



Interagency Collaboration on Alternatively Fueled Vehicle Infrastructure

Final Report

Consultant Team:
ICF
Greener by Design
Fitzgerald & Halliday, Inc.

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Table of Contents

| | |
|---|----|
| Executive Summary..... | 1 |
| Key Findings | 1 |
| Literature Review | 3 |
| Approach..... | 3 |
| Key Findings | 3 |
| Stakeholder Engagement..... | 6 |
| Municipal Stakeholder Advisory Committees (SACs) | 6 |
| Technical Advisory Committee (TAC)..... | 7 |
| Additional Stakeholder Collaboration..... | 8 |
| Readiness Plans..... | 10 |
| Approach..... | 10 |
| Key Findings and Results..... | 11 |
| Challenges..... | 12 |
| Follow-up Activities..... | 13 |
| Alternative Fuel Vehicle (AFV) Readiness Guidebook..... | 15 |
| Approach..... | 15 |
| Results | 16 |
| Key Findings and Opportunities | 16 |
| Appendix A: Stakeholders | |
| Appendix B: Literature Review | |
| Appendix C: Readiness Plans | |
| Appendix D: AFV Readiness Guidebook | |
| Appendix E: Outreach Materials | |

Executive Summary

With the increased availability of and attention on alternative fuel vehicles (AFVs) in recent years, the North Jersey Transportation Planning Authority (NJTPA) is supporting regional deployment of these vehicles and related infrastructure in both the consumer and fleet markets. The NJTPA region stands to benefit greatly from all that AFVs have to offer. This includes reduced fuel costs, savings on maintenance, attractive new technology, support of domestic industries, and promotion of improved air quality and environmental sustainability.

Community readiness planning efforts are part of a broader strategy to shift away from reliance on conventional vehicles and fuels to AFVs. As such, the NJTPA partnered with three pilot municipalities – Montclair Township in Essex County, the Town of Secaucus in Hudson County, and Woodbridge Township in Middlesex County – to develop local readiness plans that identify barriers and provide recommendations to support widespread adoption of AFVs. The effort also included a literature review, targeted stakeholder outreach, and the development of an AFV readiness guidebook for all municipalities in the NJTPA region.

This report provides an overview of each project task (literature review, stakeholder engagement, readiness plans, and guidebook), including the approach, key findings or results, challenges, and opportunities. The final versions of each project deliverable are included in the appendices.

Several reoccurring themes emerged and are highlighted in the deliverables, including the demonstrated value of local readiness planning, the importance of active stakeholder engagement, the significant opportunity for AFV deployment in the NJTPA region in the near term future, the unique considerations for each fuel type (e.g., the consumer focus for PEVs and fleet focus for NGVs), and the challenge of maintaining momentum around AFV readiness planning.

The products of this study are:

- A literature review on AFV readiness from across the United States and internationally;
- AFV readiness plans for Montclair Township, the Town of Secaucus, and Woodbridge Township;
- A guidebook to help any municipality develop an AFV readiness plan; and
- A final report, summarizing all work conducted.

Key Findings

Major conclusions, findings, and lessons from this study are as follows:

- **Stakeholder engagement and partnerships are critical to effective AFV infrastructure planning and implementation.** Deploying AFVs is a complex process involving a variety of stakeholders. Stakeholders include individuals and organizations that will be involved in implementing readiness actions, as well as those that can provide perspective. Gathering input from stakeholders and building partnerships are important steps toward effective goal setting,

Fuels of Focus

To align with the New Jersey Energy Master Plan, the municipal readiness planning efforts, including the literature review, focused on plug-in electric vehicles (PEVs) and natural gas vehicles (NGVs). Note that both plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs) make up the broader PEV category. For the guidebook, the NJTPA and the project team also considered propane, hydrogen, and biofuels.

comprehensive readiness planning, and successful implementation. It is necessary to engage stakeholders early and on an ongoing basis.

- **Readiness planning should focus on local needs, priorities, and challenges.** Effective readiness planning includes identifying specific barriers and challenges to local AFV use. Much of the readiness planning work done nationwide has had a state or regional focus, with very few truly local plans. While it is important to consider and apply lessons learned from early AFV readiness planning efforts in California and other areas, the most relevant and impactful recommendations are rooted in an understanding of the local conditions and opportunities.
- **Municipalities should prioritize efforts to support infrastructure development based on demand.** Demand analyses can provide municipalities with a better understanding of how much demand exists for PEV charging infrastructure in residential (single-family and multi-family), workplace, and public settings. While residential demand is primarily driven by market dynamics, municipalities can have a greater impact on increasing and meeting workplace and public charging demand through targeted education, outreach, and partnerships.
- **Multi-unit dwellings (MUDs) present significant challenges and opportunities for widespread PEV use.** An MUD resident typically does not have access to their own charging station given the lack of a dedicated garage or parking space. Interest in providing charging stations at MUDs is largely driven by tenant demand. Enabling PEV charging for MUD residents could be a significant opportunity to increase PEV use given that parts of the NJTPA region are densely populated urban areas. Effectively addressing the issue requires coordination with MUD developers, managers, home owners associations, and residents.
- **Municipal policy changes are among critical implementation activities leading to increased AFV use.** Municipalities must be willing to consider and eventually execute changes to ordinances, codes, and internal practices in order to address regulatory and other barriers. Activities could include the following:
 - Include PEV charging stations as a permitted accessory use in specified zoning districts.
 - Encourage or require that new developments include PEV charging stations or the electrical wiring to install them later.
 - Assess the municipal fleet and develop a fleet management plan that includes AFVs.
- **PEV charging infrastructure will be the focus of increased investment in the near-term.** Building on financial incentives available from New Jersey state agencies, funding from private entities such as Electrify America, as well as utilities, will result in more charging stations in the NJTPA region. Most infrastructure will be intended for public charging, with higher powered chargers placed along long-distance travel corridors and a mix of charging levels in metropolitan areas. There are also efforts underway to incorporate PEVs into rideshare programs and other fleets, meaning more people will be exposed to the technology.

Literature Review

The project team conducted a literature review of AFV readiness from across the United States and internationally. The literature review was intended to inform the municipal readiness planning activities by identifying case studies, lessons learned, best practices, and information gaps relevant to AFV infrastructure planning in the existing literature.

Approach

The project team initially compiled a list of documents to include in the review based on a library of readiness planning documentation from previous efforts, internet searches, and input from local stakeholders. The project team identified and reviewed 81 documents related to PEV and NGV readiness and implementation.

The project team prioritized documents that:

- **Were recently published.** All publications included were released after 2009, and approximately half were published since 2014.
- **Were locally relevant.** Over a quarter of publications included focused on the Mid-Atlantic or Northeast regions.
- **Summarized previous efforts and provided lessons learned.**
- **Focused on PEVs and NGVs.**

The project team categorized each of the documents and then developed an Excel spreadsheet to guide the review, including a document overview as well as a summary of how (if at all) the document addressed each of these items:

- **Key challenges and benefits evaluation**, including environmental, economic, and energy security.
- **Techniques for market assessment**, including niche applications and infrastructure siting visions and goals.
- **Regulatory frameworks**, including zoning, parking codes, permitting, building codes, incentives, and utility considerations.
- **Strategies for advancement**, including key partnerships, corridor planning, procurement practices, education and training, and other strategies.

Key Findings

The literature review, provided in Appendix B, includes readiness planning best practices for PEVs and NGVs, as well as key findings for AFV readiness planning in the NJTPA region overall. The most salient takeaways focus on the value of addressing the following topics:

- **Regulatory elements, including codes, standards, permitting, and parking.** The literature encourages municipalities to examine their building, electrical, and zoning codes for opportunities to standardize definitions related to AFVs, encourage PEV charging infrastructure in new construction, add charging infrastructure as a permitted use in various zones, require charging infrastructure for specific land use developments, and adopt infrastructure design standards. The permitting process should be clear, streamlined, and accessible. Lastly, parking rules should specify design criteria for PEV parking spaces and establish associated regulations and enforcement policies that are clear and consistent.

- **Incentives, financial and otherwise.** Municipalities may be able to leverage utility, state, and federal incentives and programs for AFV infrastructure development. In addition, municipalities can consider providing their own incentives, such as grants for vehicles or equipment, high-occupancy vehicle lane and time-of-day driving restrictions, parking fee exemptions, or “head of the line” incentive programs.
- **Purposeful and inclusive infrastructure planning.** One of the central challenges of AFV deployment is the accessibility of adequate fueling infrastructure to support vehicles, particularly for PEVs. PEV readiness planning should involve an analytical exercise to identify charging demand in residential, multi-family, workplace, and public settings. This analysis should take into account the logistics of infrastructure installation (e.g., proximity to electrical service) and impacts on the grid. Natural gas infrastructure siting should focus on fleet deployment interest and fuel supply.
- **Clarity, collaboration, and consistency in communication.** The literature identifies several opportunities for municipal partnerships, including with utilities, other jurisdictions, and dealerships. For example, municipalities should collaborate to ensure AFV signage is consistent.
- **Opportunities for training and education, including municipal and fleet decision-makers and first responders.** Audience-specific training and outreach is a critical component of increased AFV deployment, and ensuring safety once the vehicles are on the road. For example, consumer education around PEVs may ease concerns about charging station availability. Similar educational opportunities may exist with fleets considering AFVs. Additionally, electrician and inspector training will ensure low stress and consistently high-quality charging station installations. Lastly, first responders, drivers, and fleet managers may benefit from safety training.

The project team identified the following overarching lessons learned, based on the existing body of literature:

- **Stakeholder engagement and partnerships are critical.** Deploying PEVs and NGVs is a complex process involving a variety of players, including, but not limited to, permitting authorities, transportation planners, parking authorities, business owners, fleet managers, consumers, and local nonprofits. It is critical to engage these groups early to gather input into the readiness planning effort, and to follow up with any outcomes and to address any education and training needs. The literature includes a variety of methodologies for stakeholder engagement, including interviews, focus groups, and surveys.
- **The literature lacks NGV readiness planning guidance.** For NGV planning, local governments rely on industry documents rather than actual municipal planning documentation. The focus of NGV readiness planning is on fleets, which includes infrastructure planning, education and outreach, and other efforts, but does not typically involve as many stakeholders. This differs from a consumer focus for PEVs, which makes them more mainstream. As a result, PEV readiness planning has more widespread impacts on a variety of stakeholders (e.g., employers, residential landlords) not typically involved in fleet vehicle deployment and infrastructure development.

- **Readiness planning should focus on local challenges for PEV and NGV deployment.** While the national, and even broad regional, literature is robust – particularly for PEV readiness – effective planning should focus on identifying specific barriers and challenges to adoption in the applicable locality for it to be most impactful. For example, in cold weather climates, PEV charger location siting needs to account for snow removal, which is not relevant for warmer climates. At the time of the literature review, all of the publicly-available readiness plans were conducted at the state or regional level. Therefore, the NJTPA’s commitment to engaging with local municipalities is particularly innovative.
- **The literature lacks evidence-based approaches.** While research suggests readiness planning is effective (see below), a closer look at the literature shows that there are few best practices in this area. There are certainly examples and case studies available for review; however, there is little quantifiable evidence or metric tracking around specific approaches.
- **Stakeholders would benefit from living documents and resources.** The AFV industry, consumer and fleet markets, and political climate are always changing. Municipal planners and other stakeholders would benefit from a living central resource allowing them to share the most recent techniques, methodologies, and templates within the region. Interactive toolkits and social media tools, such as blogs with guest contributors, can also be a creative way to ensure active engagement.
- **Readiness planning is important for increasing vehicle and infrastructure use.** The success of short- and long-term transportation goals (e.g., emissions and petroleum reduction, public health improvements) will depend on the near-term deployment of AFVs and fueling infrastructure, and the associated planning required by stakeholders. Researchers have demonstrated a correlation between higher PEV deployments and infrastructure utilization and areas that undertook readiness planning efforts.

Stakeholder Engagement

Stakeholders include individuals and organizations that will be involved in implementing readiness actions, as well as those that can provide perspective based on experience, area of expertise, and complimentary efforts. Stakeholder feedback was a critical component of the entire project. Municipal stakeholder input helped to ensure each readiness plan was developed in a way that was tailored to the particular goals, interests, and concerns of the community. The project team also actively engaged stakeholders and sought input by providing progress updates and educating stakeholders on AFVs, infrastructure, and relevant topics. The project team received comments and feedback throughout the project timeframe, though the most substantive input was provided at Stakeholder Advisory Committee (SAC) meetings.

Municipal Stakeholder Advisory Committees (SACs)

In coordination with the NJTPA, the project team facilitated SACs within each of the three pilot communities. Engaging stakeholders was important to gain an improved understanding of the local demand and barriers for PEVs and NGVs, to identify potential high opportunity charging infrastructure locations, and generally to foster a sense of ownership of implementation activities. The project team worked with the municipal stakeholders to both educate them regarding the advancement of AFV technology as well as solicit guidance for the development of the local municipal readiness plans.

The project team and the NJTPA provided high level guidance and encouragement to the local municipalities so that the municipalities could identify and invite stakeholders to be part of the SACs. See Appendix A for the list of participants, though attendance at each meeting varied.

The project team held three meetings of each of the three municipal SACs during the project's timeline.

- **SAC Meeting 1, September 2016.** Following a presentation on the basics of PEVs and NGVs, as well as the various elements of the project, the goal of the initial SAC meetings was to gather input on stakeholder perception of the municipality's state of readiness, barriers (real and perceived), opportunities, and potential solutions. Discussion included ideas for increasing the level of participation and reach of the SACs.
- **SAC Meeting 2, March 2017.** The focus of the second round of SAC meetings was interactive discussion with stakeholders to draw input on a series of strategies that could be included in the readiness plan as well as help determine priority areas. The priorities, opportunities, and challenges identified and discussed during these meetings helped to determine the recommendations presented in the readiness plans.
- **SAC Meeting 3, September 2017.** During the third round of SAC meetings, the project team presented findings that were included in the draft readiness plans and received feedback from the participants on specific aspects, including high opportunity zones. The project team also presented an outline of the guidebook.

Technical Advisory Committee (TAC)

The project team helped to coordinate and facilitate three meetings of a broad-based TAC, which the NJTPA established with input from the project team. See Appendix A for a full list of TAC members. TAC meetings provided a forum for exchange of ideas related to the municipal readiness plans, the AFV guidebook, and other related information. Agenda items included guidance on the project, coordination and input on stakeholder engagement, and high-level review and input on draft deliverables. The project team prepared the TAC meeting agendas, notes, and presentation materials, and distributed them to participants in coordination with the NJTPA.

A summary of each TAC meeting is as follows:

- **TAC Meeting 1, November 1, 2016.** The project team introduced TAC members to the project, discussed the goals of the project and of the committee, and established a dialogue to inform the project. TAC participants provided brief overviews of the relevant activities they are involved in. It was immediately clear there are several complementary efforts related to AFVs and AFV infrastructure underway or in the works across the state. Challenges and barriers discussed included the following:
 - There is a lack of actual data around the business case for PEV chargers
 - The cost effectiveness, or return on investment, for installation of workplace chargers and public chargers is not well understood.
 - Gas quality can be an inhibiting factor for fleet use of natural gas within the PSE&G territory due to cold weather peak injection of propane into the natural gas distribution system.
 - The high number of multi-unit dwellings (MUDs) throughout the region will create challenges for residential charging at these developments.
- **TAC Meeting 2, May 11, 2017.** The project team briefed TAC members on the status of the readiness planning effort, the results of the interactive SAC meetings, plans for the guidebook, and other project activities. TAC members exchanged information on several relevant issues including the following:
 - There are notable challenges involved in providing PEV charging station access at MUDs.
 - The Transportation Management Associations (TMAs) need to be involved in outreach efforts, leveraging relationships with employers/workplaces.
 - Education and outreach messages should be crafted with the target audience in mind.. For example, elected officials and policy makers will want to see the value proposition for infrastructure development.
- **TAC Meeting 3, October 17, 2017.** The project team opened the meeting by highlighting the continued growth of the AFV market in New Jersey, particularly for PEVs. Since the TAC first met in November 2016, the number of PEVs registered in the state increased by one-third. The project team summarized the municipal readiness plans and focused on an overview of the guidebook. As became typical of TAC meetings, participants also shared updates on relevant activities, especially those involving PEVs and charging infrastructure.

The project team held several additional follow-up conversations with various individual members of the TAC regarding specific issues related to their organization or areas of expertise over the course of the study. Periodic discussions involved the following individuals and topics:

- **Kenny Esser, Jr., PSE&G**
 - PSE&G’s workplace charging program. PSE&G provided free charging stations at customer locations across their service territory.
 - PSE&G’s employee workplace charging program. PSE&G is providing charging stations at several PSE&G locations across the state for employee use.
 - The progress PSE&G is making in incorporating PEVs into their own fleet of vehicles.
 - The rate filing that PSE&G was in the process of developing for PEVs and potentially NGVs for submittal to the New Jersey Board of Public Utilities (NJBPU).
- **Peg Hanna, New Jersey Department of Environmental Protection (NJDEP)**
 - Progress made on the joint NJDEP and NJBPU “It Pays to Charge” program. The NJDEP is providing rebates to workplaces for charging station installation.
 - AFV registration data. The NJDEP provided updated vehicle registration data, including PEVs, NGVs, and hybrid vehicles, throughout the study period.
 - Development of the state’s mitigation plan under the Volkswagen Settlement Environmental Mitigation Trust.
- **Mike Hornsby and Mike Winka, New Jersey Board of Public Utilities (NJBPU)**
 - Discussions regarding a pending NJBPU rebate program for NGVs.
 - Progress made on the joint NJDEP and NJBPU “It Pays to Charge” program.
- **Mark Warner and Pam Frank, ChargeVC**
 - The roadmap that ChargeVC is developing for moving the state toward increased transportation electrification.
 - The detailed study that ChargeVC is conducting regarding the costs and benefits of PEVs and their potential impact on electricity rates and on the distribution system.

Additional Stakeholder Collaboration

In addition to the TAC and SAC meetings, the project team and the NJTPA participated in a number of other outreach activities. These activities aimed to solicit input from individuals or groups that had information, expertise, or direct experience in dealing with the issues relating to installing PEV charging infrastructure at MUDs. Sources of specific suggestions included SAC members, TAC members, and the project team’s research and networks.

The project team held several calls with representatives of the **New Jersey Apartment Association (NJAA)**. The NJAA is a nonprofit association representing owners, builders, developers and managers of over 200,000 apartment homes across the state. With this unique perspective, the project team was able to gain valuable insight regarding installation and use of PEV charging stations as MUDs. In addition to information exchanged during telephone conversations, the project team prepared a brief survey,

which the NJAA distributed to its members. While the response rate was relatively low, the feedback was useful in informing the project team's efforts and confirmed that MUD interest in PEV charging is driven by tenant demand.

Other outreach involved representatives of individual MUD developers and property managers, including the Pinnacle Group, Hartz Mountain, and Atlantic Realty. These discussions primarily confirmed the results of the NJAA survey, that interest in providing charging stations at MUDs is largely driven by tenant demand. At luxury buildings and higher end developments, the demographics are such that the developers are seeing interest and are seeking to facilitate residents' PEV use. In other areas, particularly MUDs serving lower income or elderly populations, there is not as much interest, therefore building managers are not taking steps to explore and incorporate PEV charging infrastructure.

The project team incorporated the MUD stakeholder discussions and conclusions summarized above into the readiness plans as well as the guidebook. Enabling PEV charging for MUD residents is a key challenge that is not unique to New Jersey, but could be a significant opportunity to increase PEV use given that parts of the NJTPA region are densely populated urban areas. Stakeholders and municipalities should continue to monitor MUD charging work being done in the San Diego area, Minnesota, and others, and make resources available to MUD developers, managers, boards, and residents.

The **New Jersey Clean Cities Coalition** (NJCCC) participated in the project as a stakeholder and a technical resource. As a coalition formally designated by the U.S. Department of Energy, the NJCCC is a source of nonbiased information about a variety of alternative fuels and advanced vehicle technologies. The NJCCC consists of numerous public and private stakeholders from across the state whose relationships and varying perspectives regarding PEVs, NGVs, and other fuels were informative to this study and its results. The NJCCC will also serve as a technical assistance resource for pilot municipalities and other New Jersey municipalities as they pursue and implement AFV readiness plans.

Readiness Plans

Building upon and informed by the literature review, and with input from the stakeholder engagement process, the three municipal readiness plans were drafted. The objective of the readiness plan development was to identify, prioritize, and guide the execution of actions within the next 10 years in order to unlock the potential of transportation electrification and NGV deployment as a sustainability initiative. More specifically, the AFV readiness plans lay out the path to make each community “AFV ready” by identifying the barriers to widespread deployment of infrastructure and vehicles, and outlining recommended actions that will reduce and resolve these barriers. The majority of readiness planning efforts to date have focused at the regional or state level, not the municipal level.

Approach

While there is some redundancy, each of the three readiness plans focuses on the individual municipality, taking into account the unique attributes that influence AFV adoption in that community and provides customized insights and recommendations. The plans were designed to help decision-makers identify and prioritize the most effective ways to catalyze AFV deployment, specifically for PEVs and NGVs.

The project team approached the readiness planning process through the following key activities:

- **Stakeholder engagement:** Gathering input from stakeholders and building partnerships are important steps toward effective goal setting, comprehensive readiness planning, and successful implementation. Municipal staff provided valuable background data and critical review throughout the project. SAC meetings helped to articulate each municipality’s vision for AFV readiness and gather input about the challenges, barriers, and opportunities related to AFV readiness. See the Stakeholder Engagement section for more information.
- **Regulatory review:** The project team, with input and information from municipal staff, researched and reviewed existing municipal plans as they relate to facilitating AFV infrastructure. The team also reviewed local zoning regulations and assessed their potential to impact installation of PEV charging infrastructure; regulations addressed include those relating to parking, site plans and site development; and environmental performance standards (noise, air quality, etc.). Finally, the team compiled a summary of financial incentives and funding sources for PEVs, NGVs, and their fueling infrastructure.
- **Data collection and analysis:** The project team collected and compiled numerous datasets at the municipal and regional level to inform the analysis and recommendations. The analyses focused on the following:
 - PEV ownership forecasts over a planning horizon from 2016-2030. Projections were developed based on varying assumptions around three PEV adoption scenarios – low, high, and greenhouse gas (GHG) stretch. The GHG stretch scenario assumes that PEV adoption rates will be slightly lower than the NJTPA Regional GHG Mitigation Plan, with a 50 percent market share by 2040
 - Charging infrastructure demand analysis, which was conducted to broadly identify the areas within each community that are most likely to see demand for charging infrastructure. It complemented the vehicle adoption forecasting, and introduced an important geographic component to guide municipal policy and investments to meet

the increased demand for charging infrastructure. Four separate analyses and resulting maps were included in the plans to correlate with the different charging types: residential, MUD, workplace, and opportunity.

- **Recommendation development:** The three steps above helped to shape the recommendations for PEV and NGV readiness in each plan.

Key Findings and Results

Readiness plans for all three municipalities are provided in Appendix C. Each readiness plan includes an executive summary, overview of the municipality, and a statement of goals for that particular readiness effort. Section 1 and Section 2 focus on PEVs and NGVs, respectively. These sections address the vehicle markets, current infrastructure development, key barriers to increased adoption, the regulatory framework, and available incentives. Section 3 of each plan lays out the roadmap and recommended actions to achieve the community's AFV readiness goals. Recommendations are presented in a way that aligns with the types of infrastructure demand. Each recommendation also references an entity or entities best suited to take responsibility for leading implementation.

All three municipalities have different characteristics in terms of population, area, demographics, land use, and other aspects, yet there are similarities between the three readiness plans. For example, many of the recommendations appear in all of the plans, framed in a way that responds to or reflects local conditions.

Commonalities among all three local readiness plans include:

- **A focus on actions to support PEVs and charging infrastructure.** While NGVs and fueling infrastructure are addressed in the plans to some extent, most recommendations will result in actions that increase awareness and usage of PEVs.
- **An emphasis on targeted initiatives to maximize the impact of municipal actions.** Each municipality participates in Sustainable Jersey and other environmentally-focused efforts, many of which result in widespread community awareness of sustainability topics and activities. The plans recommend targeted initiatives, such as outreach to specific high-priority businesses and employers to increase PEV charging infrastructure, which will complement ongoing efforts.
- **Opportunities to engage a variety of stakeholders and partners.** Collaborations involving utilities, TMAs, local businesses, and other partners will be critical to ensuring forward progress toward existing goals and goals set during the readiness planning process.

Some of the notable differences for each municipality include:

- **Montclair Township**
 - Montclair Township is the only municipality of the three that has taken steps to require PEV charging as part of redevelopment plans. While a requirement is not yet codified, multiple redevelopment plans include PEV charging spaces.
 - Montclair has a number promising public charging infrastructure development opportunities, leveraging what the township has learned from their existing chargers as well as those hosted by local businesses. Montclair Center Corporation, the business improvement district, was represented on the SAC. Montclair Center Corporation is in a

position to help coordinate meetings with businesses and assist with outreach to these stakeholders.

- The proximity of Montclair State University and existing partnership between the township and the university is another opportunity for both public and workplace charging.
- In general, SAC members expressed a genuine commitment to support implementation.
- **Town of Secaucus**
 - Secaucus has notably high demand for workplace charging throughout the municipality.
 - Secaucus is also home to several large MUDs, including those under development, presenting an opportunity for additional MUD charging infrastructure. Town staff suggested that one or more public parking lots could make an ideal location for charging stations intended for MUD residents without access to charging.
- **Woodridge Township**
 - Woodbridge Township is committed to sustainability and was named the 2016 Sustainable Jersey Silver-Level Champion. This spotlight will help demonstrate to other municipalities the importance of AFV readiness planning.
 - Woodbridge Center is an ideal location for PEV charging infrastructure because of high public and workplace charging demand. The property management company responsible for the popular retail and entertainment destination was represented on the SAC and confirmed interest in pursuing opportunities.

Challenges

In the process of developing the municipal readiness plans, the project team encountered the following challenges:

- **Accounting for variable levels of stakeholder engagement.** Just as the existing conditions for AFVs varied across the three municipalities, so did the involvement of and feedback from stakeholders. Based on the project team's previous experience with readiness planning this was expected, but it was even more evident with three separate municipalities. As noted in the Stakeholder Engagement section, the mix of stakeholders was different for each SAC. Several SAC members provided information outside of SAC meetings, such as confirming details for the Bayshore Recycling workplace charging station, but active engagement was generally limited to the SAC meetings. While municipal staff from Secaucus and Woodbridge Township sent suggestions and edits to the draft readiness plans, with the exception of comments and questions during the final SAC meetings, the project team received no feedback from individual stakeholders. This emphasizes the important role municipal staff, in particular, must play to ensure the plan is shared, used, and updated.
- **Applying the readiness planning framework to both PEVs and NGVs.** The readiness plans focus primarily on recommended actions intended to support the increased adoption of PEVs and the development of charging infrastructure. This reflects the large body of PEV readiness plans developed to date, as well as interest from the pilot municipalities to focus planning efforts on PEVs, rather than NGVs. The majority of PEVs purchased in the NJTPA region will be driven by the average consumer, each with different motivations, income levels, housing situations, and other variables. NGVs, on the other hand, are almost exclusively used in fleets, particularly medium- and heavy-duty applications. Fleet managers typically make vehicle purchase and

conversion decisions based on a combination of business-related factors, such as organization mandates or targets, return on investment, and vehicle availability. The fueling infrastructure is part of that decision-making process. Generally speaking, there are few things a municipality can do to influence a fleet's decision to use AFVs. As the project team learned from the literature review, local governments rely on industry documents for NGV infrastructure planning, rather than actual municipal planning documentation that can be used as examples.

- **Prioritizing recommended readiness actions.** The number of recommended actions can be overwhelming, as there are numerous ways to address barriers to AFV infrastructure development. Realistically, most municipalities will not pursue all recommended actions, but a municipality can prioritize implementation activities based on feasibility, community interest, resource availability, and other considerations.

Recommendations are organized to correlate with the demand for charging or fueling infrastructure. In the case of PEVs, recommendations are distinguished by their role in residential charging, MUD charging, workplace charging, and public charging. Several recommendations appear multiple times, though with different steps to implementation depending on the infrastructure to target. These recommendations include the identification of grants and other funding opportunities, and conducting targeted outreach to install charging infrastructure at high-priority locations.

Ultimately, each municipality and relevant stakeholders will need to determine which actions should be priorities. But the resulting presentation may help the municipalities develop a more strategic approach to addressing the various infrastructure types.

Follow-up Activities

The readiness plans will serve as roadmaps to increased AFV infrastructure, as long as the pilot municipalities incorporate the recommended actions into their practices, plans, and policies. All three municipalities indicated they intend to implement recommended actions and their participation in Sustainable Jersey will complement these efforts.

More specifically, the pilot municipalities expressed interest in the following priority actions:

- **Montclair Township** – explore options to require PEV charging infrastructure in all future redevelopment plans, potentially as a zoning code amendment. Also develop a comprehensive fleet management plan for all vehicles under the Township's control.
- **Town of Secaucus** – complete the pending grant-funded PEV charger installations and track usage data to understand demand. Also make resources available to MUD residents, boards, and managers to increase awareness of PEV charging infrastructure development processes and opportunities.
- **Woodridge Township** – continue to highlight the community's "AFV friendliness" through sustainability activities, education, and outreach. Serve as a resource for businesses, employers, and other potential charging infrastructure site hosts.
- **All three municipalities** – partner with local stakeholders to pursue grant funding for PEV charging infrastructure, leveraging the demand analyses from the readiness plans.

As a first step, each pilot municipalities should increase awareness of the plan and recommendations through outreach and education. Municipal staff, elected officials, and relevant local organizations will be interested in the results as well as how they can help with implementation. The executive summary provides a concise overview of the key findings and takeaways, which can be used as an overview document or content for presentations to boards and committees. Pilot municipalities should also look to the AFV readiness guidebook as a key resource, as it was informed by their plans.

As the AFV industry continues to develop, municipalities may be able to take advantage of funding sources, partnerships, additional pilot projects, and other opportunities to increase AFV and infrastructure use. Anticipated developments include (but are not limited to) technology advancements, such as faster/higher powered charging infrastructure and increased use of renewable natural gas, as well as national infrastructure development efforts, like Electrify America. Each municipality will be responsible for being aware of these opportunities, with assistance from the NJTPA, Sustainable Jersey, and other organizations to track and determine how best to leverage each.

Alternative Fuel Vehicle (AFV) Readiness Guidebook

The NJTPA and FHWA could not possibly fund the extensive readiness planning efforts the project team performed in the three pilot municipalities in every North Jersey municipality. The goal of the guidebook was to allow other municipalities in the NJTPA region to follow the same process in their own communities. While the project team came to the table with significant background knowledge on AFV readiness planning, as well as the local AFV climate, the pilot municipalities were a proving ground for the readiness planning process in the NJTPA region.

Incorporating lessons learned from the individual readiness plans, the project team developed the municipal guidebook for all municipalities in the NJTPA region to design and conduct AFV readiness planning efforts in their own communities. Recognizing that each municipality is unique, and will be starting from a different place with varying needs and priorities, the guidebook is general enough to assist any community on this spectrum, while also offering suggestions and recommendations specific enough for individual municipalities to put into practice.

Approach

Based on the information needs identified in the literature review and through stakeholder outreach, the project team designed the guidebook to be a toolkit for municipalities considering or committed to AFV deployment in their communities. Since a comprehensive approach to readiness planning is preferable, the guidebook is designed as a complete tool. It also provides direction on how municipalities can prioritize actions to identify and tackle the easier or more feasible projects and address the most pressing issues, first. From there, municipalities can use individual guidebook sections for implementation.

The project team relied heavily on the methodologies used to develop the pilot municipality readiness plans (e.g., analysis and forecasting of the PEV market), and included example figures and results from those documents as case studies and to identify lessons learned. The guidebook also touched on topics not covered as comprehensively in the readiness plans, including additional alternative fuel types (i.e., propane, hydrogen, biofuels).

While AFV planning may happen at a geographically broader level, the guidebook was written primarily with municipal policy makers and staff in mind, including councils, planning and zoning staff and boards, parking authorities, municipal utilities, environmental commissions, and business improvement districts. A larger audience could benefit from the concepts and information, including county and regional government agencies, fleet operators, local fueling station operators, and other private stakeholders.

Other Educational Materials

In addition to the guidebook, the project team updated text for the NJTPA's electronic **brochure** on AFVs. The brochure includes a general overview of each fuel, as well as a summary of related efforts in the region. See Appendix E for the final draft, which includes suggested revisions.

In coordination with the NJTPA, the project team developed a **one-pager** providing a summary of the study for outreach and education purposes. See Appendix E for the final draft.

The project team prepared a **summary presentation** for the study, calling out key takeaways. See Appendix E.

Finally, one of the guidebook appendices is a compilation of **MUD charging resources**, targeting MUD residents, boards, and managers. See Appendix D.

Results

The project team sought to answer three key questions with the guidebook, which served as the overarching sections in the document:

- **Why Take Action?** This section provided a framework by introducing the benefits of being AFV ready, as well as the state and federal actions that support AFV readiness in New Jersey. Using this background information, municipalities can build off of what is already being done.
- **What are AFVs and What do they Require?** This section summarized each alternative fuel type, vehicles, fueling infrastructure, and other considerations. The data and resources in this section provide a complete picture for municipalities deciding which fuels makes the most sense for their community.
- **What Does it Take to Become AFV Ready?** As the focal point of the document, this section focused on the steps to develop a readiness plan, including key recommendations.

Understanding that each fuel and infrastructure type is different, the guidebook, provided in Appendix D, includes fuel-specific icons to identify recommendations and activities for each fuel type.

Key Findings and Opportunities

In the process of developing the guidebook, the project team identified numerous key findings and opportunities:

- **A comprehensive approach to readiness planning is more effective than a piecemeal approach.** Ideally, a municipality will follow a thorough methodology covering all recommendations in the guidebook. Recognizing that many communities will not have the resources (i.e., staff, data) to conduct a complete AFV readiness analysis and implementation, the project team designed the guidebook to allow municipalities to prioritize and address the more easily attainable projects. Similarly, given its length and density, the guidebook could seem unwieldy to some municipalities just embarking on their AFV readiness planning efforts. The project team wanted to be sure the reader had all of the relevant tools and resources. However, where possible, the project team pointed towards existing resources (e.g., Sustainable Jersey). In addition, the guidebook includes icons, text boxes, and other formatting solutions to ensure that the document is readable and allows for quick reference.
- **Readiness planning guidance needs to remain relevant beyond the initial publication.** The alternative fuels industry is rapidly changing, meaning that the guidebook may soon become outdated. For example, New Jersey state-level efforts and focus areas could shift dramatically with each new executive administration. To ensure that the guidebook has a long shelf life, the project team attempted to include all relevant background information, while making the recommendations and guidance general enough to be useful in coming years. For instance, rather than including extensive data on current AFV registrations in the state, the guidebook points the reader to resources for the most up-to-date information.
- **Readiness planning should consider all fuel types but efforts will target specific fuels, technologies, and sectors.** Certain fuels are more suitable for different areas of the country and in different applications. In addition, state-level policy may dictate a preference for one or more fuels. The guidebook was intended to cover all alternative fuels (biodiesel, electricity, ethanol, hydrogen, natural gas, and propane) identified in the federal Energy Policy Act whereas the

literature review, pilot municipality readiness plans, and other local readiness activities align more closely with priorities identified in the New Jersey Energy Master Plan. As a result, the guidebook focuses more heavily on PEVs and NGVs and has less information on the other fuels. PEVs are typically seen as a consumer solution, where the other AFV types are more common in fleet settings. The analysis and activities necessary to prepare for PEVs is very different from the other vehicles. In the guidebook, the project team used the icons described above to differentiate and allow the reader to focus on recommendations that are relevant to their preferred fuel type(s).

- **National recommended practices can be applied in a way that maintains a local focus.** Each region and state (and even municipality) has a unique set of challenges and opportunities related to AFVs. While it is important to apply the lessons learned from early AFV readiness planning efforts, which were largely conducted in California, the project team worked to ensure that the guidebook did not lose the local focus. As a result, the document includes detailed information on topics that may not be relevant elsewhere (e.g., PEV charging at MUDs, natural gas quality).
- **Metropolitan Planning Organizations (MPOs) and Transportation Management Associations (TMAs) should be involved with readiness planning and implementation efforts.** Staff at regional MPOs and TMAs have the data and skills necessary to conduct readiness planning efforts and support municipalities, though funding and staff availability are limited. For example, TMAs may not be able to assist with targeted outreach to employers and businesses, as recommended in the guidebook. The guidebook includes a few instances where TMAs and MPOs might be able to contribute to municipal efforts, but also provides enough background for communities to work independently.
- **The NJTPA's study will help connect municipalities within the NJTPA region and serve as a resource to those nationwide.** The guidebook itself, if appropriately marketed, provides an opportunity to connect with other municipalities in the region and provide assistance, where appropriate. The guidebook will be posted online and can be circulated broadly to demonstrate the NJTPA's leadership in the area of AFV readiness planning and provide direction to MPOs in other parts of the country. It should also be shared with all stakeholders involved in the project as a resource for those organizations.

Appendix A: Stakeholders

Municipal SAC Members

Montclair Township

Councilor Bob Russo

Keith Brodock, Montclair Township Planning Board & Environmental Commission

James Sherman, Montclair Township Environmental Commission

Tina Iordamlis, Montclair Township (Parking Utility)

Graham Petto, Montclair Township (Department of Planning & Community Development)

Gray Russell, Montclair Township (Department of Environmental Affairs)

Janice Talley, Montclair Township (Department of Planning & Community Development)

David Antonio, Essex County

Krishna Murthy, EZ Ride

Israel Cronk, Montclair Center BID

Tom Mologhney, Nauna's Bella Casa

Town of Secaucus

Foula Ballas, Town of Secaucus (Construction and Zoning Department)

Captain Carlos Goyenechea, Town of Secaucus (Police Department)

Lynn Kramer, Town of Secaucus (Environmental Department)

Jennifer Modi, Town of Secaucus (Engineering Department)

Amanda Nesheiwat, Town of Secaucus (Environmental Department)

Megan Massey, Hudson County

Luis Delgado, Hudson TMA

Anthony Vairieri, Hudson TMA

Ron Mroz, Secaucus Middle School

John Elissa, Harmon Cove Towers Board Member

Carol Ellison, Harmon Cove

Don Evanson, Harmon Cove Towers Resident

Daniel Rozenbaum, Harmon Cove Towers Board Member

Tommy Schwartz, Harmon Cove

Woodbridge Township

Nancy Drumm, Woodbridge Town Council and Metro Chamber of Commerce

Thomas Flynn, Woodbridge Township (Office of the Mayor)

Mike Gelin, Woodbridge Township (Engineering)

Eric Griffith, Woodbridge Township (Planning & Development)

Dennis Henry, Woodbridge Township (Department of Public Works)

Chris Kesici, Woodbridge Township (Planning & Development)

Marta Lefsky, Woodbridge Township (Planning & Development)

Jeffrey Mayerowitz, Woodbridge Township (Office of Sustainability)

Tony Gambilonghi, Middlesex County

Morteza Ansari, Keep Middlesex Moving

Bill Neary, Keep Middlesex Moving

Amy Bellisano, Woodbridge Center/GGP
Allison Cartin, The Crossings/Fieldstone Properties
John Davies, Bayshore Recycling
Ted Schlemovitz, Wakefern Food Corporation
Gary Sondermeyer, Bayshore Recycling
Jamie Straub, Atlantic Realty/Middlesex Management

TAC Members

Nathaly Agosto Fillion, City of Newark
Rob Thomas, City of Newark
David Antonio, Essex County
Jim Appleton, New Jersey Coalition of Auto Retailers (NJ CAR)
Charlene Burke, Hudson County
Megan Massey, Hudson County
Ashley-Lynn Chrzaszcz, ChargEVC
Mark Warner, ChargEVC
Tim Croushore, FirstEnergy
Eva Gardow, FirstEnergy
Luis Delgado, Hudson TMA
Jay DiDominico, Hudson TMA
Kenny Esser, Jr., PSE&G
Rob Graff, Delaware Valley Regional Planning Commission (DVRPC)
Eric Griffith, Woodbridge Township
Peg Hanna, New Jersey Department of Environmental Protection (NJDEP)
Mike Hornsby, New Jersey Board of Public Utilities (NJBPU)
Roberta Karpinecz, Keep Middlesex Moving
Bill Neary, Keep Middlesex Moving
Bruce McCracken, Middlesex County
Tom Moloughney, Private Citizen
Chris Moog, NJ TRANSIT
Krishna Murthy, EZ Ride
Ellie Ferrer, EZ Ride
Kinga Skora, EZ Ride
Amanda Nesheiwat, Town of Secaucus
Graham Petto, Montclair Township
Nancy Quirk, Sustainable Jersey
Linda Weber, Sustainable Jersey