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MUNICIPAL ELECTRIC VEHICLE CHARGING INFRASTRUCTURE CASE STUDIES

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Adamstown Borough, Lancaster County

Blossburg Borough, Tioga County

Borough of Ambler, Montgomery County

Borough of Ephrata, Lancaster County

Borough of Oxford, Chester County

Borough of Swarthmore, Delaware County

City of Bethlehem, Lehigh/Northampton Counties

City of Bethlehem Parking Authority

City of Harrisburg, Dauphin County

City of Pittsburgh, Allegheny County

City of Pittsburgh Parking Authority

City of Scranton, Lackawanna County

College Township, Centre County

Denver Borough, Lancaster County

East Norriton Township, Montgomery County

Freedom Township, Adams County

Honey Brook Township, Chester County

Indiana Borough, Indiana County

Kennett Square Borough, Chester County

Lansdale Borough, Montgomery County

Lower Gwynedd Township, Montgomery County

Middletown Township, Bucks County

Muhlenberg Township, Berks County

Narberth Borough, Montgomery County

O'Hara Township, Allegheny County

Oil City, Venango County

Patton Township, Centre County

Phoenixville Borough, Chester County

Royersford Borough, Montgomery County

South Union Township, Fayette County

Springfield Township, Montgomery County

State College Borough, Centre County

Uwchlan Township, Chester County

Warminster Township, Bucks County

Warwick Township, Bucks County

West Hempfield Township, Lancaster county

West Rockhill Township, Bucks County

West Whiteland Township, Chester County

Whitemarsh Township, Montgomery County

Executive Summary

This document is a resource to help Pennsylvania municipalities plan for and implement electric vehicle (EV) charging infrastructure for public access. It identifies recent activities that several Pennsylvania local governments have taken to advance EV charging for their residents and visitors. The Pennsylvania Department of Transportation (PennDOT) collected information by conducting local government outreach between October 2022 and June 2023. Insight was gathered on EV charging infrastructure topics such as installation barriers, charging locations, costs, local ordinances, and community needs.

Outreach included municipal interviews and an email survey of municipal recipients of the Pennsylvania Department of Environmental Protection's (DEP's) Driving PA Forward Level 2 Charging Rebate Program (Level 2 Program). Key findings from the outreach are summarized below with links to specific sections of the full document for additional details.

KEY FINDINGS: MUNICIPAL EV CHARGING INFRASTRUCTURE FOR PUBLIC ACCESS

EV PLANNING & RESOURCES

Several municipalities, regional planning organizations, and parking authorities have prepared plans recommending installation of EV charging infrastructure and developed resources providing municipal assistance.

- Sustainability and climate action plans prepared by the City of Bethlehem and Bethlehem Parking Authority (BPA) have resulted in the installation of EV charging infrastructure at parking authority facilities and the City's progress towards installing EV charging infrastructure city-wide.
- BPA has adopted 'green garage' design standards, including EV charging infrastructure, consistent with GCBI Parksmart certification.
- The City of Pittsburgh's Climate Action Plan recommends modal shifts and fuel shifts to reduce greenhouse gas (GHG) emissions. Vehicle electrification was identified as a recommendation to address fuel shifts.
- The Pittsburgh Public Facility EV Charging Strategic Plan includes detailed recommendations supporting the shift to vehicle electrification.
- An objective of Middletown Township's Climate Action Plan is to make EVs attainable, and planning is underway for new EV charging projects.
- Narberth Borough's developed the Narberth Climate Action Plan in partnership with ICLEI.
- The City of Scranton is partnering with surrounding municipalities to develop a regional EV implementation plan.
- DVRPC, TMA Bucks, and Duquesne Light Company each provide resources and tools to help position municipalities for EV adoption.

KEY FINDINGS: MUNICIPAL EV CHARGING INFRASTRUCTURE FOR PUBLIC ACCESS

EV PROJECTS

Locations

- Public EV chargers are being installed at municipal or municipal authority owned property such as municipal buildings, municipal parks, surface parking lots, and parking garages.
- Level 2 Program recipients reported that user convenience was the primary reason for selecting locations.
- Lansdale Borough and Phoenixville Borough identified available public parking for EV chargers in commercial areas and entertainment districts, providing a value-added service to visitors while shopping or dining.

Equipment & Operational Costs

- The average cost per charging plug for Level 2 Program recipients was $7,137 and on average two plugs were installed per project.
- Operational costs typically paid to charging vendors include networking and equipment maintenance.
- BPA budgets for long term charger maintenance, like other capital budget expenditures such as parking garages and parking lots.
- In addition to the cost of charging equipment, municipalities should consider installation costs such as electric circuit breakers, conduit, and bollard units.
- The cost for BPA to wire a new 731 space parking garage for future EV charging expansion is $180,000.

Frequency of Charging Station Usage

- According to Level 2 Program recipients, current charging station usage varies widely, and usage appears to depend on municipal density.
- Municipalities report that charging station usage has been increasing, consistent with the adoption of EVs.

Charging Equipment Vendors & Networking

- Charging vendors offering a flexible user interface, make the EV charging transaction relatively seamless for EV users.
- An application roaming agreement negotiated by Narberth Borough's charging provider and other vendors, removed the barrier of multiple user interfaces for EV users.
- Networking charging infrastructure allows for data analysis, essential to help determine when and where additional EV chargers should be installed.

KEY FINDINGS: MUNICIPAL EV CHARGING INFRASTRUCTURE FOR PUBLIC ACCESS	
	• BPA uses networked data to assess demand as EV adoption continues and to report on progress towards GHG emissions reduction. **Incorporating EV infrastructure into Other Projects** • The City of Harrisburg incorporated EV charging infrastructure into a streetscape and mobility project which included sidewalks, traffic-calming, and green infrastructure.
BARRIERS	**EV Charging for Residents Without Garages** • EV owners living in Pennsylvania's cities and downtowns often lack garages or a dedicated driveway to charge their vehicle. Several municipalities are in varying stages of addressing this need. • The City of Bethlehem is currently planning for residents that lack private EV parking and will need to charge via on-street parking. Pole mounted Level 2 EV chargers at curbside locations and Level 3 EV charging at designated municipal lots are being considered. • The City of Pittsburgh is working with residents without garages and driveways to develop a long-term strategy for EV charging. • Phoenixville Borough has formed a policy committee including Borough residents to develop guidelines that could include charging behind homes, in planting strips adjacent to streets, and in underutilized locations. **Loss of Existing Parking Spaces** • Reducing the number of existing available parking spaces by converting to EV parking should be coordinated with existing business owners. • Narberth Borough was careful to avoid removal of high demand on street parking from non-EVs. **Design Standards** • Design standards should be developed from the perspective of an EV owner. Considerations such as location, safety, and weather resistant charging stations should be included. **Electric Infrastructure Costs** • Total project costs will be minimized if a charging station is located close to existing electric infrastructure. New electric service may be required and should be factored into project costs. • Electric and installation costs were the greatest barrier for Level 2 Program recipients.

KEY FINDINGS: MUNICIPAL EV CHARGING INFRASTRUCTURE FOR PUBLIC ACCESS

Lack of Consistent Data Collection

- Every charging company has their own way of collecting data (payment methods) which is a challenge for EV owners. The nascent industry is not yet standardized for ease of consumer usage.

Funding Availability/Application/Reimbursement

- A few Level 2 Program recipients identified challenges with the amount of available public funding, providing local matching funds, and the application and reimbursement process.
- It was noted that grant funds with little to no match requirement would increase the installation of public EV chargers.

Limited EV Awareness

- Not all residents are familiar with EV charging requirements and why charging infrastructure is so important. Ongoing public education is needed.
- Phoenixville Borough is beginning to notice community wide EV acceptance and in 2022 switched EV signage from "EV Parking Preferred" to "EV Only".

Municipal Support

- Convincing municipal officials to install EV charging stations requires time.
- For Lansdale Borough, this was made easier by demonstrating that installing charging stations would be at no cost to the Borough due to public funding and electric supplier commitments.
- Middletown Township's Climate Action Plan established policy direction, making it easier for officials to commit to allocating funds or applying for public funding for EV projects.

LAND USE REGULATIONS/ INCENTIVES

A few municipalities are updating existing or adopting new ordinances to address public EV charging infrastructure.

- Including EV infrastructure in new development is a focus in some municipalities and others note that developers are starting to include EV charging infrastructure in land development plans as EV adoption is increasing.
- The City of Bethlehem is amending its Subdivision and Land Development Ordinance (SALDO) to include EV infrastructure requirements. The City is also developing an expedited process for EV public charger approvals and installation.

KEY FINDINGS: MUNICIPAL EV CHARGING INFRASTRUCTURE FOR PUBLIC ACCESS	
	• The City of Bethlehem is evaluating incentives such as providing tax incentives or free parking for residents who purchase or own an EV or zero emission vehicle (ZEV). • Middletown Township may consider land use regulation modifications to require EV charging in new commercial and residential developments. Currently, the Township's Climate Action Plan sets forth the EV objectives it seeks to achieve, and developers are proposing projects with EV charging infrastructure. • Narberth Borough updated its parking regulations to prohibit non-EVs from parking at EV charging spaces. The Borough will be updating its SALDO to require that new construction is EV ready. • In general, Level 2 Program recipients are not considering the adoption of new land use regulations to address EV charging infrastructure. Several note that the market through commercial and residential developers is beginning to install infrastructure.
BEST ADVICE	Municipalities shared advice for other communities seeking to install EV charging infrastructure for public access. **Upfront Planning/Establish priorities** • Developing a planning framework establishes a solid implementation foundation and is useful to achieve EV priorities. The City's CAP and BPA's Sustainability Program provide the framework necessary to achieve EV infrastructure goals. • Middletown Township's Climate Action Plan establishes the Township's EV priorities which provides guidance to developers. **Stakeholder Support** • With a solid foundation for implementation through upfront planning, make certain stakeholders commit to endorsing a plan. • The successful purchase and installation of BPA's charging stations in a short period of time would not be possible without the commitment of stakeholders. • Narberth Borough engaged elected officials, municipal staff, the utility, and citizens early and often resulting in efficiently designed projects, ultimately reducing project costs.

KEY FINDINGS: MUNICIPAL EV CHARGING INFRASTRUCTURE FOR PUBLIC ACCESS

Choose Locations Wisely

- Pick locations close to existing electric infrastructure with extra capacity. This minimizes labor and expense for cutting into sidewalks and placing conduits under streets.

Invest in Electric Infrastructure/Consider Peak Demand

- Engage the local utility early and often. Know key utility contacts and follow the utility's process. This aids in efficient project design, reducing project costs in the long term by minimizing redesign.
- Successfully deploying public EV charging infrastructure requires a municipality to make a long-term, high dollar investment in electric infrastructure.
- Narberth Borough leveraged its recent streetlight conversion project by providing excess electricity and new wiring for EV charging.
- Peak demand costs should be factored into projects. Lansdale Electric is a municipally owned utility and can absorb peak demand fees. Level 3 DC fast chargers will use much more electricity at peak times, resulting in higher electric costs.

Access Available Grants & Other Types of Funding Identify Funding Sources

- Identify and apply for available grants and funding.
- Plan in advance for the time needed to write grant applications and secure approvals.
- Many municipalities have been successful in leveraging operational funds and electric utility programs with DEP's Alternative Fuels Incentive Grant Program (AFIG) and Driving PA Forward to implement EV charging projects.

Know Your Lead Times

- Securing equipment through supply chains is an ongoing issue, complicating project timing. Plan for a 6-month lead time on equipment at a minimum.

Understand the Use Case

- Important, but not always a focus, is understanding the needs of an EV owner. Where, when, and how will EV owners charge their vehicle? What are the pros and cons for every type of EV owner and every type of EV?

Make Decisions Informed by Data

- Use available network data to monitor trends.

KEY FINDINGS: MUNICIPAL EV CHARGING INFRASTRUCTURE FOR PUBLIC ACCESS

- Using analytics available through networked EV charging stations, BPA can appropriately balance the need for new EV chargers.

Ownership & Operations

- Municipalities should consider who will own and operate charging infrastructure including the allocation of EV charging revenue proceeds.

Background/Purpose

Pennsylvania Department of Transportation (PennDOT) conducted statewide outreach in 2022 to brief communities about Pennsylvania's National Electric Vehicle Infrastructure Formula Program Plan (NEVI Plan). During that outreach, local officials indicated that it would be beneficial to know what steps other municipalities across Pennsylvania are taking to plan for and implement electric vehicle (EV) charging infrastructure.

This technical memorandum summarizes input collected from several Pennsylvania municipalities between October 2022 and June 2023. The assignment is part of ongoing municipal outreach being conducted by PennDOT to gather information and build resources to help municipalities in planning and implementing EV charging infrastructure. Municipal input was gathered in two phases.

- **Phase One:** The first phase included developing municipal case studies highlighting public EV charging infrastructure installation and planning.
- **Phase Two:** The second phase included outreach to municipal recipients of Pennsylvania Department of Environmental Protection's (DEP's) Driving PA Forward Level 2 Charging Rebate Program (Level 2 Program) to understand where EV charging infrastructure is being installed, challenges encountered, and future EV planning.

This assignment focused on EV charging infrastructure available for public use, rather than infrastructure installed for municipal use. In addition, it is not a comprehensive accounting of all EV charging infrastructure projects and planning across Pennsylvania, but rather a snapshot of several municipal efforts as discussed under the Methodology section for each phase.

Phase One: Municipal Case Studies

METHODOLOGY

DEP's Energy Programs Office was contacted for insight on which Pennsylvania municipalities are planning for and implementing public EV charging infrastructure. As the Energy Programs Office manages the Level 2 Program, it has knowledge of EV installations across Pennsylvania. Specific emphasis was placed on the following topics:

- Addressing community requirements (such as on street charging for residents without garages)
- Barriers or issues in installing infrastructure
- Charging locations
- Coordination
- Costs
- Local ordinances

DEP provided a list of municipal contacts as well as contacts from Delaware Valley Regional Planning Commission (DVRPC) with knowledge of EV infrastructure installations throughout southeast Pennsylvania. Municipalities recommended by both DEP and DVRPC were contacted and asked the following questions:

- What types of challenges and barriers do municipalities encounter in planning and constructing EV charging infrastructure for the public?
- Where are good locations for public EV charging?
- How do citizens without garages charge their EVs?
- Have land use regulations been enacted to facilitate EV charging infrastructure?

Input obtained from follow up phone calls and emails were compiled into the following Case Studies. Additional resources to support municipal EV planning and implementation were also identified through stakeholder interviews conducted as part of this assignment and summarized under EV Charging Resources.

CASE STUDIES

Several municipalities across the Commonwealth are starting to plan for EV charging infrastructure for public access. Some are doing so by preparing climate action plans which set forth policy and actions addressing EV charging infrastructure, and some are enacting land use ordinances through either zoning or subdivision and land development. The following case studies were developed from municipalities and municipal parking authorities in varying stages of implementing or developing an EV charging infrastructure strategy.

1. City of Bethlehem, Lehigh and Northampton Counties
2. City of Harrisburg, Dauphin County
3. City of Pittsburgh, Allegheny County
4. Landsdale Borough, Montgomery County
5. Middletown Township, Bucks County
6. Narberth Borough, Montgomery County
7. Phoenixville Borough, Chester County

The case studies provide background information on each municipality including municipal population and land area, a summary of ongoing climate action planning or sustainability planning, existing EV projects, barriers to project implementation, and municipal contact information. Each municipality also identified their best advice for communities seeking to install EV charging infrastructure for public access.

1. CITY OF BETHLEHEM, LEHIGH, AND NORTHAMPTON COUNTIES	
BACKGROUND	Located in the Lehigh Valley, the City of Bethlehem is 19.46 square miles in size and home to 75,781 citizens (U.S. Census 2020), with a population density of 3,894 per square mile. **Sustainability and climate planning** are key priorities for both the Bethlehem Parking Authority (BPA) and the City of Bethlehem (City). Planning efforts have resulted in the installation of EV charging infrastructure at many BPA facilities and the City's progress towards installing EV charging infrastructure city-wide.

1. CITY OF BETHLEHEM, LEHIGH, AND NORTHAMPTON COUNTIES

EV PLANNING

A few key studies and plans identifying the need for EV charging infrastructure have been developed by BPA and the City over the past several years.

BPA Parking Study

- In 2018, BPA commissioned a study which identified that BPA parking facilities did not yet include EV charging stations. The study recommended installation of EV chargers in at least two BPA garages.
- Since that time BPA has installed 22 Level 2 charging stations in each of its five parking garages (s*ee Existing EV Projects below*).

BPA Sustainability Program

- BPA developed and began incorporating a sustainability program, titled Park-Green, into its operations in 2020. The Park-Green program, which was awarded a 2023 Pennsylvania Governor's Award for Environmental Excellence, is built around the following three pillars:
- **Transportation** – Converting 100% of BPA fleet vehicles to electric.
- **Efficient Operations** – Reducing energy consumption in all garages and parking lots.
- **Green Garages** – Implementing a BPA Sustainable Design Standards Resolution adopted in 2021 requiring the use of GCBI Parksmart certification standards for the design and construction of all parking garages.

City of Bethlehem Climate Action Plan

The City of Bethlehem adopted a comprehensive Climate Action Plan (CAP) in 2021 with implementation advocated by the City's Environmental Advisory Committee (EAC).

- A CAP goal is greenhouse gas (GHG) emission reduction of 30% by 2030.
- A transportation specific goal is to increase adoption of electric, alternative fuel, and zero-emitting vehicles (ZEVs). To achieve this goal the CAP identifies four detailed strategies.
- Increase electric vehicle infrastructure in the City
- This strategy assumes: 1) EV owners have garages or private off-street parking available and will take action to provide charging facilities on their own, and 2) demand from residents that do not have private EV parking available, and those residents will charge their EV's via on-street parking.

1. CITY OF BETHLEHEM, LEHIGH, AND NORTHAMPTON COUNTIES

- The City's EAC is evaluating two potential EV charging solutions in neighborhoods without private off-street parking:
- 1) Pole mounted Level 2 EV chargers with designated EV parking spaces. This solution assumes residents without private charging access will want to charge their EV curbside up to two times weekly. Concerns associated with this solution include:
    - → Power poles are owned by the local utility, typically PPL in the City. PPL's tariff restrictions prevent the utility from providing EV charging. A pole mounted EV charging station would need to be owned/operated by a separate entity and PPL would need to grant permission to install the equipment on PPL owned poles.
    - → The availability of parking spaces near power poles could be a challenge in some neighborhoods.
    - → Allowing residents to install EV chargers curbside is an additional solution which would require added permitting and neighbor buy in.
- 2) Local Level 3 charging stations. This solution assumes residents will be willing to travel to a local Level 3 charging station once a week to charge their vehicle for approximately 20 to 30 minutes.
    - → The primary issue with this solution is cost as Level 3 chargers currently range between $50,000 to $150,000.
    - → To maximize investment, Level 3 chargers would need to be in high traffic locations in proximity to residential neighborhoods. Convenience amenities such as retail or recreation would need to be available for EV owners while vehicles are charging.
- Adjust city codes and zoning to expedite EV infrastructure (See Land Use Regulations below.)
- Encourage public and private vehicle fleets to convert to all-electric or ZEV
- To address this strategy, the Bethlehem Area School District is beginning an electric school bus pilot program.
- Incentivize residential use of EVs and ZEVs
- The City's Office of Sustainability has been evaluating incentives such as providing tax incentives or free parking for residents who purchase or own an EV or ZEV. The City is working towards building bicycle and pedestrian infrastructure to promote active transportation as well.

1. CITY OF BETHLEHEM, LEHIGH, AND NORTHAMPTON COUNTIES

EXISTING EV PROJECTS

Parking Garages and Surface Parking Lots

- BPA operates five parking garages and 14 surface parking lots in the City. Since 2019, 22 Level 2 charging stations have been installed.
- The charging stations are in each of the parking garages and two surface lots.
- Each charging station is dual plug, resulting in 44 total EV parking spaces.
- BPA has installed both Blink and ChargePoint chargers. Both brands offer a flexible user interface, making it relatively seamless for EV users to use either type of charger.
- Operational costs paid to charging vendors include networking and equipment maintenance. BPA has budgeted for long term maintenance of the EV chargers, like other capital budget expenditures for infrastructure such as parking garages and parking lots.
- The cost per charger ranged between $5,643 and $6,768. An added $4,500 - $5,500 was required for installation costs such as electric circuit breakers, conduit, and bollard units.
- All charging stations are networked, allowing BPA to analyze data such as the number of charging sessions, the number of unique drivers, and which stations are being used. The data is essential for BPA to identify when and where additional EV chargers should be installed.
- This allows for the expansion of the charging infrastructure as local adoption of EVs continues to increase. As demand for EV charging infrastructure increases, BPA will respond by increasing supply.
- Analytical data also allows BPA to measure progress on substantiality and climate goals. Since 2020, the charging stations have helped reduce about 40,000 kg of GHG emissions.

EV Ready Parking Garage

- To meet downtown parking demand, BPA is constructing a $20 million, 731 space parking garage. The Polk Street Garage, located at East Third and Polk Streets, will be complete in 2023.
- The new garage will include 10 EV spaces and will be wired to expand EV spaces as demand for electric vehicle charging increases in the City.
- The added cost to wire the new garage for future EV charging expansion was $180,000.

1. CITY OF BETHLEHEM, LEHIGH, AND NORTHAMPTON COUNTIES	
	• The garage will be a GBCI Parksmart certified garage. Parksmart is a certification program that defines, measures, and recognizes high-performing, sustainable garages. • While GBCI LEED certifies buildings for sustainability excellence, GBCI Parksmart does the same for garages.
LAND USE REGULATIONS	• The City and the EAC are recommending EV infrastructure be included in new development. • The City is amending its Subdivision and Land Development Ordinance (SALDO) and once adopted, EV infrastructure requirements can be incorporated. • The City is also working on an expedited process for EV public charger approvals and installation.
BEST ADVICE	• **Upfront Planning** – Developing a planning framework establishes a solid implementation foundation and is useful to achieve EV priorities. The City's CAP and BPA's Sustainability Program provide the framework necessary to achieve EV infrastructure goals. • **Stakeholder Support** – With a solid foundation for implementation through upfront planning, make certain stakeholders commit to endorsing a plan. The successful purchase and installation of BPA's charging stations in a short period of time would not be possible without the solid commitment of stakeholders such as BPA board members and City officials. • **Team Member Buy-In** – The success of BPA's EV and sustainability achievements over the past few years relied on the dedication of BPA's staff. BPA team members are engaged in and helped develop BPA's sustainability program, leading to solid, long-term success. • **Funding Sources** – Identify and apply for available grants and funding. Purchasing and installing EV charging infrastructure can be expensive. BPA has been successful leveraging its operational funds with DEP's Alternative Fuels Incentive Grant Program (AFIG) and Driving PA Forward to implement EV charging projects. • **Make Informed Decisions** – Use available network data to monitor trends. Using analytics available through the networked EV charging stations, BPA can review which chargers are being used, when, and for how long. This provides BPA tools needed to appropriately balance the need for new EV chargers. As EV adoption continues to grow, BPA will respond with new installations.

2. CITY OF HARRISBURG, DAUPHIN COUNTY

BACKGROUND

The City of Harrisburg is 8.12 square miles in size and home to 50,090 citizens (U.S. Census 2020). The City's population density is 6,171 per square mile.

EV charging infrastructure projects are part of Harrisburg's commitment to sustainability and renewal energy. As part of this commitment, the City has also been increasing the number of EVs in the City Fleet which will reduce gasoline consumption and GHG emissions over time. The City's goal is to switch light-duty, non-emergency vehicles from fossil fuels to electric, replacing upwards of 40 vehicles with EVs by 2026.

EXISTING EV PROJECTS

3rd Street Improvement Project

- Harrisburg's first EV charging infrastructure project was part of the 3rd Street Improvement Project, a streetscape and mobility improvement project running the length of 3rd Street. The project included new sidewalks, traffic-calming measures, and green infrastructure.
- Parking in front of the State Museum on 3rd Street was reconfigured from parallel to angled resulting in more parking spaces. Once the parking was reconfigured, eight EV charging stations were installed.
- Charging stations were not part of the original 3rd Street Improvement Project scope. However, several state legislators worked with City officials to include charging stations to serve electric vehicle parking needs near the state capitol.
- The $66,844 project was funded with a $40,000 Level 2 Rebate.

City Island Parking Garage

- The second project was complete in 2021 at the parking garage on City Island.
- The total project cost was $72,000 and was funded in part with Level 2 Rebate in the amount of $32,000.
- The project included installation of 4 bollards, 8 plugs for 8 EV charging parking spots, and a 3-year service and software contract with the charging station vendor, ChargePoint.
- Electric installation was $24,000 of the project cost and required installation of an additional electrical cabinet/circuit breaker and shut-off switch.

2. CITY OF HARRISBURG, DAUPHIN COUNTY	
	• The City encountered challenges with flood zones when installing the charging stations at the City Island parking garage. • ChargePoint dual port chargers were installed for both projects for a total of 16 public EV parking spaces in Harrisburg. The cost per charger averaged $8,516 and the cost to charge vehicles at both the 3rd Street and City Island locations is $0.72 per hour in addition to a regular parking fee. The $0.72 EV charging fee was chosen in 2019 and covered the City's cost for electricity at that time.
BEST ADVICE	**Invest in Electric Infrastructure** - Successfully deploying public EV charging infrastructure requires a municipality to make a long-term, high dollar investment in electrical infrastructure.

CITY OF PITTSBURGH, ALLEGHENY COUNTY	
BACKGROUND	The City of Pittsburgh is Pennsylvania's 2nd most populous municipality with 302,971 (U.S. Census 2020). The City developed a Climate Action Plan in 2018 which identified transportation as the City's 2nd leading source of Greenhouse Gas Emissions (GHG's).
EV PLANNING	**Climate Action Plan** • **Pittsburgh's Climate Action Plan** establishes several goals, two of which include improving air quality and minimizing GHG emissions from transportation by 50% by 2030. • To achieve these goals the Climate Action Plan recommended the implementation of modal shifts (transitioning more trips to walking, biking and mass transit) and fuel shifts (increasing the percentage of non-fossil fuel powered vehicles). Vehicle electrification was identified as part of the fuel shift solution. **EV Charging Strategic Plan** • The framework for EV charging infrastructure established through the **Pittsburgh Public Facility EV Charging Strategic Plan** (EV Charging Strategic Plan) supports the shift to vehicle electrification. • Pittsburgh's EV Charging Strategic Plan was written and facilitated by the National Resources Defense Council, through the support of the American Cities Climate Challenge. Completed in 2021, it addresses barriers associated with EV charging infrastructure.

CITY OF PITTSBURGH, ALLEGHENY COUNTY	
	• The EV Charging Strategic Plan established a vision for the City to ensure public EV charging is available, accessible, equitable, and convenient for all who live, work, and visit in the City of Pittsburgh. To achieve the vision, the following mission was developed: • Enabling the market by encouraging private investment where possible and where demand for EV charging is greatest. • Filling market gaps, particularly ensuring EV charging is available for those with the greatest barriers to charge. • Providing and managing EV charging through financial sustainability that recovers operating costs, enabling additional investments in the City's EV charging programs. • Engaging the community in planning and implementing the City's EV charging strategy, as well as using the infrastructure. • The plan includes a set of policy and operational recommendations through four overarching topic areas including: • Planning and Siting • Community Engagement and Outreach • Economics and Financing • Policies and Operations
EXISTING EV PROJECTS	EV chargers have been installed at several Pittsburgh Parking Authority garages. • First Avenue Garage & T Station - Capacity to charge 15 electric vehicles including 3 single ChargePoint chargers and six 6 dual ChargePoint chargers. • Grant Street Transportation Center – Capacity to charge 4 electric vehicles via 2 Eaton Level 2 Dual Electric Vehicle Chargers. • Smithfield-Liberty Garage – Capacity to charge 8 electric vehicles through 4 dual ChargePoint chargers. The Level 2 Rebate program was used as a funding source for this project in 2019. • Third Avenue Garage - Capacity to charge 8 electric vehicles through 4 dual ChargePoint chargers. The Level 2 Rebate program was used as a funding source for this project in 2019. EV infrastructure projects are planned for the Oliver Garage and Ft. Duquesne & Sixth Garage. Patrons at the Oliver Garage are primarily residential and 4 dual chargers are proposed.

CITY OF PITTSBURGH, ALLEGHENY COUNTY

BARRIERS

- **Ownership and Operating Model** – The City needs to consider who will own and operate EV charging infrastructure including considerations such as allocating parking revenue proceeds, operation of infrastructure, and ongoing infrastructure maintenance.
- **Location** - The City has not yet installed public chargers and is working with the Pittsburgh Parking Authority in planning optimal locations for EV charging infrastructure. Current EV chargers are in Parking Authority downtown garages where commuters park during weekdays.
- **EV Charging for Residents Without Garages** – The City is working with residents without garages and driveways to develop a long-term strategy for EV charging. Currently, some downtown residents without garages are deploying short term fixes to charge such as pulling electric cords from their home to curbside. The City's Department of Mobility and Infrastructure is identifying temporary, short-term solutions.
- **Design Standards** – Design standards should be developed from the perspective of an EV owner. Considerations such as location, safety, and weather resistant charging stations should be included.
- **Consistent Data Collection** - Every charging company has their own way of collecting data (payment methods) which is a challenge for EV owners. The nascent industry is not yet standardized for ease of consumer usage.
- **Revenue Generation** – Pittsburgh Parking Authority garage revenues are not yet at pre-pandemic levels. As parking garage revenues are the main source of funding for capital projects, structural renovations addressing safety are the current priority. This impacts implementation of new EV infrastructure projects in Parking Authority's garages.

BEST ADVICE

- **Develop a Solid Utility Relationship** - Know key electric utility contacts and follow the utility's process. This will help identify electric locations and connections, which ultimately impact project costs.
- **Know Your Lead Times** - Supply chains are an issue, complicating project timing. Plan for a 6-month lead time on equipment at a minimum.
- **Access Available Grant & Other Types of Funding** – Identify available grant funding and plan in advance for the time needed to write grant applications and secure approvals. Funding is not guaranteed; therefore, planning for contingencies is important.
- **Understand the Use Case** – Extremely important but not always a focus, is understanding the needs of an EV owner. Where, when, and

CITY OF PITTSBURGH, ALLEGHENY COUNTY

how will they charge? What are the pros and cons for every type of EV owner and every type of EV?

- **Know the Technology and Have a Maintenance Plan** – A municipality needs to understand the technology and have staff or a contractor ready to address ongoing, long-term maintenance.

LANSDALE BOROUGH, MONTGOMERY COUNTY

BACKGROUND

Lansdale Borough is located in southeast Pennsylvania, 25 miles northwest of Philadelphia. The Borough is 2.99 square miles in size with a population of 18,773 (U.S. Census 2020), and 6,272 people per square mile.

The Borough is one of 35 Pennsylvania municipalities which own an electric utility and is part of the Pennsylvania Municipal Electric Association. Because Lansdale Borough owns its electric utility, it is uniquely positioned to minimize electric costs associated with EV charging.

The Borough does not generate electricity but purchases electricity in 10-year blocks at a fixed rate. PPL owns the power lines and the Borough purchases electricity from American Municipal Power and Next Era.

The Borough is one of six municipalities earning the Reliable Public Power Provider (RP3) designation by the American Public Power Association. The American Public Power Association's Reliable Public Power Provider program recognizes utilities that demonstrate high proficiency in reliability, safety, workforce development, and system improvement.

EXISTING EV PROJECTS

- In 2019 the Borough used a Level 2 Rebate to install five Level 2 public dual port EV chargers. Ten total parking spots are available for vehicles to charge.
- Charging stations were obtained from BTCPower and cost $6,000 each. The charging stations are in Borough parking lots, in commercial areas, at the Borough library, and at Borough Hall.
- Electricity supplier Next Era provides renewable energy and agreed to sponsor electricity for the chargers.
- Because the Borough owns the electric utility and agreed to provide electricity at no charge, the public charging stations are offered for free.
- Offering EV charging free of charge helps the Borough promote zero emission driving.

LANSDALE BOROUGH, MONTGOMERY COUNTY	
	• Lansdale Electric staff and equipment are used to install most of the infrastructure required and installation of the chargers was contracted. • Charging stations are connected via wireless modem and the Borough pays a fee of $35/month per charging station for the network connection. • Existing charging locations were selected to minimize disruption to sidewalks and roads, minimizing excavation. • Commercial charging locations were identified to encourage EV owners to patronize restaurants and other Borough businesses while charging. Similarly, the library was selected as users typically remain long enough or charging. • The public's use of the chargers was greater than anticipated. In the first 10 months of operation, the chargers were used about 1,000 times. • Since 2019 the Borough has provided approximately $10,000 worth of free electricity to the public through use of the chargers. • The Borough installed municipal utility meters at the stations to compare the kWh used for billing purposes. • The Borough is planning to install Level 3 DC fast chargers in the future and is considering installing chargers at strategic locations where people park for longer periods of time such as near rail locations and sports fields.
BARRIERS	• **Municipal Support** – Convincing Borough officials to install EV charging stations requires time. This was made easier by demonstrating the charging stations were no cost to the Borough due to public funding and electric supplier commitments.
BEST ADVICE	• **Consider Peak Demand** - Peak demand costs should be factored into projects. Lansdale Electric is a municipally owned utility and can absorb peak demand fees. Level 3 DC fast chargers will use much more electricity at peak times, resulting in higher electric costs. • **Identify Public Funding** - Public funding is needed. A municipality's return on investment will take much longer if a grant or rebate is not used to offset project costs. • **Choose Locations Wisely** - Pick locations that are close to existing electric infrastructure with extra capacity. This minimizes labor and expense for cutting into sidewalks and placing conduits under streets.

MIDDLETOWN TOWNSHIP, BUCKS COUNTY	
BACKGROUND	Middletown Township is a Township of the Second Class located in southeast Pennsylvania. The Township is 19.3 square miles in size with a population of 46,040 (U.S. Census 2020), and 2,437 people per square mile. **Middletown Township is a Certified Platinum Community**, the highest level of sustainability achievable through the Sustainable Pennsylvania Certification Program. The Township adopted a Climate Action Plan in 2021 with a goal of reducing the community's contribution to GHG emissions by 40% by 2040. Converting municipal vehicles to electric and providing public EV charging infrastructure will help the Township achieve these goals. As two heavily travelled major roadways traverse Middletown Township (US 1 and I-295), pass through traffic adds to Township emissions. Therefore, adopting EV charging infrastructure is a critical tool to address non-resident emissions. EV charging infrastructure also benefits residents and makes owning an EV more feasible, particularly for those residents without a garage.
EV PLANNING	**Making EV Chargers Attainable** One of the objectives of the Climate Action Plan is to make electric vehicles attainable. • Developers are proposing projects which include EV charging infrastructure due to the direction set forth in the Climate Action Plan. **Public Use Charging Stations** The Township will continue to focus on increasing the number of charging stations available for public use. This will include planning for: • Public charging for citizens who lack garages. • Potential projects on Township-owned property near residential developments. • Encouraging multifamily property owners to add charging stations to their developments.
EXISTING EV PROJECTS	Middletown Township currently has four EV charging stations and is planning to install four additional stations in 2023. • The Township's existing charging stations are Level 2 with two plugs.

MIDDLETOWN TOWNSHIP, BUCKS COUNTY	
	• Charging stations are installed at the Township's Municipal Center, Public Works building, and Styer Orchard, a Township owned preserved farm property. • Each charging station costs approximately $20,000 and was installed and is maintained by vendor, ChargePoint, Inc. • The Township selected the vendor through COSTARS. • Project costs were paid for by the Township along with rebates from the Level 2 Rebate program. Energy provider, PECO, also provided a rebate for the charging station at Styer Orchard. • To minimize installation costs, charging stations were tied into existing building electric panels. • The public's use of the charging stations has increased since 2019. The charging station located at the Township's Municipal Center is used most frequently and 8,000 MWh of power has been used. Middletown Township is currently planning to install four Level 3 DC fast chargers for public use. • The project will cost an estimated $430,000. The Township was awarded $215,000 for the project through DEP's AFIG program and will provide 50% matching dollars. • The Level 3 chargers will be placed in front of the Township Municipal Center, near three residential developments, and at a Township shopping center. The residential developments include a variety of housing types: an age restricted 55+ community, a mid/upscale townhome development, and low/midscale townhomes and apartments. • Each DC fast charging station includes one plug equipped with two connectors.
LAND USE REGULATONS	While the Township has not enacted an ordinance to require electric vehicle charging, its Climate Action Plan sets forth the policy the Township would like to achieve. • Enacting land use regulations to require electric vehicle charging stations in new commercial land developments and requiring new residential developments to be constructed with electric vehicle infrastructure are identified as possible future actions.

MIDDLETOWN TOWNSHIP, BUCKS COUNTY	
BARRIERS	• **Electric Infrastructure Costs** – Total project costs will be minimized if a charging station is located close to existing electric infrastructure. New electric service may be required. • **Loss of Parking Spaces** – Reducing the amount of existing available parking spaces by converting to EV parking needs to be reviewed and coordinated with existing business owners. • **Municipal Support** – Ensuring that Township officials are supportive of EV projects is critical to success. Because the Township adopted a Climate Action Plan that established policy direction, it was easier for officials to commit to spending funds or applying for public funding for EV projects.
BEST ADVICE	• **Infrastructure Planning** - Plan for long term electric vehicle infrastructure, especially for fleet vehicles. • **Develop EV Priorities for Developer Use** - Develop a guiding document such as a Climate Action Plan or modify land use regulations to provide developers with guidance about the type of electric vehicle infrastructure the Township desires to achieve.

3. NARBERTH BOROUGH, MONTGOMERY COUNTY	
BACKGROUND	Narberth Borough is located approximately 30 minutes northwest of Philadelphia. The Borough is 0.5 square miles in size with a population of 4,492 (U.S. Census 2020). To address the impacts of climate change, in 2020 the Narberth Borough Environmental Advisory Council in partnership with ICLEI – Local Governments for Sustainability (ICLEI) produced the Narberth Climate Action Plan. The **plan details steps** to reduce GHG emissions from transportation, utilities, and municipal waste through solutions such as installing LED streetlights, purchasing 100% renewable electricity by 2040, and installing multimodal transportation options.
EXISTING EV PROJECTS	**Initial Project** • One of the multimodal transportation options the Borough implemented from the Climate Action Plan was its first EV charging

3. NARBERTH BOROUGH, MONTGOMERY COUNTY

project. The project was completed in 2021 and included installation of four Level 2 public charging stations on Borough property.

- The Borough selected EV charging infrastructure company FLO for the project due to the firm's robust, reliable, and durable utility grade EV charging solutions. A local contractor was retained to complete charging station installation.
- To address charger data reporting and ease of customer use, the EV charging infrastructure project included:
- Networked stations collecting data and utilization.
- The ability for EV users to initiate a charging session through FLO's mobile application or RFID card.
- An application roaming agreement between FLO and EV charging providers ChargePoint and Greenlots, removing the barrier of multiple user interfaces for EV users.
- The current charging fee is $0.15 per kWh. The Borough determined the fee by reviewing operating costs including electricity and vendor payments, while trying to maintain the lowest cost to encourage charging station use.

Upcoming Project

- The Borough's second project, also in conjunction with FLO, is scheduled for completion in 2023.
- The project will include eight Level 2 charging stations. The stations will be curbside, on street locations in residential neighborhoods to meet the needs of Borough residents without a garage or driveway.
- Initially, the Borough considered installing the EV charging infrastructure on existing utility poles. After early discussions with utility provider, PECO, it was determined this solution was not feasible due to third party liability issues.
- The type of charging station to be installed is currently deployed in residential neighborhoods in New York City. The stations are 12 feet in height with a slimmer profile, fitting better on the Borough's sidewalks.
- In consultation with PECO, the Borough determined it will power the EV chargers from existing electric service at Borough streetlights. Because the Borough converted to LED streetlights in 2021 including new wiring, additional electric power will be available for charging.
- Total project cost is estimated at $109,000 funded through the Level 2 Rebate program, PECO's Make Ready Program, and Borough matching funds.

3. NARBERTH BOROUGH, MONTGOMERY COUNTY	
	• Consistent with the Borough's initial EV charging project, the fee for the curbside chargers will be $0.15 per kWh.
LAND USE REGULATIONS	• **Revised Parking Regulations** - The Borough updated its parking regulations to prohibit non-EVs from parking at EV chargers. • **Updated SALDO** - The Borough will be updating its SALDO to require that new construction is EV ready.
BARRIERS	• **Limited EV Awareness** – Because EVs are a new technology, not all residents are familiar with what is needed to charge vehicles and why the installation of charging infrastructure is so important. As the EV industry grows and more EVs are purchased, it will be easier to explain charging needs and develop the best use case for Borough residents. Ongoing education is needed. • **Reducing High Demand Parking Spots** - The Borough was careful to avoid removal of high demand on street parking from non-EVs while society transitions to EVs. To do so, charging locations were carefully selected and the cost of installation was offset through grant funding. • **Lack of Metropolitan Residential Charging Options** - Because approximately 41% of Americans in the top 100 metropolitan areas live in multi-family homes, many do not have a garage, or a suitable dedicated driveway or parking spot. Therefore, curbside charging is important to facilitate EV adoption. This charging solution is especially helpful for 'garage-orphans'.
BEST ADVICE	• **Upfront Utility Coordination** – The local electric utility should be included in early and often. Upfront coordination aids in efficient project design, reducing project costs in the long term by minimizing redesign. • **Plan Ahead** - Because the Borough converted its streetlights to LEDs, it not only had excess power but new wiring. The streetlight conversion will reduce the cost of the Borough's second EV project, spreading infrastructure investment costs over a longer timeframe. • **Know Your Use Case** – It is important to know who you are planning for. Each of the Borough's projects were focused on different EV charging users. With the second project focusing on residents, knowing needs upfront will save time and costs during project design.

3. NARBERTH BOROUGH, MONTGOMERY COUNTY	
	• **Identify and Secure Funding** – The Borough used state and utility funds to help fund its projects. It is important to research and apply for funding and identify and secure municipal matching funds. • **Consistent Stakeholder Involvement** – Engaging elected officials, municipal staff, the utility, and citizens early and often ensures a thoughtfully developed project which will be efficiently designed, ultimately reducing project costs.

4. PHOENIXVILLE BOROUGH, CHESTER COUNTY	
BACKGROUND	Phoenixville Borough is in southeast Pennsylvania about one hour northwest of Philadelphia. The Borough is 3.51 square miles in size with a population of 18,602 (U.S. Census 2020), and 5,298 people per square mile. Phoenixville has been focused on transitioning to renewable energy and in 2017 was the first Pennsylvania community to commit to 100% renewable energy through the Sierra Club's Ready for 100 campaign.
EXISTING EV PROJECTS	Phoenixville installed eight public Level 2 EV charging stations in each of two public lots in 2020. Combined, the lots provided spaces for 16 vehicles to charge. • Each group of eight chargers six are equipped with Tesla proprietary connectors under Tesla's Destination Charging Program and two have standard J1772 connectors. • The Borough chose to install the chargers in public lots near the Borough's entertainment district to provide a value-added service to visitors. • To reduce installation costs, Phoenixville selected spots near existing power. Installation required trenching the grass in parking medians and installation of electric meters. • Phoenixville did not network the chargers as the equipment and administrative costs would have been higher than the cost of electricity. • Phoenixville uses the Passport Parking app to collect payment for EV charging station parking spots. • When chargers were initially installed, any vehicle was permitted to park in a space with an EV charger. The cost to park in an EV space is $1.50 an hour, $0.50 higher than spaces without EV chargers.

4. PHOENIXVILLE BOROUGH, CHESTER COUNTY	
	• Spaces with EV chargers were initially marked with signage stating, "EV Parking Preferred". The combination of signage and pricing assured that EV spaces were the last spots filled, maximizing availability for EV users without removing parking from the inventory available for visitors. • In 2022 as EV ownership grew and EV charging stations were being accepted by the community, the Borough switched the spaces and signage to "EV Only". • The Borough also began charging for overnight charging.
EV PLANNING	• Phoenixville has a goal of 50 EV charging stations by the end of 2023. • Charging stations will be installed at the new Borough Hall and new Recreation Center where conduit was installed in the parking lots; therefore, EV spaces are ready to wire. Stations will also be installed at the Borough's fire station. • To accommodate EV charging for residents without garages, a policy committee including Borough residents are developing guidelines that could potentially include charging locations behind homes, in planting strips along streets, and in underutilized locations.
LAND USE REGULATIONS	• In the mid-2010s, the Borough passed several resolutions related to renewable energy, sustainability, and energy efficiency. • In 2022 the Borough completed revisions to its SALDO to include EV ready standards for new residential developments over 20 units, parking garages, and commercial developments. • Even before its SALDO revisions, the Township would discuss incorporating EV ready measures into land development projects with developers. Many of the Borough's developers and smaller builders understood the benefits. Incorporating EV ready infrastructure is another way for builders to market their project.
BARRIERS	• **Available Parking Spaces** - Phoenixville has an active downtown and any loss of parking spaces could hinder visitors from dining and shopping. The Borough worked with downtown business owners to identify the best locations for EV parking. • **Building Consensus** – The Borough also needed to balance the concerns of tourism and environmental groups. A key takeaway is that green infrastructure can also be economic development.

4. PHOENIXVILLE BOROUGH, CHESTER COUNTY	
BEST ADVICE	• **Pick Good Locations** - Make sure EV charging stations are located where people want it to be. Whether the locations are for businesses, residents, or a mix, find out where demand for charging stations is located. • **Local Government Leadership** – Having local government leadership committed to EV charging infrastructure is important. In Phoenixville's case, the Borough Council made it possible to take on the first project. • **Networking is Not Always Necessary** – Collecting data through networking is not always necessary and includes extra costs such as credit card and Internet fees. These extra costs should be factored into projects. • **Commit to EV Infrastructure** – Make a long-term commitment to installing EV charging infrastructure. It will require years of time and effort. • **Be Flexible** – EV charging is new, and adjustments will be made as charging stations are introduced and technology changes. Being nimble and working with citizens, businesses, and developers helps to move implementation forward.

ADDITIONAL MUNICIPAL INPUT

In addition to the municipal case studies presented above, a few municipalities that are just beginning to install or plan for EV charging infrastructure provided input.

City of Scranton, Lackawanna County

The City of Scranton has installed several EV chargers for municipal vehicles using DEP's AFIG program. Currently, Scranton is partnering with surrounding municipalities to develop a regional EV implementation plan. The plan will set the foundation for EV charging infrastructure in the Scranton area.

Oil City, Venango County

Oil City has one public charging station installed in 2021 using the Level 2 Rebate program. With the charging station being just one of a small number of EV public charging stations in the area, it was installed to benefit electric vehicle travelers making long trips in the region. The location of the charging station was intended to help increase downtown foot traffic while a vehicle is charging, with a goal of increased consumer spending and positive economic benefit. Oil City has not enacted land use regulations to address EV charging infrastructure and would consider existing public lots for public EV charging in the future.

EV CHARGING RESOURCES

Additional resources to support municipal EV planning and implementation were also identified through stakeholder outreach conducted as part of this assignment. DVRPC, TMA Bucks, and Duquesne Light Company each provide resources and tools to help position municipalities for EV adoption.

DVRPC Electric Vehicle Information Clearinghouse and *Ready to Roll!*

DVRPC has assembled an online resource for counties and local governments in its Pennsylvania and New Jersey service area - Electric Vehicle Information Clearinghouse. In 2013 DVRPC developed *Ready to Roll! Southeastern Pennsylvania's Regional EV Action Plan* (Ready to Roll!), a regional approach to introducing EVs and electric vehicle supply equipment (EVSE) into Bucks, Chester, Delaware, Montgomery, and Philadelphia counties. The plan was funded through a U.S. Department of Energy's Clean Cities Program Electric Vehicle Community Readiness Project Award

Duquesne Light Company Community Charging Program

Duquesne Light Company (DLC) provides electricity for most of Allegheny and Beaver counties. DLC's Community Charging Program provides technical assistance and incentives as EV adoption continues to grow in the Pittsburgh region. DLC is working with municipalities, businesses, multi-family properties and non-profits through the Community Charging Program to make the EV charging installation easier. installing EV charging easier. DLC's Community Charging Program Guide provides program details.

TMA Bucks Online Seminar

TMA Bucks, the transportation management association for Bucks County, sponsored an effective, informative online seminar on increasing the integration of electric vehicles into communities. Addressing topics such as supply equipment and electrical service requirements, local land use regulations, siting and design, installation and maintenance costs, and first responder and safety considerations, the webinar provides practical guidance for municipalities in planning for electric vehicle infrastructure.

Phase Two: Driving PA Forward Recipient Input

METHODOLOGY

To augment information collected through case studies, input was obtained from recipients of the Driving PA Forward Level 2 Rebate program (Level 2 Rebate). DEP provided a list of municipalities receiving an award as of October 12, 2022. A total of 59 municipalities received a Level 2 Rebate for installing EV charging infrastructure for public access.

The average cost per charging plug was $7,137 with a low cost of $2,077 installed in Centre County and a high cost of $13,537 installed in Allegheny County. On average municipalities installed two plugs per project with the City of Harrisburg and City of Philadelphia installing the most plugs per project at eight each.

The municipalities were contacted and 29 (49%) provided information about their existing EV charging project, challenges, land use regulations, and future EV planning. Each municipality was asked the following questions:

- When did your municipality complete the Level 2 charging project outlined in the Driving PA Forward application?
- Where was the charging infrastructure installed in your municipality? (municipal building, park/recreation facility, parking lot, other)
- How was the location selected?
- How often are the EV charging stations being used?
- Is your municipality considering installing EV charging stations at other locations and if so where?
- What types of challenges or issues did your municipality encounter in planning and constructing the public EV charging infrastructure project?
- Has your municipality enacted or is it considering enacting land use or enforcement regulations to facilitate EV charging infrastructure?

Answers to questions were compiled and categorized to develop findings.

FINDINGS

Where were EV chargers installed?

In general, public EV charging infrastructure has been installed at municipal parking lots or garages; near parks and recreation fields; or near libraries and community centers.

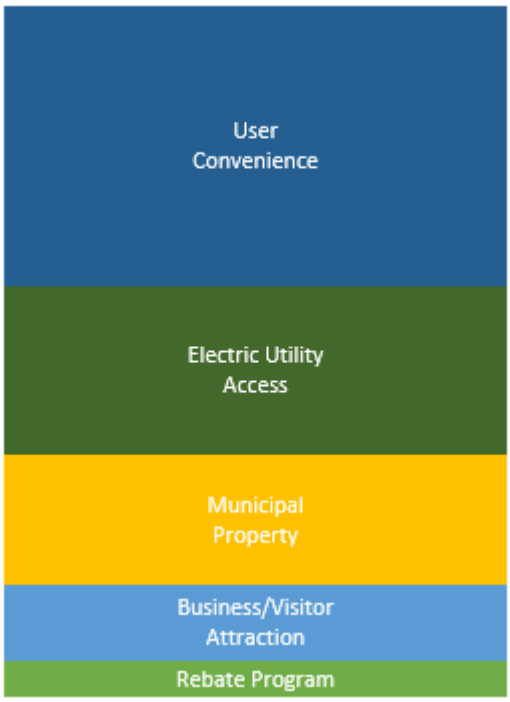
Several municipalities with active downtowns installed charging stations along sidewalks for use of visitors and residents.

How were locations selected?

USER CONVENIENCE

Many municipalities prioritized the location of charging stations based on user convenience, making it easier for EV drivers to patronize local businesses or parks while charging. It was also important for municipalities to provide access for residents and people employed in downtown locations.

- The Borough of Ephrata in Lancaster County installed charging stations for easy availability and short walks to the Borough's Central Business District and Recreational Rail Trail.
- The Borough of Oxford in Chester County was in the process of constructing a parking garage when it found out the Level 2 Rebate program was available. It made sense for the Borough to install the charging stations for the convenience of future downtown patrons as well as residents. Having the rebate cover most of the project costs was advantageous.



ELECTRIC UTILITY ACCESS

A few municipalities noted that their primary siting factor was easy access to electricity. Readily available access to electricity reduces overall project costs.

MUNICIPAL PROPERTY

Selecting locations on municipal owned property was the main siting consideration for many municipalities. Municipal ownership combined with proximity to the electric utility were prime considerations. One municipality noted that it dedicated one charging port for municipal vehicles and the other was made available for public use.

BUSINESS/VISITOR ATTRACTION

Installing charging infrastructure as part of an overall business and visitor attraction strategy was identified as a location consideration for a few municipalities.

Denver Borough in Lancaster County selected charging infrastructure locations to attract more people to its Main Street Business District. With a PA Turnpike interchange in proximity to the Borough and an increasing number of electric vehicles travelling the turnpike between Philadelphia and Pittsburgh, the Borough hopes it can attract more visitors by installing charging infrastructure.

REBATE PROGRAM

Depending on when a municipality applied, DEP's Level 2 Rebate program provided a 100% reimbursement, making projects extremely cost effective for municipalities. Several municipalities said that because equipment costs are so high, they would not have completed projects without the assistance of the state rebate program.

How frequently are charging stations being used?

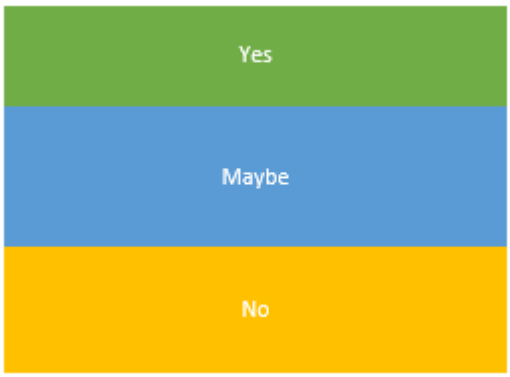
Charging station usage varied widely and variations appeared to depend on municipal density.

Several boroughs and townships in larger urban areas in southeastern Pennsylvania reported daily or weekly usage while boroughs and townships in more rural locations reported that usage was light, infrequent, or not often. State College Borough in Centre County reported 2,851 sessions over the past 365 days.

It was also noted that charging station usage has been increasing over time, likely corresponding with the increase in electric vehicles on the road. For example, Indiana Borough in Indiana County stated that charging stations were rarely used when installed in 2019. Today, usage is almost daily.

A few municipalities said that although their charging stations are networked, they do not currently use the data.

Are additional public charging stations being considered?



YES

Several municipalities are planning to install additional charging stations at locations such as community parks, recreation centers, municipal buildings, and park and ride lots.

Municipalities also commented that new charging stations should be DC fast charging stations due to rapidly changing technology.

MAYBE

Several municipalities were unsure if they would complete an additional public EV charging infrastructure project. A few reported they would complete additional projects if funding was available or if projects were 100% funded. Matching funds are a key consideration.

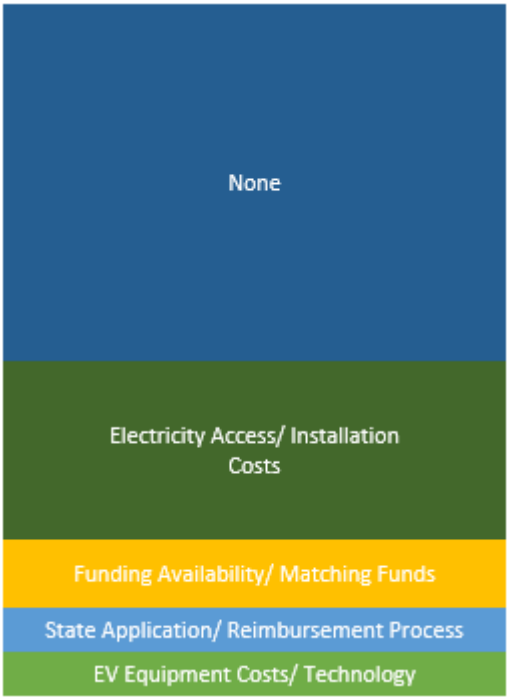
A few municipalities are conducting feasibility assessments to determine if installing additional chargers would be beneficial with some looking out 10+ years for both fleet and public usage. College Township in Centre County does not have any current plans to install additional charging stations, but notes that it might consider charging stations at its municipal building as the Township is considering replacing its aging vehicle fleet with EVs. Future consideration could be given to charging stations at other municipal owned locations such as parks.

NO

For those municipalities not intending on installing additional charging stations, many said that cost is an issue.

A few municipalities indicated they are not planning on installing additional charging stations because the private sector is beginning to install based on market demand. Some municipalities are encouraging non-residential developers to include charging stations in parking lots.

What challenges were encountered during planning and construction?



NONE

Many municipalities encountered limited to no challenges when planning and constructing their EV charging infrastructure project through the Level 2 Rebate program, particularly those municipalities that have electricity in place.

Having available funding in the form of a rebate also removed challenges, "*No challenges as funding was 100%".*

A few municipalities said the vendor made the charging project relatively easy. For example, ChargePoint was identified as a vendor that makes a charging project easy to plan and implement.

ELECTRICITY ACCESS/INSTALLATION COSTS

Many municipalities reported that the most challenging part of the project was working with their utility to provide access. Electric capacity needed to be increased in many instances and in those cases where electricity was a barrier, it appeared that project costs were also a concern.

- Denver Borough in Lancaster County said that it incurred the cost of extending electric service, purchasing, and installing a pole for the service, and providing a conduit connection to the unit.
- O'Hara Township in Allegheny County is planning future projects at its municipal building and a community park. it would like to add additional charging stations at its Community Center, but it would require a major electrical upgrade to do so.

FUNDING AVAILABILITY/MATCH

Funding and having municipal match were a challenge for some municipalities. For example, municipal officials in Freedom Township, Adams County would only agree to a public EV charging project if it did not cost the Township.

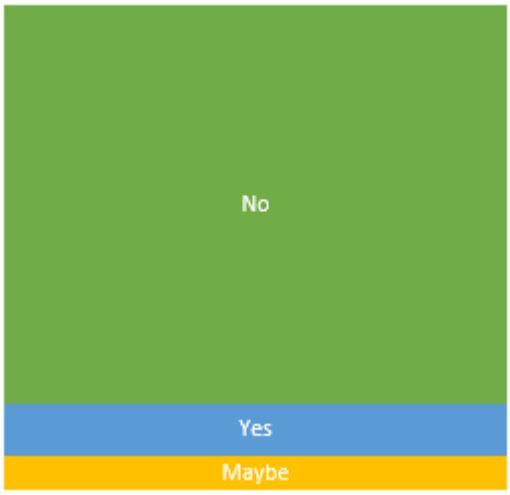
STATE APPLICATION/REIMBURSEMENT PROCESS

A few municipalities noted that the Level 2 Rebate program application process ran smoothly, although a few municipalities commented that it took a while to receive reimbursement. One municipality noted that the delay in reimbursement was most likely due to the COVID-19 pandemic.

EV EQUIPMENT COSTS/ TECHNOLOGY

Springfield Township in Montgomery County said the return on investment to offset the initial investment in charging infrastructure is the biggest challenge. With very limited revenue from the charging station project, *"it will still take the Township 26 years to recoup its investment."* Because EV technology is rapidly changing, infrastructure that is installed today becomes quickly outdated. Springfield Township has received complaints that Level 2 charging isn't fast enough.

Are new land use regulations being considered or have new land use regulations been adopted?



In general, regulations are not being considered by municipalities. Many note that because businesses are beginning to install charging stations and homeowners are installing chargers on their properties, additional land use regulation is not always necessary. "*We have looked at potential regulations and determined that the "market" seems to be moving most stakeholders in the correct direction"* and additional municipal requirements would not be helpful.

A few municipalities are asking applicants to include EV charging stations as a green option in their land development projects.

Municipalities that reported modification of existing land use regulations to address EV charging infrastructure include:

- Royersford Borough – Enacted an ordinance enforcing the regulation of EV charging infrastructure.
- Warwick Township – Added a requirement that a developer install at least one EV charging station if developing a fuel station.
- Whitemarsh Township – Amended parking regulations in the zoning ordinance to require EV charging stations.

Additional Input

A few municipalities provided insight on items that could help increase public EV charging infrastructure installation.

- **Funding** – Grant funds with little to no match requirement would increase the installation of public EV chargers.
- **Liquid Fuels** – Consider legislative modification to use municipal Liquid Fuels funds to buy and install EV chargers in public spaces. Liquid Fuels funds are currently used for streetlights, salt, purchasing trucks, etc. Expanding the use of Liquid Fuels to cover public EV charging infrastructure would provide an additional funding source.
- **Guidance** – Provide state guidance to help municipalities set public EV charging fees. This would help municipalities recoup installation costs.