargers or pre-wired spaces to be provided at new developments of different sizes. Pre-wiring can help developers avoid unnecessary costs later on. Anecdotal industry experience indicates the cost to pre-wire a space during construction is several hundred dollars compared to thousands of dollars if the required upgrade is done once construction is completed.

Incentives may include density or floor-to-area ratio bonuses or reduced application/design review fees. While Montclair Township has implemented a requirement for redevelopment plans to include PEV charging stations and their necessary infrastructure, there is opportunity to strengthen the language to ensure that the requirements are more comprehensive, consistent across all redevelopment areas, and will not unintentionally impede charging station installations.

## Public Charging

Public charging refers to away-from-home charging that does not occur at the workplace, and is part of a non-work trip. These stations are typically accessible to the public or specific drivers, and as noted previously can include Level 1, Level 2, and DC fast charging. Public charging typically takes place at locations where drivers are parked for varying times; the actual demand for public charging is difficult to predict. In some regards, the likely utilization of public charging infrastructure will vary considerably depending on factors including but not limited to driving patterns and the fee charged. Although there is an opportunity for public entities to provide public charging at recreational and other sites, this plan assumes that site hosts will generally be private or commercial entities working with a PEV charging infrastructure provider. Site hosts may be keen to support public charging infrastructure for a variety of reasons, including demonstrating a commitment to sustainability, attracting new visitors to a site, or increasing the time that visitors spend at a site.

Montclair Township is becoming more of a destination and will draw visitors that include PEV drivers. As the demand for public charging becomes clearer, it is important that Montclair Township provide technical and policy support where possible, and seek opportunities to conduct targeted education and outreach. Table 12 below highlights the key recommendations for consideration by Montclair as they relate to public charging.

**Table 12. Recommendations to Support Public Charging for Montclair AFV Readiness**

Action Area	Recommendation	Timeframe	Responsible Stakeholders
General Plans & Policies	Identify AFV grants and other funding opportunities for infrastructure development	Ongoing	Montclair Township
	Conduct targeted outreach to landowners to install chargers at high-priority locations	Near-term	Montclair Township, EZ Ride
	Pursue public-private partnerships to fund publicly accessible charger installations	Near-term	Montclair Township
Zoning & Parking Codes	Establish preferential parking policies for PEVs	Medium-term	Montclair Township
	Amend parking codes to regulate the use of PEV charging spaces	Medium-term	Montclair Township
	Amend zoning codes to require or incentivize PEV charging stations or pre-wiring in new commercial developments	Medium-term	Montclair Township
	Allow PEV parking to count towards minimum requirements	Medium-term	Montclair Township

## General Plans & Policies

### Identify AFV grants and other funding opportunities for fueling infrastructure development

Montclair Township can play an important role in accelerating regional AFV adoption by helping to identify grant funding, including for the purchase and installation of public fueling infrastructure. Table 6 and Table 7 (in [Section 1](#)) summarize the available incentives for PEVs and charging infrastructure, respectively. Each opportunity varies in terms of eligibility and timelines. Some are opportunities Montclair Township can apply for to fund public charging infrastructure or to purchase AFVs for the municipal fleet. Others are more suitable for private businesses in Montclair to expand the use of AFVs and the network of supporting infrastructure.

Montclair and its businesses should actively seek support in developing a robust charging station network that will ensure visitors and residents can access nearby charging options. This will both ease range anxiety and maximize the number of miles driven in electric mode. The high opportunity zone map in [Section 1](#) (Figure 7) provides Montclair Township with a starting point to identify specific areas of the best suited for public charging. This analysis is backed by the public charging demand illustrated in Figure 6.

The Montclair Parking Utility has indicated a willingness to explore charging infrastructure installation at public parking lots, and may be in a position to apply for grant funding. There are several municipal lots that would provide highly visible, centralized locations serving both visitors and residents. These include multiple lots in and around Montclair Center, the Grove Street lot, and the two lots in Watchung Plaza not specifically intended for train service parking. To help prioritize locations, the Montclair Parking Utility should consider the average dwell time, split between metered and permit spaces, and whether a lot is already at capacity on a regular basis.

### **Conduct targeted outreach to landowners to install chargers at high-priority locations**

Building on the previous recommendation, Montclair Township should leverage the high opportunity zone and public charging demand maps in [Section 1](#) (Figure 7 and Figure 6, respectively) as resources to target outreach. Local landowners should contribute to the charging network, as the local economy will benefit from increased visitation and longer stays. In Montclair, retailers, in addition to workplaces and MUDs, are particularly high-priority targets. Property owners, developers, and other decision makers at these locales can have a tangible impact on PEV deployment in the region by providing charging for visitors, in addition to residents. EZ Ride is in a position to bring businesses to the table, leveraging their regional network. PEV charging stations can be amenities that help draw customers, and ultimately, pose opportunities to grow the local economy through increased visitor traffic and community spending.

It is important for businesses interested in hosting public stations to have a sense of the demand for charging before they pursue installation. Several of the existing charging stations in Montclair are networked and site hosts have access to data on usage over time. The township is in a position to collect and compile usage information, including data from its chargers, and make it available in summary form. This will supplement the public charging demand map in [Section 1](#) (Figure 6), helping to illustrate how often chargers in certain parts of the township (e.g., Upper Montclair) are being used and where there may be opportunities to serve high demand areas with additional charging stations.

Montclair Township has already been proactive in its environmental and sustainability outreach, so it would be very feasible and require little additional cost to build upon that foundation by developing a variety of situation- or user-specific PEV materials for distribution. Strategic outreach can take additional time, but it can also be highly impactful. Montclair Township could share this information using a combination of print materials (to be distributed at events, in local venues like business improvement district offices, and other destinations around town) and digital materials that people can access online or via email newsletters.

### **Pursue public-private partnerships to fund publicly accessible charger installations**

There are various opportunities for Montclair Township to help facilitate funding for public charging station installations outside of grants. The Township should consider fostering public-private partnerships and working with business improvement districts (e.g., Montclair Center Corporation) to finance such installations. In the realm of public-private partnerships, there are display advertising opportunities for companies that sponsor charging stations. In both this case and that of partnerships with business improvement districts, the township will need to provide information supporting the business case for installing PEV charging stations, including customer attraction, dwell time, etc. Prospective station hosts should consider the potential increased revenue, as well as upfront costs.

Montclair Center Corporation has the authority to undertake improvements for parking areas and facilities, as well as provide special parking arrangements subject to Township Council approval. As such, Montclair Center Corporation could serve as a focal point and convener for discussions around PEV charging infrastructure in that particular commercial district. Businesses will need to be educated about the benefits of PEV charging, including increased customer interest and dwell times, and the township's targeted outreach efforts noted above should address this need.



## Zoning & Parking Codes

### **Establish preferential parking policies for PEVs**

Montclair Township should consider offering additional incentives for drivers to purchase PEVs, by creating dedicated parking spaces or waiving parking fees for these vehicles. If Montclair provides PEV parking that exceeds immediate demand, the township can consider specifying interim regulations that allow conventional vehicles to use these spaces in order to avoid under-utilization. The Montclair Parking Utility would provide leadership on this action and may look at adjusting existing parking permit requirements, as well as metered parking regulations, to benefit PEVs and other AFVs.

### **Amend parking codes to regulate the use of PEV charging spaces**

After establishing policies and strategies to encourage the deployment of PEVs, the next step for Montclair Township is to amend parking ordinances to specify the regulations that apply to parking spaces designated for PEVs. The goal of these amendments is to ensure that PEVs have unobstructed access to PEV charging and to ensure the township can recoup the costs of public charging at the stations it owns and operates.

When designating PEV parking, Montclair should consider applicable definitions, restrictions, enforcement policies, time limits, and fees. In general, it is a best practice to restrict the use of PEV charging stations to vehicles that are actively charging to ensure that the equipment is available for drivers who need them. For example, the City of Raleigh's Code of General Ordinances requires that vehicles parked in designated PEV spaces be connected to the charging station or be subject to a \$50 fine.<sup>45</sup>

While Montclair has taken a positive step by developing regulations to govern the use of PEV charging spaces, the ordinances may actually pose barriers to some charging station installations. The township should consider amending such regulations to include time limits for PEVs, restrictions for PEVs while not charging, and partnering with the Montclair Parking Utility to enforce these rules.

### **Amend zoning codes to require or incentivize PEV charging stations in new commercial developments**

Zoning codes, if developed thoughtfully, can facilitate PEV and charging infrastructure deployment. Montclair Township should consider amending zoning codes to require or incentivize pre-wiring or charging station installations at new commercial developments, including guidance on identifying locations for and installing EV charging stations in such settings. Ideally, requirements should specify the number of chargers or pre-wired spaces to be provided at new developments of different sizes and land-use types. Pre-wiring can help developers avoid unnecessary costs later on. Anecdotal industry experience indicates the cost to pre-wire a space during construction is several hundred dollars compared to thousands of dollars if the required upgrade is done once construction is completed.

Incentives may include density or floor-to-area ratio bonuses or reduced application/design review fees. While Montclair Township has implemented a requirement for redevelopment plans to include PEV charging stations and their necessary infrastructure, there is opportunity to strengthen the language to

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<sup>45</sup> City of Raleigh, NC, *Raleigh City Ordinance 11-2174(c) Electric Vehicle Parking FAQs*, <http://www.raleighnc.gov/content/PWksParkingMgmt/Documents/EVParkingFAQ's.pdf>. Accessed April 10, 2017.

ensure that the requirements are more comprehensive, consistent across all redevelopment areas, and will not unintentionally impede charging station installations.

**Allow PEV parking to count towards minimum requirements**

Montclair has minimum parking requirements specifying the number of spaces that developers must provide for new construction in different land uses. If PEV parking is not counted toward these requirements, it can discourage developers from installing charging infrastructure, because developers must either build more structured parking or reduce the amount of developed space to accommodate PEV charging. By amending the zoning or parking code to allow PEV parking to count toward parking requirements, Montclair could encourage PEV deployment. This is similar to the way that many local governments treat handicapped accessible parking, allowing it to count toward minimum requirements even though it has additional design requirements and is restricted to certain users.

## Appendix A. Acronyms

Acronym	Stands For
AC	alternating current
AFV	alternative fuel vehicle
AEO	Annual Energy Outlook
AFDC	Alternative Fuels Data Center
BEV	battery electric vehicle or all-electric vehicle
CNG	compressed natural gas
DC	direct current
EIA	U.S. Energy Information Administration
EVSE	electric vehicle supply equipment
GHG	greenhouse gas
HEV	hybrid electric vehicle
MUD	multi-unit dwelling
NGV	natural gas vehicle
NJBPU	New Jersey Board of Public Utilities
NJDCA	New Jersey Department of Community Affairs
NJDEP	New Jersey Department of Environmental Protection
NJTPA	North Jersey Transportation Planning Authority
PEV	plug-in electric vehicle
PHEV	plug-in hybrid electric vehicle
SAC	stakeholder advisory committee
TAZ	traffic analysis zone
TMA	Transportation Management Association
UCC	Uniform Construction Code
ZEV	zero emission vehicle

## Appendix B. Plug-in Electric Vehicle Forecasting Methodology

For the purposes of this plan, residential PEV ownership forecasts for Montclair were projected over a planning horizon from 2016-2030. PEV projections for Montclair were developed as a range based on varying assumptions around adoption trends. Estimates of new vehicle sales included in this plan were developed using the following assumptions:

- The total annual sales of light-duty vehicles in New Jersey has been about 550,000 to 600,000 over the last several years, based on data from the National Automobile Dealers Association.
- New sales in Montclair are proportional to the share of total vehicles in Montclair relative to the entire state.
- New vehicle sales increase at a rate similar to the forecasted new vehicle sales reported by the Energy Information Administration (EIA) in the Reference Case of the Annual Energy Outlook (AEO) 2016, for the Middle Atlantic Region.<sup>46</sup>

The increased deployment of PEVs coincides with increased deployment of more efficient conventional vehicles, driven largely by federal fuel economy and tailpipe greenhouse gas (GHG) emissions standards. Broadly speaking, the total stock of vehicles on the road is forecast to increase by about 10-12 percent between 2015 and 2030, and the stock of conventional vehicles is going to become more efficient, with efficiencies ranging from 40-50 miles per gallon (up from an average of around 25-30 miles per gallon today).

The table below summarizes the approach used to forecast PEVs in Montclair in low and high adoption scenarios. It also includes a GHG stretch scenario in which New Jersey meets the emissions reductions set forth in the New Jersey Global Warming Response Act.

Scenario	Description
<b>Low</b>	Reflects adoption trends comparable to the Reference Case in the EIA's AEO 2016, adjusted slightly for increased potential indicated in the Middle Atlantic region. <sup>47</sup>
<b>High</b>	Assumes that PEV adoption rates in Montclair will be consistent with the ZEV mandate in place for New Jersey, <sup>48</sup> with a fair-share assumption (i.e., that ZEV deployment will occur in the state on a population-weighted basis in the long-term).
<b>GHG Stretch</b>	The PEV strategy of the NJTPA Regional GHG Mitigation Plan calls for a 60 percent market share of PEVs by 2040 to meet state goals. The GHG stretch scenario assumes that PEV adoption rates will be slightly lower than the plan, with a 50 percent market share by 2040.

<sup>46</sup> U.S. DOE Energy Information Administration, *Annual Energy Outlook: 2016*, [http://www.eia.gov/outlooks/aeo/pdf/0383\(2016\).pdf](http://www.eia.gov/outlooks/aeo/pdf/0383(2016).pdf). August 2016.

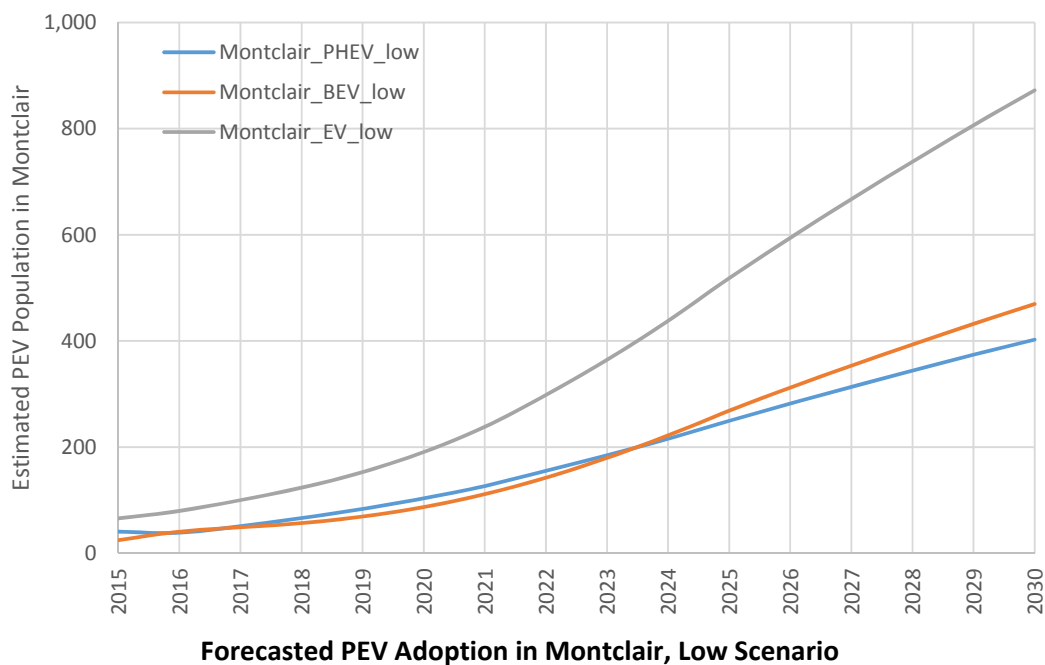
<sup>47</sup> AEO forecasting is typically used as a base for forecasts because it provides the benefit of transparency and consistency with national-level assessments. Further, the amount of data that is required to conduct a locally specific forecasting exercise is generally prohibitive. Lastly, the data are something that can be updated annually and modified by stakeholders easily, rather than relying on some proprietary methodology.

<sup>48</sup> ZEV programs aim to increase sales of ZEVs, which include PEVs and fuel cell electric vehicles, by requiring that some portion of vehicle manufacturer sales in the state be ZEVs. More information on New Jersey's ZEV mandate is available online at <http://www.nj.gov/dep/cleanvehicles/LEV.pdf>.

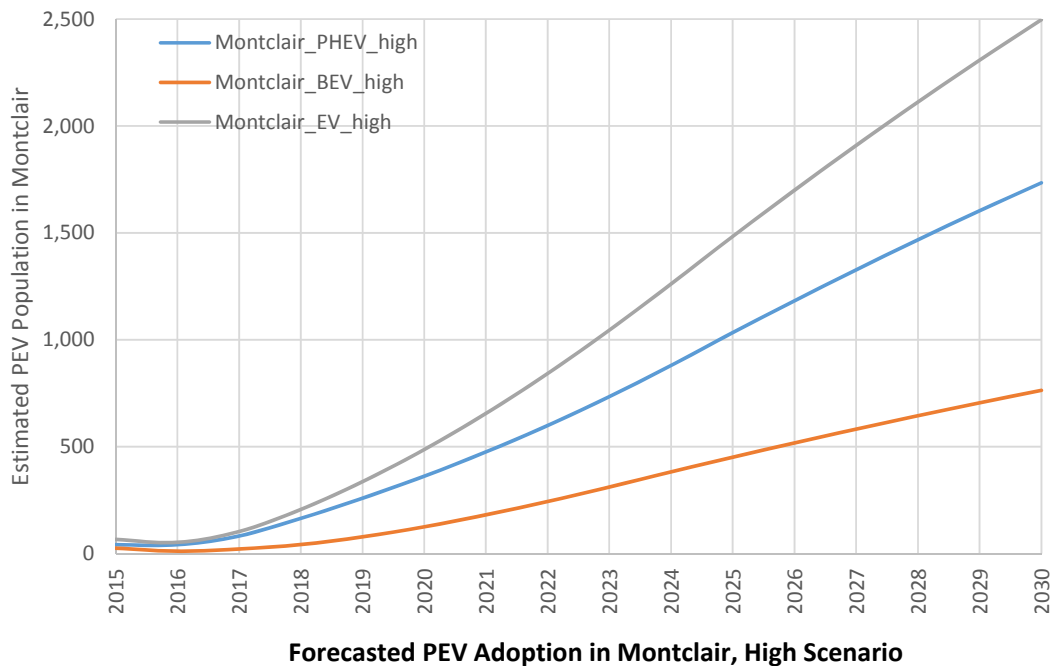
The figures that follow present the three PEV demand scenarios for Montclair based on the forecast descriptions in the table above. In the low scenario, the forecast is for approximately 875 PEVs (400 PHEVs and 475 BEVs) to be on the road in Montclair in 2030. In the high scenario, the forecast is for approximately 2,500 PEVs on the road (1,750 PHEVs and 750 BEVs). The GHG stretch scenario yields about 15,000 EVs on the road by 2040 in Montclair. To provide context, total light-duty vehicles are expected to increase by about 10-12 percent in Montclair by 2030, with a population of about 29,200 vehicles. The forecasts indicate that PEVs will make up to 6-17 percent of the vehicle fleet by 2030.

Additionally, note that the shape of each of the curves in the low scenarios and the shape of each of the curves in the high scenarios are similar. This is because both scenarios come from the same root functions, modified slightly based on the characteristics assumed in each case.

## Low Scenario



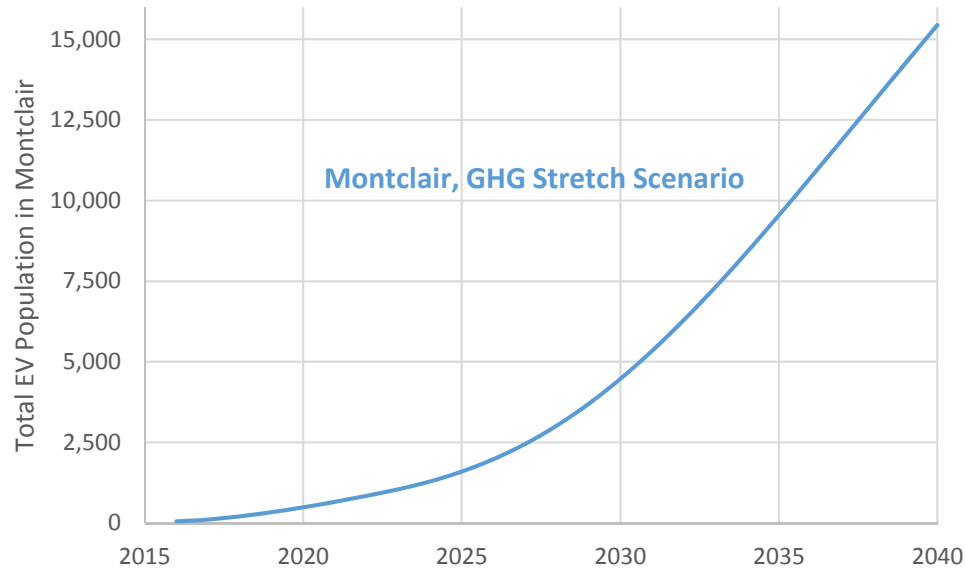
## High Scenario



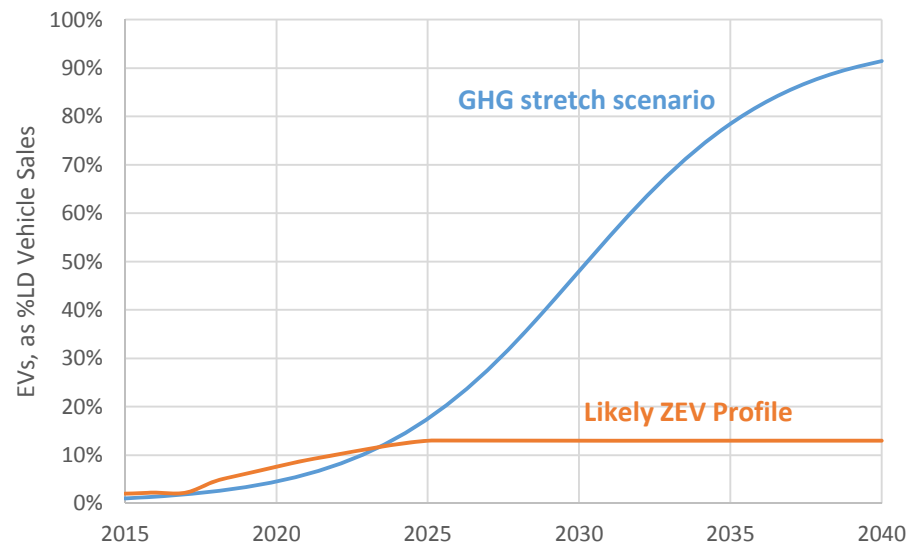
## GHG Stretch Scenario

The New Jersey Global Warming Response Act requires a statewide reduction in emissions of 80 percent from a 2006 emissions baseline by 2050. In the NJTPA Regional GHG Mitigation Plan, a PEV strategy is included with the myriad strategies designed to reduce GHG emissions from on-road transportation. The EV Plan Implementation and Clean Fuels strategy calls for a 60 percent market share of PEVs by 2040. This level of penetration of PEVs by 2040 would effectively require PEVs to capture 50 percent of all new vehicle sales by 2028, and increase rapidly to greater than 90 percent of new vehicle sales by 2040. The GHG stretch scenario assumes PEVs will capture 50 percent of the light-duty market by 2040. The first figure below compares the GHG stretch scenario with the likely compliance outlook for the ZEV program, which plateaus post-2025. As shown in the second figure below, the ZEV program will help PEVs with an initial trajectory, but much higher sale volumes will be needed post-2025 to achieve a 50 percent market share by 2040. In fact, in order to achieve the 50 percent market share by 2040, PEVs will have to make up 80 percent of new sales by 2035 and 90 percent by 2040.





Forecasted PEV Adoption in Montclair, GHG Stretch Scenario



GHG Stretch Scenario vs Likely ZEV Profile

## Appendix C. Charging Infrastructure Demand Forecasting Methodology

### Overview

The infrastructure demand analyses are largely based upon the foundational data points of the NJTPA region's current and likely PEV ownership.<sup>49</sup> Socio-economic data were extracted from the 2014 American Community Survey (five year estimates). These data are available at the Census Block Group (CBG) level and include income, tenure or property ownership, and dwelling type. The analysis also relies on vehicle registration, particularly of HEVs.<sup>50</sup> The key socio-economic indicators used to develop the charging infrastructure siting analysis were:

- **Income.** Market research on early adopters of PEVs suggests that households with higher incomes are more likely to purchase a PEV. Because these vehicles tend to have higher upfront costs, income can be a limiting factor and individuals with a low income might not be able to afford the upfront cost of a PEV. Furthermore, higher income households generally buy a disproportionate share of new vehicles across all market segments and vehicle types.
- **HEV Ownership.** There can be long-term fuel savings associated with HEV (and PEV) ownership, which is one of the main reasons some might invest in such a vehicle. However, research shows that households who value the non-economic (e.g., environmental) benefits of HEVs are more likely to purchase PEVs, particularly in the early adoption phases. Many HEV owners have shown a willingness to pay to reduce gasoline use that goes beyond the economic benefits of using an HEV. A Ford Motors representative noted that typical Focus Electric buyers have purchased HEVs in the past.<sup>51</sup> Research from the University of California, Davis (UC-Davis) supports this assumption: 68.3 percent of PEV owners surveyed either own or have owned an HEV and locations of HEV owners correlate with locations of PEV owners.<sup>52</sup>
- **Property Ownership.** Households who own their property are more likely to purchase a PEV than those who rent, according to market research by Nissan and Chevrolet and surveys by UC-Davis and California's Clean Vehicle Rebate Project recipients. Home ownership reduces both financial and non-financial barriers to charging infrastructure deployment.

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<sup>49</sup> There are multiple overlapping geographies considered in the charging infrastructure siting analysis. For instance, vehicle ownership data are provided at the ZIP code level; socio-economic indicators are provided at the CBG level; and trip data are generated for TAZs. These overlapping geographies can lead to uncertainty in the analysis; however, the analysis typically relies on values as percentages rather than absolute numbers. Through iterative analyses in other jurisdictions, the ICF team has found that this approach minimizes uncertainty. Furthermore, this makes the analysis less sensitive to changes on a time scale less than a year. For instance, if a municipality obtains PEV ownership at six-month intervals, and seeks to update the analysis, it is unlikely it will observe substantive changes in the results.

<sup>50</sup> Data provided by the NJDEP, based on NJMVC registration data.

<sup>51</sup> Mike Tinsky, Associate Director, Sustainability and Vehicle Environmental Matters, Vehicle Electrification and Infrastructure, Ford Motor Company. Phone interview, April 9, 2012.

<sup>52</sup> Gil Tal, Michael Nicholas, Justin Woodjack, Daniel Scrivano, Tom Turrentine, Plug-in Hybrid and Electric Vehicle Research Center of the Institute of Transportation Studies, University of California, Davis. Plug-In Vehicles in the San-Diego Region: A Spatial Analysis of the Demand for Plug-In Vehicles. Presented by Gil Tal, May 9, 2012, at EVS 26, Los Angeles, CA.

- **Dwelling Type.** Dwelling type (e.g., single-family detached, single-family attached, or multi-unit dwelling) can help indicate PEV ownership. Consumers with a single-family detached home generally have fewer barriers to PEV adoption as they usually have access to a garage or driveway. Consumers living in MUDs are more likely to encounter barriers to installing chargers (e.g., limited space for infrastructure installation, home owners' association restrictions, installation costs for trenching, additional metering requirements, power availability).<sup>53</sup>

The charging infrastructure demand analysis leverages origin-destination trip tables from the NJTPA, which indicate the number of trips from an origin traffic analysis zone (TAZ) to a destination TAZ.<sup>54</sup> Trip types include home-based work (HBW), home-based other (HBO), and non-home non-work (NHNW) trips.

The readiness plan includes the mapped results of each infrastructure demand analysis – residential, MUD, workplace, and public/opportunity charging. Each map includes five levels of shading, based on the percentile of each TAZ's score relative to the entire NJTPA region, and ranked as shown in the table below.

Scoring	Percentile	Demand
1	0—40%	Low
2	40—60%	Low/Medium
3	60—80%	Medium
4	80—95%	Medium/High
5	95—100%	High

## Residential Charging

The residential charging demand analysis (associated with both HBW and HBO trips) relies exclusively upon socio-economic data for each TAZ. This data determined a General Residential Charging (ResGeneral) Score, which is directly correlated with residential charging infrastructure demand. As such, no trip data was incorporated into this assessment.

The socio-economic indicators explained above were scored with different weighting factors, which were linked to survey and market research of PEV owners and based heavily on California's extensive PEV ownership data. These factors contributed to a ResGeneral Score:

$$ResGeneral\ Score = \sum \alpha Income, \beta HEV\_Ownership, \gamma Tenure, \delta DwellingType,$$

where

$$\alpha + \beta + \gamma + \delta = 1.$$

Each weighting factor was based on the level of correlation associated with PEV ownership to date, and each factor is skewed towards the first two parameters: income and HEV ownership. The latter two factors — tenure and dwelling type — were used to differentiate amongst areas with higher potential.

<sup>53</sup> Graham, R.L., J. Lieb, J. Sarnecki, R. Almazan, B. Neaman. Wise Investment in Electric Vehicle Charging Infrastructure through Regional Planning. EVS26 International Battery, Hybrid and Fuel Cell Electric Vehicle Symposium, 2012.

<sup>54</sup> The socio-economic data are scored at the CBG-level and the trip data are available at the TAZ level. NJTPA staff provided a look-up table linking each CBG with a TAZ.

The most critical parameter in this infrastructure demand analysis is income, which accounts for 60 percent of the scoring. To integrate this factor, CBGs were scored against one another by comparing the share of different income groups. This provides more granularity to the analysis than simply comparing median incomes.

The second most prominent parameter in the analysis is HEV ownership, which accounts for 30 percent of the scoring. This analysis compared the percent of HEVs owned in each CBG against the percent of HEV ownership in that CBG's municipality and against the entire state of New Jersey. CBGs scored higher in the analysis if they had HEV ownership higher than the state median.

The tenure parameter represents the rate of home ownership relative to the median rate of home ownership for the state of New Jersey. Based on survey data and PEV market research, home ownership as a percent of the number of residential units available in a given area are short- to mid-term indicators for PEV ownership but are less effective indicators over the long-term. For this reason, the tenure parameter accounts for 5 percent of the total score. Additionally, these parameters were used exclusively to differentiate amongst areas with better than median income and HEV ownership profiles. In other words, if an area did not have a higher than median income but did have a higher than median rate of home ownership, the home ownership factor would not impact the ResGeneral Score. However, for areas with a similar median income or HEV ownership profile, a higher rate of home ownership would yield a higher ResGeneral Score.

For the final parameter, dwelling type, areas were scored based on the rate of single-family units relative to the median rate of single-family units. This parameter also accounts for 5 percent of the total score and a higher rate of single-family units yields a higher ResGeneral Score.

## Multi-Unit Dwelling Charging

This analysis includes a new metric to estimate the likely demand for charging at MUDs. This metric was developed by using the same approach as outlined previously for the residential charging estimates, however, the value of the weighting factor for dwelling type,  $\delta$ ,<sup>55</sup> and the structure of the scoring were modified to favor areas with above median income, above median hybrid ownership, and a high share of MUDs (instead of a higher rate of single family units).

## Workplace Charging

To forecast the likely demand for workplace charging infrastructure, the results of the residential demand analysis were combined with regional travel demand data to determine the TAZs within Montclair that have the highest number of trips originating from TAZs with the highest likelihood of PEV ownership. The analysis relied upon an output matrix from the NJTPA's travel model, referred to as origin-destination trip tables for home-based work trips. The trip originating from TAZ<sub>o</sub> was multiplied by the score determined in the residential analysis, *ResGeneral Score<sub>o</sub>*. The likelihood of workplace

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<sup>55</sup> The weighting factor for dwelling type was increased to 25 percent from 5 percent, and the weighting factors for income and hybrid ownership were decreased to 50 percent and 20 percent, respectively. These changes are more subjective than the analysis behind the residential siting analysis, and it is important to update these values as the demand for charging at MUDs is better understood.

charging is simply correlated with the number of trips concluding at the workplace destination  $TAZ_D$ . The letters O and D represent origin and destination.

## Public Charging

In the long run, public charging will consist of predominantly Level 2 and DC Fast charging, with Level 2 being the charging type most feasible for Montclair Township to install and support. For this reason, the forecast for public charging focuses on Level 2 charging, using a methodology similar to the workplace charging analysis. However, instead of multiplying the ResGeneral Score by HBW trips, it is multiplied by HBO trips, which served as a proxy for public charging.

## Appendix D. Municipal Policy Examples

### Sustainability/Climate Action Plan

Woodbridge *Sustainable Community Plan and Climate Action Plan*,  
<http://www.twp.woodbridge.nj.us/DocumentCenter/Home/View/2813>

- Transportation and Circulation objectives include:
  - “Use fuel-efficient and alternative-fuel vehicles to reduce energy consumption, fossil fuel use, and associated air pollution emissions, including greenhouse gas emissions”
  - Continue to track alternative technologies such as electric, CNG or hybrid.”
- Includes indicators and targets specific to AFVs in the municipal fleet:
  - “Year 1 target: add at least five alternative fuel or high efficiency vehicles to the fleet
  - Further target: at least 25% of fleet using alternative fuels and/or high efficiency vehicles within 10 years.”
- Energy Conservation and Green Buildings action steps include:
  - “Adopt ordinances to change zoning to become electric vehicle friendly
  - Create a program that encourages work place and multifamily charging
  - Hold an event that promotes electric vehicle awareness”
- Other specific actions outlined in detail include:
  - “Create a Carpool Board for Municipal Employees and Promote Carpooling/Alternative Fuel Vehicles,” which seeks to provide information resources and explore the possibility of extending incentives to municipal employees.
  - “Create and Implement “Anything But Cars” (ABC) Program,” which aims to “provide choice and interconnectivity among sustainable transport modes and measures.”

### New Construction Pre-Wire Requirement

New York City requires that newly constructed and upgraded parking garages and open lots include the necessary hardware for charging infrastructure in at least 20 percent of the parking spaces. See the General Administrative Provisions for Construction Codes, Section 28-101.4.3, as well as the Building Code, Sections 406.2.11 and 406.7.11 (<https://www1.nyc.gov/site/buildings/codes/2014-construction-codes.page>).

### “Right to Charge” Language

While it exists at the state level, rather than as a municipal ordinance, California’s “right to charge” policy is summarized as follows:

A common interest development, including a community apartment, condominium, and cooperative development, may not prohibit or restrict the installation or use of electric vehicle supply equipment (EVSE) in a homeowner's designated parking space. These entities may put reasonable restrictions on EVSE, but the policies may not significantly increase the cost of the EVSE or significantly decrease its efficiency or performance. If installation in the homeowner's



designated parking space is not possible, with authorization, the homeowner may add EVSE in a common area for their use. The homeowner must obtain appropriate approvals from the common interest development association and agree in writing to comply with applicable architectural standards, engage a licensed installation contractor, provide a certificate of insurance, and pay for the electricity usage associated with the EVSE. Any application for approval should be processed by the common interest development association without willful avoidance or delay. The homeowner and each successive homeowner of the parking space equipped with EVSE is responsible for the cost of the installation, maintenance, repair, removal, or replacement of the station, as well as any resulting damage to the EVSE or surrounding area. The homeowner must also maintain a \$1 million umbrella liability coverage policy and name the common interest development as an additional insured entity under the policy. If EVSE is installed in a common area for use by all members of the association, the common interest development must develop terms for use of the EVSE. (Reference [California Civil Code](#) 4745 and 6713)

Source: <http://www.afdc.energy.gov/laws/9579>

## Appendix E. Plug-in Electric Vehicle Community Readiness Resources

This information was adapted from a collection of resources compiled by the DOE's Clean Cities program, focusing on tools, documents, websites, and other information available via DOE's Office of Energy Efficiency and Renewable Energy.

### [DOE EV Everywhere Electric Vehicles: Stakeholder Solution Center](#)

#### States and Municipalities

States and municipalities are key players in increasing PEV readiness. The best way for states and municipalities to improve their PEV readiness is to partner with their [local Clean Cities coalition](#), which can connect them to specific regional resources and other relevant stakeholders.

- [Plug-in Electric Vehicle Readiness Scorecard](#): Hosted on the DOE's Alternative Fuels Data Center, the Scorecard allows communities to assess their readiness, receive feedback about ways to improve, read about best practices, and record progress.
- [Guide to the Lessons Learned from the Clean Cities Community Electric Vehicle Readiness Projects](#): This guide, which is on the DOE Clean Cities' website, summarizes the best practices in streamlining permitting processes, revising codes, training emergency personnel, developing incentives, and educating the public based on the experiences of 16 PEV readiness projects across the country.
- [Reports from the Clean Cities' EV Community Readiness Projects](#): These are individual reports and community readiness plans from each of the projects, hosted on the Clean Cities' website. (See list of projects in chart, below).
- [Zoning, Codes and Parking Ordinances](#): This page on the DOE's Alternative Fuels Data Center links to relevant NIST codes for electric vehicle charging.
- [Handbook for Public Charging Station Hosts](#): This handbook on the DOE's Alternative Fuels Data Center provides an overview for what cities hosting public charging stations need to know before installation.
- [Creating EV-Ready Towns and Cities: A Guide to Planning and Policy Tools](#): Published by the Transportation and Climate Initiative, this guide provides information on the steps to create, administer, and amend planning processes, rules and regulations, including in zoning, parking, and permitting.
- [EV-Ready Codes for the Built Environment](#): This guide, published by the Transportation and Climate Initiative, provides an overview of building and electrical codes as relating to PEVs, as well as providing recommendations specific to jurisdictions in the Northeast and Mid-Atlantic.
- Training on PEVs for First Responders through the [National Alternative Fuels Training Consortium](#) and the [National Fire Protection Association](#) provides essential education to firefighters, police officers, EMTs and others that may need to respond to accidents involving PEVs.
- [Drive Electric Vermont Case Study](#): This case study examines the opportunities and barriers to enabling small and midsize communities to partake in the PEV market and benefit from the economic and environmental advantages of the vehicles.

## Employers

Providing charging at the workplace can encourage employees to purchase PEVs, be an attractive employee benefit, and maximize all-electric miles driven by PEV owners. The EV Everywhere [Workplace Charging Challenge](#) was a DOE program to encourage and recognize employers providing workplace charging.

- [Resources to Install and Manage Workplace Charging](#)
- [Handbook for Workplace Charging Hosts](#)

## Fleets

Like consumers, fleets can benefit from the low operating costs and other benefits associated with PEVs. [Local Clean Cities coalitions](#) can help fleets decide which technologies and models will be most appropriate to meet their needs.

- [Handbook for Fleet Managers](#): This handbook on the DOE's Alternative Fuels Data Center provides fleet-specific information on the basics of PEVs, including issues like maintenance and charging.
- [Plug-in Electric Light, Medium and Heavy-Duty Vehicle Search](#): This tool on DOE's Alternative Fuels Data Center provides information on PEVs that can be filtered by class/type and manufacturer.
- [AFLEET Tool](#): Argonne National Laboratory's Alternative Fuel Life-Cycle Environmental and Economic Transportation Tool allows fleet managers to calculate the cost of ownership, petroleum use, greenhouse gas emissions, and air pollutant emissions of alternative fuel vehicles.

## Electrical Contractors and Inspectors

The installation of residential, workplace and public charging is essential to establishing a PEV market.

- [Electric Vehicle Infrastructure Training Program](#): This program provides training and certification at community colleges and electrical training centers across the U.S. for people installing electric vehicle supply equipment for residential and commercial markets.
- [EVSE Residential Charging Installation Video](#): A series of segments on the Clean Cities TV YouTube channel walk electricians through the basics of installing PEV charging infrastructure in homes, including an overview of the equipment, the relevant National Electrical Codes, inspection, and best practices.

## Utilities

Through a partnership with the Edison Electric Institute, DOE is developing a suite of tools for utilities to support the use of PEVs.

- [The Utility Guide to Plug-in Electric Vehicle Readiness](#): A guide from the Edison Electric Institute, this document covers structuring your company to support PEVs, adding PEVs to utility fleets, enhancing the customer experience, working with state and local governments, and managing the electrical grid with PEVs.
- [Utilities Power Change](#) – This case study showcases how New Jersey's Public Service Electric and Gas Company, and Southern Company's unit Georgia Power are launching workplace charging programs for their commercial customers.

## Additional Resources

[At A Glance: Electric-Drive Vehicles](#)

[Charging Plug-In Electric Vehicles in Public](#)

[Charging Plug-In Electric Vehicles at Home](#)

[Resources for Electrical Contractors and Inspectors](#)

[Developing Infrastructure to Charge Plug-In Electric Vehicles](#)

[Plug-In Electric Vehicle Deployment Policy Tools: Zoning, Codes, and Parking Ordinances](#)

[Signage for Plug-In Electric Vehicle Charging Stations](#)

[Plug-In Electric Vehicle Handbook for Consumers](#)

[Workplace Charging: Charging Up University Campuses](#)

[Electric Vehicle Charging for Multi-Unit Dwellings](#) (webpage with links to resources and case studies)

[Massachusetts Plug-in Electric Vehicle and Charging Infrastructure Case Study](#)

[Rolling Down the Arizona EV Highway](#) (case study)

[San Diego Prepares for Electric Vehicles in Multi-Unit Dwelling Communities](#) (text version and video)

[Houston Energizes Deployment of Plug-In Electric Vehicles](#) (case study)

[Seattle Rideshare Fleet Adds EVs, Enjoys Success](#) (case study)

[Alternative Fuels Data Center Publications](#) (search by keyword for additional resources)

## Appendix F. Additional Information on Parking

Montclair's Parking Utility is governed by Chapter 3, Article XIVB of the Montclair Code of Ordinances (<http://ecode360.com/MO0769>). This states that the "Montclair Parking Utility shall be responsible for the administration, operation, and maintenance of all parking facilities owned by or under the control of the Township, including but not limited to parking lots, parking decks and structures, and regulated street parking." The Montclair Parking Utility is also responsible for the oversight of parking operations within the Township and is continuously working to improve parking conditions throughout Montclair. The Parking Utility is responsible for the implementation of PEV infrastructure on township property.

Another department with responsibilities related to municipal infrastructure (and thus, AFV infrastructure) is the Montclair Department of Community Services. This department performs the functions of maintenance, construction and reconstruction of streets, roads, storm sewers, drainage and parking facilities under Chapter 3, Article XI (Montclair Code of Ordinances), and may relate to management of alternative fuel equipment and infrastructure. Additionally, Chapter 44, Article VI (Montclair Code of Ordinances) creates the position of Parking Enforcement Officer, and covers powers, duties, qualifications, and compliance, specifically under § 44-23:26. This position is responsible for proper parking of AFVs as in the ordinances below.

Parking permits, limitations, and restrictions are covered extensively in the Montclair Code of Ordinances under Chapter 327, "Vehicles and Traffic." Article V under this chapter covers Metered Parking, but does not address charging for electric vehicles, which should be considered for the future. Chapter 347 governs zoning within the Township. The following are relevant definitions found within the zoning ordinances that may relate to AFVs:

- **Off-Street Parking** – Surfaced areas, not including driveways, designed for the parking of motor vehicles.
- **Parking Deck** – A deck, building or structure or part thereof used or intended to be used for the parking and storage of vehicles.
- **Structure** – Anything constructed, the use of which requires permanent location on the ground or attachment to something having permanent location on the ground, including central air-conditioning units, stationary and portable carports, but excluding paved parking areas, driveways, and walkways.

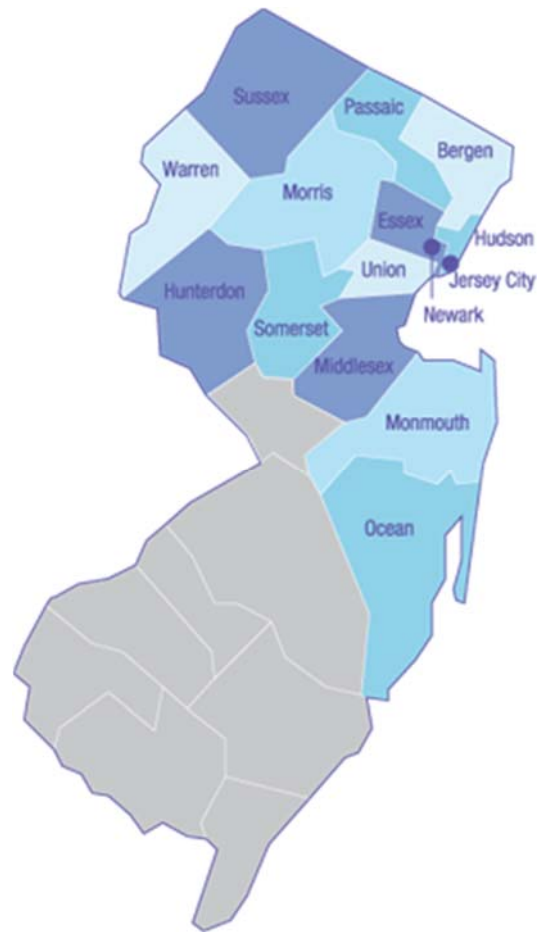
## Appendix G. Regional Planning Area

The NJTPA regional planning area consists of 13 counties within North New Jersey; Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, and Warren; and its two largest cities, Newark and Jersey City. The region spans 4,200 square miles, about half of the state's land area. It is the fourth largest MPO in the nation in terms of population, serving more than 6.7 million people and over 3.1 million jobs.<sup>56</sup>

The region has a robust multi-modal transportation network, including 26,000 miles of roads, 255 local and express bus routes, and 13 commuter/light rail lines with 228 stations, and 18 ferry routes from 19 piers.<sup>57</sup> Situated between New York and Philadelphia, the area is a regional corridor for both intra- and inter-state transportation. According to the American Community Survey (ACS), 34 percent of regional residents work outside their county of residence and 14 percent work outside of the state. The ACS found that the majority (70 percent) of commuters report driving alone, a rate that is significant but lower than most major metropolitan areas. In 2015, the region had 149.1 million miles of vehicle travel.<sup>58</sup>

The NJTPA's regional transportation plan – Plan 2045: Connecting North Jersey – outlines the principles that guide project selection and provide policy and planning direction.<sup>59</sup> These include:

- **Help Northern New Jersey Grow Wisely** — Transportation investments should encourage economic growth while protecting the environment and minimizing sprawl in accordance with the state's Smart Growth plan, Energy Master Plan, and environmental plans.
- **Make Travel Safer** — Improving safety and security should be explicitly incorporated in the planning, design, and implementation of all investments.
- **Fix It First** — The existing transportation system requires large expenditures for maintenance, preservation, and repair, and its stewardship should be the region's highest priority.



**NJTPA Region**

<sup>56</sup> NJTPA, Plan 2045: Connecting North Jersey, <https://apps.nitpa.org/plan2045/>.

<sup>57</sup> New Jersey Transit, *Facts at a Glance – Fiscal Year 2016*, <http://www.njtransit.com/pdf/FactsAtAGlance.pdf>.

<sup>58</sup> New Jersey Department of Transportation, *New Jersey's Roadway Mileage and Daily VMT by Functional Classification Distributed by County*, [http://www.state.nj.us/transportation/refdata/roadway/pdf/hpms2015/VMTFCC\\_15.pdf](http://www.state.nj.us/transportation/refdata/roadway/pdf/hpms2015/VMTFCC_15.pdf).

<sup>59</sup> NJTPA, Plan 2045: Connecting North Jersey, <https://apps.nitpa.org/plan2045/>.



- Expand Public Transit — Investment to improve the region’s extensive transit network should be a high priority, including strategic expansions to serve new markets.
- Improve Roads but Add Few — Road investments should focus on making the existing system work better and road expansion should be very limited without compromising the tremendous accessibility provided by the existing highway system.
- Move Freight More Efficiently — Investments should be made to improve the efficiency of goods movement because of its importance to the region’s economy and quality of life.
- Manage Incidents and Apply Transportation Technology — Investments should be made to improve information flow, operational coordination, and other technological advances that can make the transportation system work smarter and more efficiently.
- Support Walking and Bicycling — All transportation projects should promote walking and bicycling wherever possible.
- Increase Regional Resiliency — Investments should be made to mitigate risks associated with sea level rise, extreme weather, homeland security, and other potential threats. Investments should consider criticality of infrastructure, vulnerability, and level of risk.

While the expansion of transit and smart land-use planning work to reduce single occupant travel, the adoption of AFVs within the region will help reduce the environmental impact of the remaining vehicle trips by reducing oil consumption and transportation-related emissions, thus supporting the NJTPA’s goal of protecting the environment.