

City of Pittsburgh

EV TASK FORCE RECOMMENDATIONS



pittsburgh
city planning

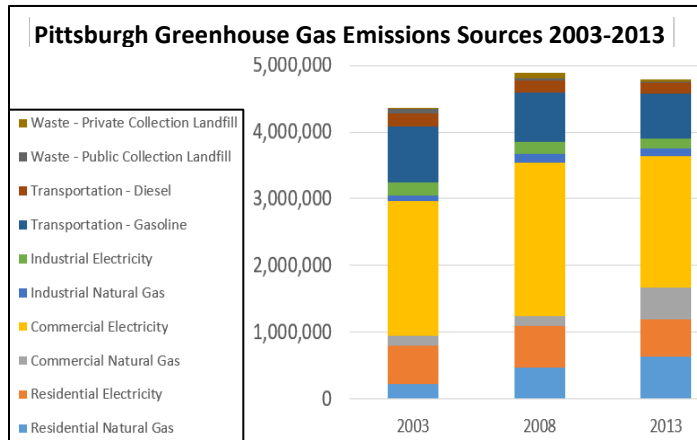
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Background

Why Electrify?

Transportation is the second leading source of GHG emissions, making up 17-18% of Pittsburgh's



Source: Pittsburgh Climate Action Plan, 2018

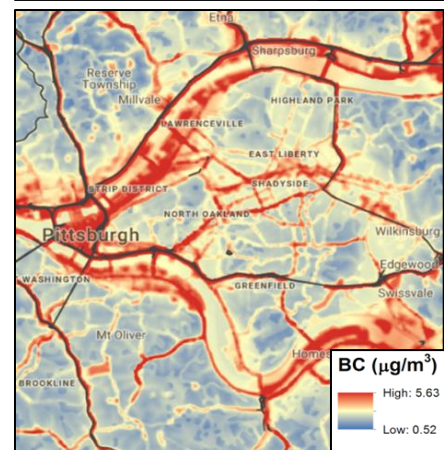
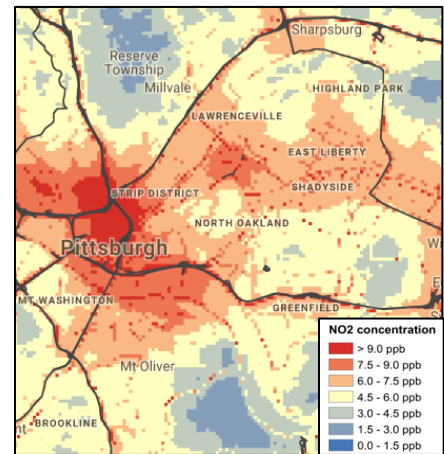
annual GHG emissions. To mitigate the negative impacts associated with climate change, the City's 2018 Climate Action Plan outlines a goal to reduce the total amount of GHG emissions from transportation citywide by 50% by 2030.

Pittsburgh is already experiencing the impacts of climate change through increased rainfall and flooding events, unprecedented landslides, and rising temperatures.

Transportation emissions contribute to already poor air quality in Pittsburgh.

The American Lung Association failed Pittsburgh for ozone and short and long term particulates in their 2018 and 2019 State of the Air Reports, showing air quality worsening as temperatures increase due to climate change. Ozone is the main ingredient in smog, and is created when pollutants from motor vehicle exhaust, among other sources- nitrogen oxides (NOx) and volatile organic compounds (VOCs) react when exposed to sunlight. Breathing ozone can trigger a variety of health problems, reduce lung function and harm lung tissue. Ozone can worsen bronchitis, emphysema, and asthma, leading to increased medical care.^{1 2}

The maps to the right show nitrogen dioxide and black carbon pollution as mapped by Carnegie Mellon University's Create Lab. Hot spots of both pollutants visibly align with highways and streets. Nitrogen dioxide (NO₂) is part of the larger class of compounds nitrogen oxides (NO_x) commonly emitted by cars, trucks and buses. Exposure to NO₂ for as little as 30 minutes increases airway inflammation in healthy people and can worsen asthma symptoms. Black carbon (BC) is black or grey soot emitted from diesel trucks and other sources. BC is a component of fine particulate matter (PM_{2.5}), which the American Lung Association acknowledged is worsening in Pittsburgh. Breathing fine particles increases risks of asthma attacks, heart attacks, reduced lung function, lung cancer, and death.



NO₂ (top) and BC (bottom) Pollution Maps courtesy Albert Presto/CMU/Breathe Project

¹ <https://www.lung.org/our-initiatives/healthy-air/sota/city-rankings/states/pennsylvania/>

² <https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics#formation>

Allegheny County does not meet federal standards for PM_{2.5} concentrations. In Pittsburgh, the major sources of BC are industrial facilities and diesel vehicles. Elevated concentrations are found in communities in the river valleys, and people living in those communities have higher risks of negative health impacts from pollutant exposures than the county average.³

Pittsburgh region children suffer a 22% asthma rate, more than twice the national average, and major disparities exist as black children in the region suffer asthma hospitalizations at a rate of nearly four times those of white counterparts.⁴ The American Lung Association says that those living or working within 300-500 meters of a highway are susceptible to a wide range of health impacts. While industrial sources are clearly the major contributor to regional air quality issues, reducing localized transportation pollution is an area where City policies and initiatives can provide significant relief to residents.

Electrification as Part of a Solution

To achieve both goals of improving air quality and reducing emissions, the City recommends the implementation of the following two tactics:

1. **Mode Shift** – transitioning more trips to walking, biking and mass transit
2. **Fuel Shift** – Increasing the percentage of non-fossil fuel powered vehicles

While the purpose and focus of this document is on fuel shift, and exploring how the City can facilitate an equitable transition to e-mobility, it is important to reiterate the City’s mode shift goals. Vehicle electrification and fuel shift is intended for the vehicles remaining after the prioritization and encouragement of mode shift. Any electrification efforts for private vehicles and fleets should not have an adverse effect of increasing car ownership or vehicle trips overall, regardless of fuel source. The table to the right shows the City’s current commuter mode breakdown and goals for 2030.

City of Pittsburgh Mode Shift Goals

Mode	2014 Commuter Mode Split	Objective	2030 Commuter Mode Split Goal
Walk	10.9% (+/- 0.6)	50% increase	16.4%
Bike	1.8% (+/- 0.2)	100% increase	3.6%
Public Transit	16.9% (+/- 0.7)	100% increase	33.8%
Single Occupancy Vehicle (Drove Alone)	55.5% (+/- 0.9)	50% decrease	27.75%

Source: Pittsburgh Climate Action Plan, 2018

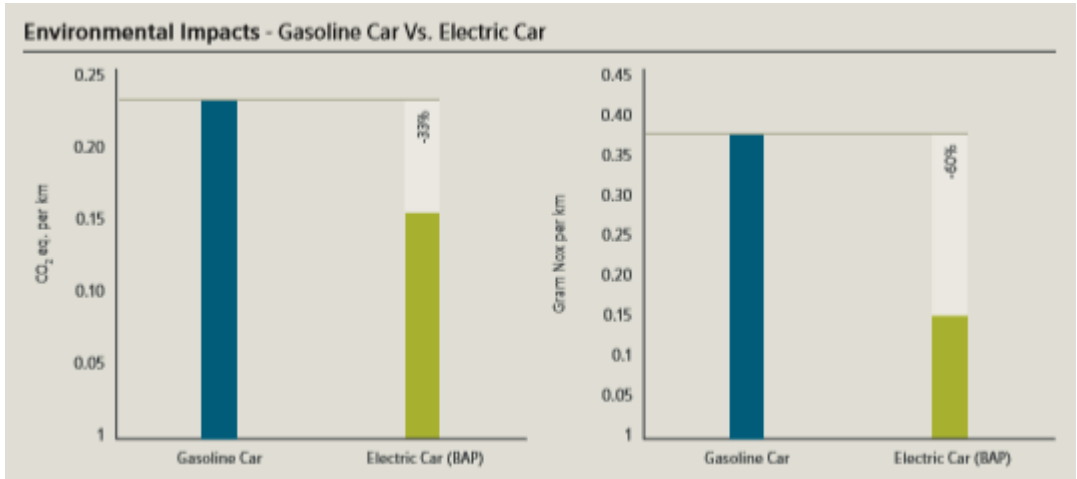
E-mobility in Pittsburgh is not exclusively focused on electrifying cars. Electric buses, scooters, bicycles and cars are all forms of electric transportation that must be considered. These different forms of electric vehicles (EVs) can potentially offer access to clean transportation throughout all corners of the City, and can align with the City’s mode shift as well as fuel shift goals. Electric buses are particularly important as diesel particulates are a major contributor to black carbon and PM_{2.5} levels.

The source of energy used to charge electric vehicles is a crucial consideration. An influx of EVs will lead to higher energy supply requirements, and current surges in energy demand are filled largely by coal-fired power plants. To maximize the air quality benefits and emissions reduction potential of

³ <https://breatheproject.org/pollution-map/>

⁴ https://pittsburghpa.gov/equityindicators/documents/PGH_Equity_Indicators_2018.pdf

electric vehicles, EV charging infrastructure must be aligned with clean, local energy production either on-site or via grid purchase. This is also particularly relevant as the Beaver Valley Nuclear facility is planning to close in 2021, which supplies nearly 70% of the City’s energy use. In a scenario where the difference in production is made up with natural gas and coal, an analysis conducted by Siemens for the City of Pittsburgh concluded that the CO₂ and NO_x reduction will still be beneficial, however coupling EV charging with renewable power whether on-site or via purchase is critical to achieving maximum benefit from electrification efforts.⁵

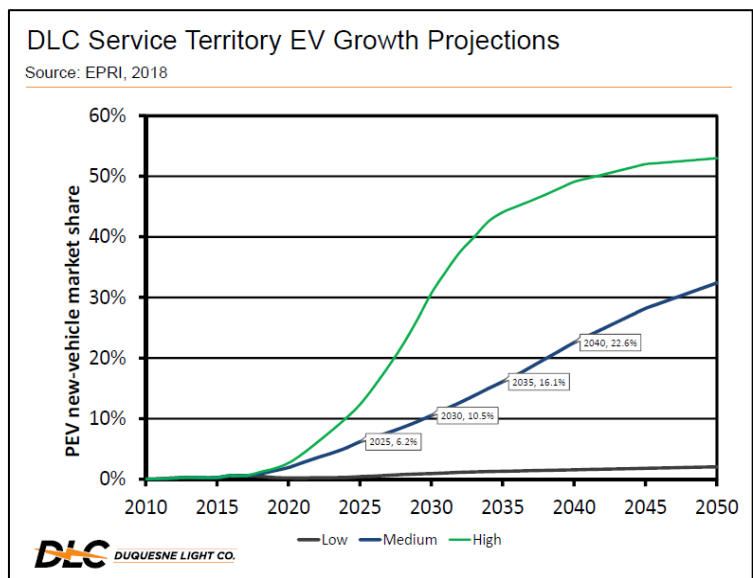


Source: Siemens CyPT Report for the City of Pittsburgh, 2019

Current E-Mobility Landscape

In 2018, there were 961 electric vehicles registered in Allegheny County,⁶ the Port Authority had two electric buses on order, and the Scoobi on-demand electric scooter service was beginning a second year of operation. Comparatively, there are more than 856,000 registered vehicles in PennDOT’s database at the end of 2018. Electric vehicles and buses make up less than 0.3 of a percent of the county fleet. This number is nearly four times lower than the national average of 1.15%.⁷

Electric Power Research Institute has projected EV growth by 2050 throughout the Duquesne Light service territory, as seen in the chart to the right.



Source: Duquesne Light Company

⁵ <https://assets.new.siemens.com/siemens/assets/public.1561154658.a31d7c2c-8c2c-4836-998a-097fe3e10bf0.2019-cypt-report-pittsburgh-lowres.pdf>

⁶ <http://www.dot.state.pa.us/public/dvspubsforms/BMV/Registration%20Reports/ReportofRegistration2018.pdf>

⁷ <https://evadoption.com/ev-statistics-of-the-week-historical-us-ev-sales-growth-market-share/>

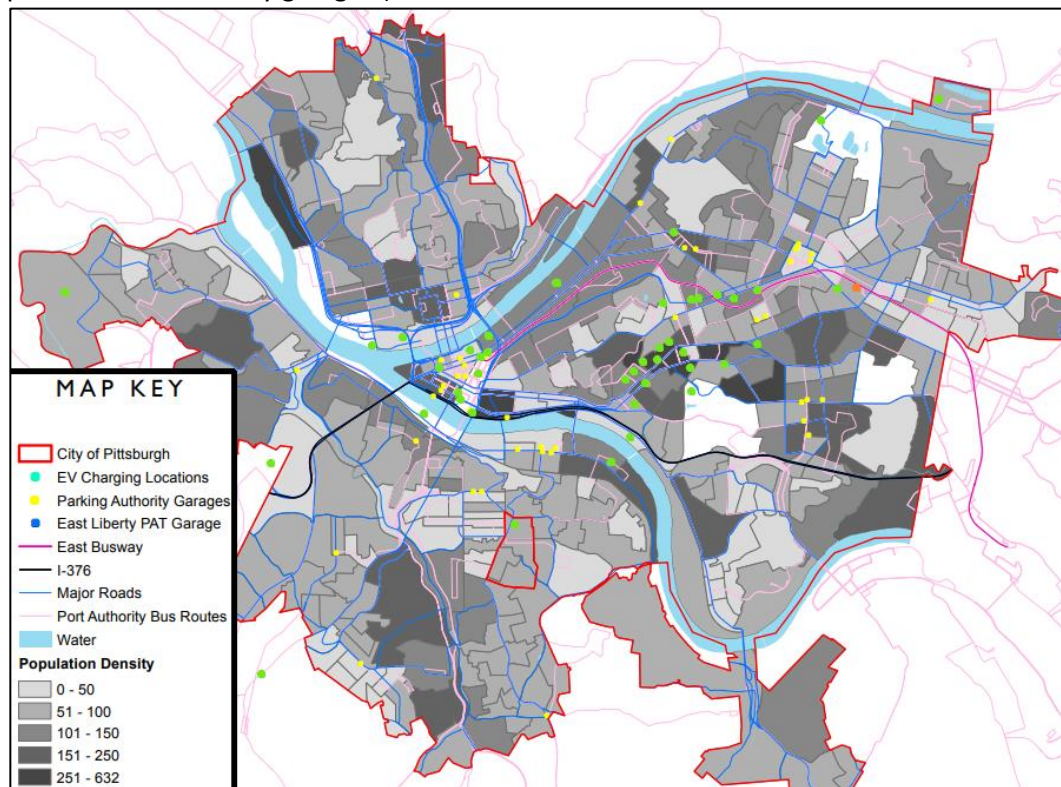
One of the biggest barriers to entry for potential EV buyers is “range anxiety”, the fear drivers have of running out of electric charge between charging locations. Strategies to reduce range anxiety include:

- technological improvements in vehicles that increase range
- decreasing the time it takes to charge an electric vehicle
- increasing the locations that offer charging infrastructure
- increasing education and outreach around charging and convenience

The City of Pittsburgh can most directly influence charging through installation in Pittsburgh Parking Authority assets, permitting construction in the right of way, reviewing and streamlining codes and processes, collaborating with partners, and providing education and outreach. In a city landscape such as Pittsburgh, a significant portion of residences do not have a private driveway. 80% of personal electric vehicle charging typically happens at home,⁸ which limits residents who do not have access to off-street EV charging compatible parking, or live in multi-unit dwellings without EV charging options. There are currently no programs available in city limits to allow for charging infrastructure installation near on-street parking, or to encourage charging options for apartment buildings or new development.

Currently available public infrastructure in Pittsburgh is not yet sufficient to accommodate the charging needs of residents without private driveways. The map below shows where public charging infrastructure is currently available within the city. The green dots represent charging locations, while the yellow dots represent Port Authority garages (which will be discussed later as an asset that can be

used to bring neighborhoods access to EV charging). Residential neighborhoods have less charging infrastructure than commercial centers, leaving many residents of the city who cannot charge in their own garage or driveway without a viable charging solution near their home. In



Map of current EV charging infrastructure and Pittsburgh Parking Authority lots/garages

⁸ <https://avt.inl.gov/sites/default/files/pdf/arra/PluggedInSummaryReport.pdf>

contrast, the business centers of Downtown and Oakland are well-served by charging infrastructure and also very accessible by public transit. These are naturally considered good locations for charging infrastructure, as people are parking here for long durations while at work. However, there are fewer than 100 charging units in these two areas. With more than 286,000 commuters driving into Pittsburgh daily- more than half of those going to either Oakland or Downtown⁹- present charging infrastructure would need to be increased 100-fold to allow the majority of commuters to charge while at work. However, the charging needs of car commuters must be balanced with the City's goals of prioritizing public transit and non-motorized trips to these two business districts over single occupancy vehicles, even if they are electric. It would a be better strategy for the City to focus EV charging infrastructure in secondary workplace and retail areas that are less transit-served where more people truly need to drive.

Vision for E-Mobility

The City's vision of e-mobility aspires to achieve the following overarching goals:

- 1. Bridge charging gaps and reduce range anxiety by creating and then promoting regional and local charging opportunities and networks**
 - **To bridge residential charging gaps, we will look into on-street charging programs, neighborhood parking hubs, partnering with local businesses, multi-unit dwelling charging, and new construction EV readiness requirements**
 - **To establish regional connections, travelers coming from all corners must be able to easily find chargers and recharge quickly and comfortably. For local connections, commuters must not be concerned about running out of charge on their way to or from work**
- 2. Encourage the conversion of large public and private fleets to electric**
 - **The City will also look to leverage its own resources and infrastructure development to encourage other fleets to explore conversion to electric**
- 3. Ensure that all public EV infrastructure investments are equitable to all residents**
 - **To ensure equity in all charging infrastructure development, we will embed a community process within neighborhood planning, consider how the disabled community may be impacted beyond requirement of ADA standards, and monitor outcomes so that participation in e-mobility is ubiquitous across neighborhoods and demographics**
- 4. Be a leader in finding opportunities for community readiness, and set an expectation that all new mobility services looking to set up in the city be electric**

Creating a plan that addresses these goals will ensure an e-mobile future for Pittsburgh transportation.

⁹ <https://www.bizjournals.com/pittsburgh/news/2016/01/14/survey-shows-the-most-popular-commuting.html>

Research and Outreach

With electric vehicles starting to gain acceptance in the mainstream auto sales market, the Department of City Planning's Division of Sustainability and Resilience has been taking proactive steps to ensure that City government is helping, and not hindering this growing market. In the fall of 2018, Siemens and 100 Resilient Cities held a conference in New York with stakeholders from industry and cities who have joined the 100 Resilient Cities cohort. The Division of Sustainability and Resilience attended this meeting to gain insight on how cities and corporations across the globe are preparing for EVs. The topics of discussion revolved around challenges that are being faced by current EV adopters, barriers to entry for potential EV adopters (both individuals and fleets) and equity issues that may come about from a shift to EVs. Five focus areas regarding EV adoption were highlighted at this conference:

1. Governance and Policy
2. Public EV Infrastructure
3. Fleet EV Infrastructure
4. Energy Supply and Demand
5. Equity and Accessibility

These conversation topics helped guide research and analysis regarding EV readiness in Pittsburgh. Governance and Policy will set the tone for the public and private sector to advance EV adoption. Infrastructure will need to be built out to reduce "range anxiety", the fear of running out of charge. Energy production will need to be increased to meet the added demand from EVs, while clean energy sources must be built to ensure maximum air quality improvement and GHG reductions. Equity and accessibility must be forefront in the conversation to ensure all citizens of Pittsburgh are served by electric mobility options.

To get a better pulse on the unique challenges facing fuel shift in Pittsburgh, a Pittsburgh EV task force was convened that includes:

- Allegheny County
- City of Pittsburgh Department of City Planning
- City of Pittsburgh Department of Mobility and Infrastructure
- City of Pittsburgh Office of Management and Budget
- City of Pittsburgh Office of Equity
- City of Pittsburgh Residents
- Duquesne Light Company
- Giant Eagle
- National Car Charging
- Penn Environment
- Pennsylvania State Department of Environmental Protection
- Pittsburgh Parking Authority
- Pittsburgh Region Clean Cities
- Port Authority of Allegheny County

The Task Force convened for 2 meetings to discuss the unique issues of EV charging in the City. After these meetings, a workshop was held with members of the task force and industry experts. The

conversation notes were reviewed by professional EV-focused organizations including Duquesne Light Company, Electrification Coalition, and Sam Schwartz Engineering. The Task Force will be convened to discuss this document and create finalized recommendations that the City can undertake to fill EV charging gaps.

Early Task Force conversations led to an understanding that the current lack of EV charging infrastructure will be a major deterrent to Fuel Shift in the city. To help highlight what areas of EV charging individual stakeholders can improve, a classification was created that breaks charging infrastructure down into the following categories:

Public Charging	Parking Garages Surface Lots/Parking Meters On Street Permit Parking Areas On Street No Permit Areas
Private Charging	Home/Residential Charging Workplace Business – Commercial Fleet Charging

To gather more information, the EV Task Force and Sustainability and Resilience Division with help from 100 Resilient Cities convened a conference of Pittsburgh stakeholders in the EV market to achieve 2 goals:

1. Develop a local framework and definition of e-mobility including how micro-transit, shuttles, e-bikes and scooters, e-buses etc. will shape future mobility
2. Create policy and governance recommendations that the City can enact to facilitate equitable e-Mobility

On Wednesday January 30th, a collection of industry experts, government workers and scholars congregated for a discussion on the e-mobility future of the City of Pittsburgh. The day began with lectures from industry experts, as well as government representatives and utility partners to discuss what is being done currently in this space both in Pittsburgh and around the world. Stakeholders from all corners of the EV world then voiced their concerns, advice and expertise during breakout discussion sessions to craft outlines of what the city will need in the next few years to ensure a seamless transition to e-mobility. Participants were divided into 5 discussion groups: EV Infrastructure for the Public, EV Infrastructure for Fleet Vehicles, Social Equity, Energy Supply, and Policy and Governance.

The EV Task Force, e-Mobility Workshop, and additional research from local partners and Pittsburgh’s Sustainability and Resilience Division led to the development of the following recommendations to encourage more widespread E-mobility adoption.

Recommendations



Plan for Converting Pittsburgh Parking Authority Facilities

High Priority
Moderate Difficulty

Existing Pittsburgh Parking Authority lots and garages offer large areas that could act as EV charging hubs, conveniently located in commercial districts where customers park for long periods of time. EV charging revenues should be set aside and used to install more charging infrastructure. Over the long term, charging revenues could also be considered as a potential revenue source for the City's pension fund, as the City looks to reduce parking overall by encouraging mode shift, and the pension fund is currently funded through the Parking Authority.

Considerations

- The City and Parking Authority should develop a formalized agreement for installing charging infrastructure in lots and garages, particularly where the City fleet is housed. This agreement can be replicated with other public fleets looking to install charging infrastructure within PPA garages
- The Parking Authority should also develop partnerships and agreements with private entities looking to power fleets, such as currently exists with ZipCar parking
- The City and Pittsburgh Parking Authority should set targets for number of public EV charging spots in each lot, and number of lots with charging availability citywide
- The City and Pittsburgh Parking Authority should determine whether to own, operate, and maintain charging infrastructure, or to allow private companies to operate within lots, and could release a Request for Information to determine the best model
- A decision point is whether spots be reserved for only electric vehicle parking or remain open to all vehicles
- The increase in energy bills for the Pittsburgh Parking Authority can be offset by charging fees, as well as by energy efficiency of lighting within garages
- Lots and garages will need to be evaluated to determine capacity and cost to run adequate energy to the site for charging infrastructure, and whether to install level 2 and/or DC Fast chargers
- Any significant renovations or new construction of parking lots and garages should be made ready for EV charging- see guidance in "EV Readiness in New Construction and Planning" recommendation
- PPA lots and garages should be analyzed for the installation of solar, as all increases in energy consumption should be offset by renewable energy

Department/Organization Lead

Pittsburgh Parking Authority

Department of City Planning- Sustainability and Resilience Division

Duquesne Light Company

Neighborhood Mobility Hubs

High Priority
High Difficulty

80% of EV charging happens at home. Many City residents rely on on-street parking due to the lack of an off-street parking option at their home. To ensure equitability, and that residents who own private vehicles can easily transition to EVs, there must be a convenient alternative for those without driveways. Developing mobility hubs that offer EV charging on City-owned property in neighborhoods provides an opportunity to change the mindset that charging needs to happen in driveways, and lead to an increase in adoption of EVs citywide.

Considerations

- Mobility hubs must be dispersed across, and offer access to, all of Pittsburgh’s neighborhoods
- Must be easily accessible and built to ADA compliant standards¹⁰
- All types of charging, including DC fast, level 2, and additional plugs for wheelchairs and micro-mobility should be considered
- Access to other mobility options should be included, such as Port Authority kiosks, EV car share, e- and regular bike share, etc.
- Neighborhood planning and public input through an information gathering process should be at the center of determining where these hubs are built
- Public property in neighborhoods, such as City recreation centers and parks, should be looked at as potential target locations for mobility hubs (conversion of Parking Authority lots are a separate recommendation)
- The City should prioritize development of mobility hubs in high density neighborhoods with permitted parking zones
- Public Private Partnerships should be explored for financing mechanisms, and the City should determine whether it wants to own infrastructure in mobility hubs, or enable and incentivize third parties to do so
- City-owned vacant lots in neighborhoods without other public property could be explored for future use of mobility hubs
- The City should ensure proper staffing capacity to handle planning and oversight of public charging on City facilities, which could include electrical engineers in the Facilities Division and electrical inspectors in the Department of Permits, Licensing and Inspections

Examples

New York City

New York City Mayor DeBlasio announced a plan in 2017 to install at least 1 charging hub in each borough of the city. Each hub will have Level 3 Fast chargers that will refill the battery in an Electric Car in 30 minutes on average. The cost to charge would be 6 cents per mile, 4 cents less than the cost of gas

¹⁰ https://afdc.energy.gov/files/u/publication/WPCC_complyingwithADArequirements_1114.pdf

at the time (has since gotten more expensive). NYCHA (public housing) properties were also identified as good candidates for charging hubs since they often had a density of low-income visible minority residents, and always had plenty of off-street surface parking lots.¹¹

Minneapolis and St Paul

The two Minnesota cities partnered on a \$4 million grant with nonprofit car sharing service, HourCar, to expand electric car sharing in the Twin Cities. The project includes expanding the electric fleet to charge in Mobility Hubs throughout Minneapolis and St. Paul, which are also open for public charging use. The goal is for every resident to live within a 5 minute walk from a mobility hub.¹²

Department/Organization Lead

City of Pittsburgh Department of City Planning- Strategic Planning

City of Pittsburgh Department of Mobility and Infrastructure

Pittsburgh Parking Authority

Duquesne Light Company

¹¹ <https://www1.nyc.gov/office-of-the-mayor/news/600-17/leading-charge-mayor-fast-charging-ev-hubs-all-5-boroughs>

¹² <https://www.twincities.com/2019/02/13/st-paul-based-hourcar-to-go-electric-expand-with-help-of-city-feds-and-xcel-energy/>

Residential On-Street Pilot to Determine Policy

High Priority
High Difficulty

Because of the long time it takes to charge an electric vehicle (20-30 minutes on a DC fast charge, 4-8 hours on a level 2 charger), owners want to be able to charge at a time and location that is most convenient for them. Even with technological improvements in batteries and charging, a resident may not consider purchasing an electric vehicle unless they are able to charge at home, as this is currently the standard charging location for EV owners. Many citizens of Pittsburgh live in single family homes with on-street parking, so the City will need to develop a process that permits charging infrastructure within the right-of-way in residential areas. Residential on-street pilots should be tested in multiple categories of street parking, and used to determine a policy that the City will adopt.

Considerations

A residential on-street pilot should take the following steps:

1. Based on parking and zoning information from Department of City Planning- Strategic Planning Division, the Department of Mobility and Infrastructure and the Pittsburgh Parking Authority should develop a typology of neighborhood context and parking and user types, and identify pilot project in that location. For example:
 - Permit ADA compliant and City-approved cord coverings for level 1 or 2 chargers from a dwelling to the curb for renters
 - Permit homeowners to install outlets in the right of way in low density residential areas
 - Identify locations for on-street, City/PPA-owned chargers in the right of way in high density residential areas
2. Draft policy for pilot
3. Find residents to participate in pilot
4. Construct outlet or charger in front of dwellings
5. Incorporate subsidization or group purchasing to keep costs down
6. Analyze and iterate
7. Set policy

There are currently two residential typologies: permitted parking areas, and non-permitted parking areas

Permitted Parking Areas

The City could maintain the streets as a public resource and own and operate chargers in residential areas with a pay structure like parking meters

- To satisfy demand, the City could look to existing City request models such as for street trees or by partnering with crowdfunding entities, such as IOBY
- If the City were to absorb the installation cost and own the infrastructure, it can be potentially offset by negotiating time-of-day usage rates with utility providers, as well as by collecting on-going usage charges

- Cost of charging should be only nominally more than the cost of electricity, however should have time limits or price adjustments to encourage drivers to move when charging is completed

Non-Permitted Parking Areas

A resident could be permitted to install and own a power outlet or charger in front of their house, or run a cord from their house to the curb

- Requires careful consideration about parking spot ownership, and what happens when the dwelling is sold
 - Limits the ability to share the resource with other residents
 - Privatized residential on-street charging should be at cost to the resident, not the City
 - On-street charging should not lead to designated parking spots on city streets, or an increase in car ownership overall
 - The cost of installing the charger must be reasonable to accommodate all income levels
 - Alternatives to installing infrastructure must be explored to engage renters
 - If a cord is permitted to be run from a dwelling to a vehicle, the City must approve a covering that is ADA compliant
-
- A thorough review of existing standards and permitting must be conducted to determine if residents are already allowed to install outlets at the curb or conduit beneath the sidewalk, and should be done for both permitted and non-permitted parking areas
 - Any permitting must contain language regarding ownership of parking spot
 - Residential on-street charging, once finalized, should be a consistent policy developed citywide that accounts for multiple contexts in different communities, and the potential for changing designations between non-permitted and permitted parking areas overtime
 - Chargers or outlets should not interfere, but be integrated with sidewalks, street trees, and other items in the right-of-way
 - The City should explore adding chargers to streetlights
 - Public-private partnerships may be explored to allow vendors to facilitate public charging in the right of way
 - The City should consider ensuring that installers working with residents in the right of way are certified electrical contractors

Examples

New Orleans Curbside Pilot

The New Orleans City Council passed an ordinance in 2017 to allow owners of homes without driveways to request a special permit for curbside EV chargers. With this program, the public right of way must “remain available for parking of the general public at all times when the location is not legally occupied by the permittee’s vehicle.” The total cost of an EVSE for Applicants is \$500: they must pay \$100

application and \$300 permit fees and need a \$100 operating permit. If transferring this unit to the new owner of the property, there is a \$300 transfer fee.^{13,14}

Philadelphia PA Curbside Pilot

From 2015-2017, residents in Philadelphia were able to apply for a permit to install an EV charger in front of their home and get a special parking permit so only EVs could park in that spot. There was a \$50 application fee, an install fee of \$150-500 and an annual fee of \$75-150. The program was ended with a moratorium stopping the issuance of charging stations in front of homes. Those who had already paid for the install of a charger were allowed to retain their chargers, but were only guaranteed the spot now from 6pm to 6am. At all other times the spot would be 2 hour parking open to anyone.¹⁵

Berkeley CA Curbside Pilot

Starting in February 2018 and running through 2020, Berkeley is running a program with 25 applicants to pilot curbside charging. Applicants must prove that they do not have access to an off street parking location and don't have the ability to create one. They will pay a \$397 application fee and must pay for the install and hardware fees. Unlike Philadelphia, but similar to New Orleans, there will be no exclusive rights to the street parking in front of their charger as streets are a "shared, public resource."^{16,17}

Los Angeles Curbside Pilot

Los Angeles is investigating the use of power lines in light poles as the energy source for plug in and EV vehicles. Currently charging is free from this source as LA is looking to address low income residents' barriers to charging infrastructure.¹⁸

Department/Organization Lead

Department of Mobility and Infrastructure

Department of City Planning- Zoning and Strategic Planning Divisions

Pittsburgh Parking Authority

Permits, Licensing and Inspections

¹³ <http://ev-la.org/wp/?p=139>

¹⁴ <http://ev-la.org/wp/wp-content/uploads/2017/09/FINAL-EV-charger-ordinance-9-28-17.pdf>

¹⁵ [http://www.philly.com/philly/business/0150506 Buy an electric vehicle apply for a city parking space to charge it.html](http://www.philly.com/philly/business/0150506_Buy_an_electric_vehicle_apply_for_a_city_parking_space_to_charge_it.html)

¹⁶ <https://cityofberkeley.info/EVcurbside/>

¹⁷ https://www.cityofberkeley.info/uploadedFiles/Planning_and_Development/Level_3_-_Energy_and_Sustainable_Development/Neighbor%2012-1-14%20for%20form.pdf

¹⁸ <https://www.ladwpnews.com/ladwps-electric-vehicle-charger-installed-on-power-pole-in-watts-likely-the-first-in-the-country/>

Commercial District On-Street Charging

Low Priority
Moderate Difficulty

Installing charging in locations where vehicles spend longer periods of time reduces the inconvenience of having to wait for charging. Charging in commercial districts should be focused on existing parking garages and surface lots where cars spend the most time. On-street commercial district charging should be used when gaps exist in that location, or when charging is coupled with handicap parking.

Considerations

- The City should develop a criteria for locating on-street commercial district charging, as parking infrastructure should not be built where walking, cycling, or short parking times are prioritized
- The City should be careful to ensure that investments in business district charging infrastructure do not create an unintended consequence of increasing personal vehicle trips over non-motorized or public transit trips- this can be accounted for in cost structures
- Pittsburgh Parking Authority meters and streetlights are connected to the electric grid and it should be investigated if an alignment could be made between existing meters or streetlights and EVSE technology
- It will need to be determined if parking in front of EV chargers on-street in commercial districts will be reserved for EVs only
- The City should incorporate wheelchair and other micro-mobility charging options, such as e-bikes and scooters, and work with the private car/bike/mobility-sharing sector to ensure adequate charging availability for all modes citywide
- Consideration should be made for intersectionality between handicapped parking and EV charging locations
- Determine financing, ownership, operations and maintenance models

Examples

Seattle EVCROW Program

Applicant Submits Request for Installation (RFIn) Form which is reviewed by City of Seattle staff. The applicant then must apply for SDOT Street Use Permit and must submit a Service Connection Application. If the location is suitable, SDOT Sends Applicant a Final Approval and construction begins.¹⁹

Department/Organization Lead

Pittsburgh Parking Authority

Department of Mobility and Infrastructure

¹⁹ <https://www.seattle.gov/transportation/projects-and-programs/programs/new-mobility-program/electric-vehicle-charging-in-the-public-right-of-way>

EV Readiness in New Construction and Planning

Moderate Priority
Moderate Difficulty

Installing EV charging infrastructure at the time of construction on a new building is much cheaper than installing the same infrastructure during a building renovation. For example to install two charging stations in a 10 space parking lot, the EV infrastructure costs are estimated at \$920 per charger during new construction, versus \$3,710 per charger for a retrofit. Most of the cost increase is due to trenching, demolition, and additional permitting costs, things that would be avoided in new construction.¹⁴ The City should explore options for encouraging EV readiness in all new construction, and ensure that all municipal projects include installation of EV charging infrastructure.

Considerations

- The City consider as standard the below requirements from the EV Ready Building measure under the 2018 International Green Construction Code²⁰:

b. **Provisions for electric-vehicle charging infrastructure.** The *building project* shall comply with one of the following:

- Two or more electric-vehicle charging stations shall be available to the building occupants and shall be located not more than 1/4 mi (400 m) from the *building project*.
- Electrical raceways shall be installed and extend from one or more of the building's electrical power distribution panels to not less than the number of parking spaces specified in Table 501.3.7.3 (5.3.7.3) to facilitate the future installation of vehicle charging stations. Electrical power distribution panels serving such raceways shall be sized to supply the future charging stations based on a design load of not less than 40 amp per required parking space at a supply voltage of not less than 208/240 VAC.

TABLE 501.3.7.3 (TABLE 5.3.7.3)
NUMBER OF SPACES REQUIRED TO HAVE RACEWAYS

TOTAL NUMBER OF PARKING SPACES PROVIDED	NUMBER OF SPACES REQUIRED TO HAVE RACEWAY
1 through 25	1
26 through 50	2
51 through 75	4
76 through 100	5
101 through 150	7
151 through 200	10
201 and over	5% of total

- The types of buildings that should require EV readiness and number of chargers must be considered
- Municipal facilities should strive towards a higher standard of readiness, and lead the way for the rest of the city in adoption by publicly setting a target
- The City and URA could use government-subsidized development projects as leverage, and should also consider requirements for chargers in affordable housing development
- There are 3 levels of EV readiness in building codes:
 - EV Capable: Electrical Panel and branch circuit installed, with raceway to future spot from panel
 - EVSE-Ready Outlet: Panel, raceway and conduit installed with 240v lines and 14-50 NEMA outlet at future charging spot

²⁰ <https://www.ashrae.org/technical-resources/bookstore/standard-189-1>

3. EVSE-Installed: Level 2 chargers installed at charging spot

- Identify and work with early adopters and businesses interested in charging to better understand issues and impediments
- Explore policies that buy down parking spots and other incentives for businesses installing EV charging
- Explore adding charging infrastructure into “Payment-in-lieu-of Mobility Fund”
- Determine a target amount of spaces for “make ready” and for chargers installed
- Incorporate other types of mobility charging including wheelchairs and micro-mobility

Examples

Atlanta EV Readiness Ordinance

Passed on 11/21/2017, the “EV Ready Ordinance” of Atlanta GA requires 20 percent of parking spaces in new commercial and multifamily (apartments, condos, etc) parking structures be EV ready; Additionally, all new residential homes must be equipped with all wiring, conduit, electrical capacity, etc. needed to install EV charging stations.²¹

Boston, Massachusetts

The City of Boston requires that 25% of parking be equipped with chargers and an additional 100% be make ready in substantially modified or new construction projects, and in all parking freeze zones.²²

Department/Organization Lead

Department of City Planning- Zoning and Strategic Planning Divisions

Department of Permits, Licenses and Inspections

Urban Redevelopment Authority

²¹ <https://www.atlantaga.gov/Home/Components/News/News/10258/1338?backlist=/>

²² <https://www.boston.gov/departments/environment/ev-boston-electric-vehicle-resources>

Permitting DC Fast Charging

Low Priority
Low Difficulty

DC Fast Charging is a newer technology that requires additional analysis in regards to permitting and adoption. With the ability to charge a vehicle in as little as 15-20 minutes, this charging model could be likened to present-day gas stations, and elicit concerns about traffic flow, oversight, and maintenance. However, as electric charging infrastructure does not require underground storage tanks and hazardous materials, DC Fast chargers should not require the same oversight and permitting that is required of traditional gas stations.

Considerations

- Review current codes and identify any limitations that could be foreseen when permitting a DC Fast Charger
- The City could assemble a group of businesses and public entities attempting to install DCFC to identify pain points
- Currently Giant Eagle and the City of Pittsburgh have received grant funding from the State Department of Environmental Protection to install DCFC over the next two years. Permitting could be reviewed with these entities as a pilot for future cases
- Consideration must be given to the higher electrical needs of DCFC
- The City should standardize the DC Fast Charging permit review and inspection process, and create a DCFC checklist for inspections
- May want to clarify DCFC as an accessory use that does not require zoning board review
- Make permit applications known and easily accessible to anyone looking to install EV charging
- Collaborate with Duquesne Light Company to identify existing 480V lines that can be leveraged for DC Fast Charging
- Create and promote how-to materials to explain rules and process

Examples

Northeast States for Coordinated Air Use Management: Preparing Our Communities for Electric Vehicles: Facilitating Deployment of DC Fast Chargers²³

Department/Organization Lead

Department of City Planning- Zoning Division, Sustainability and Resilience Division

Department of Permits, Licensing and Inspections

Duquesne Light Company

²³ <http://www.nescaum.org/documents/dcfc-permit-streamlining-whitepaper-final-5-14-19.pdf/view?searchterm>

Design Standards and Consistent Signage

Moderate Priority
Low Difficulty

For public EVSE infrastructure, it will be important to make sure chargers are easy to find and accessible for all. A good way to achieve this are standards that all chargers and signs must adhere to. Non-standard wayfinding and station signage will lead to confusion and an inability to find chargers. Non-standard installations could lead to confusion or inability to use different chargers throughout the city. For private EVSE infrastructure, safety and guidelines on how to properly install chargers will be important to establish.

Considerations

- The City can use permitting as a way to control for standard EV installation
- The City should reference existing wayfinding and EV station signage produced by the PA DEP and the Federal Highway Administration for interstates and major highways²⁴
- Common signage for both wayfinding and EV stations should be instantly recognizable and easy to read, including for those who are colorblind
- There are disabled drivers who will be interested in buying EVs, so charging station and associated parking must be compliant to ADA standards and easy to use for those with walkers, wheel chairs, etc.
- All EVs use J-1772 charger for Level 1 and Level 2 as universal standard, Tesla is the only outlier, which has an adapter issued with every vehicle
- For DC Fast Charging, there are two charging standards (CHAdeMO and CSS Combo), which are installed simultaneously with each DC Fast Charge unit
- Public infrastructure will need to be adaptable to all kinds of electric charging ports
- A good option for residential on-street is to require a NEMA 14-50 outlet (capable of Level 2), which allows homeowners to take a home charger with them upon leaving, and allow future homeowners to bring their own charger upon move in
- More EVs are coming with standard Level 2 chargers as their stock charger
- Engaging residents in designing branding and marketing could be a fun way to educate and engage residents

Examples

Atlanta EV Readiness Guide

Large document that outlines install standards to ensure ADA compliance, signage standards, installation considerations outside of ADA compliance and infrastructure considerations.²⁵

²⁴ https://afdc.energy.gov/fuels/electricity_charging_station_signage.html

²⁵ <https://www.atlantaga.gov/home/showdocument?id=34401>

Department/Organization Lead

Pittsburgh Parking Authority

Department of Permits, Licensing and Inspections

Department of City Planning- Zoning Division

Department of Mobility and Infrastructure

Department of Public Works

Energy and Infrastructure Alignments

Moderate Priority
High Difficulty

An influx of electrified devices, vehicles, trucks and buses will require a large build out of EV charging infrastructure. While Duquesne Light Company has capacity and does not anticipate stress from this buildout, coordinated and integrated planning is critical to ensure that infrastructure is built out properly and efficiently. Existing City-owned parking lots and garages should be leveraged for charging and on-site energy generation. Analyses show that vehicle electrification based on the City's planned electric grid makeup, with the closure of the Beaver Valley Nuclear Plant, would result in minimal savings in carbon and air quality emissions.²⁶ It is important to couple EV charging with local and clean energy sources such as solar, wind and hydro in order to achieve the optimal environmental benefit of electrification efforts.

Considerations

- Electric charging should be integrated with other City-led infrastructure projects such as LED streetlights, fiber networks, paving, tree pits, etc.
- Existing utility coordination efforts with Duquesne Light, Peoples, PWSA, etc. should include electric charging infrastructure
- In some parking lots, upgrades to electrical panels will be needed to support the electricity demands of EV charging infrastructure, and running electric to new sites can be costly
- Parking lots could be candidate locations for solar canopies and onsite electricity generation in order to provide power without the need for expensive trenching and parking lot re-paving
- Where possible, coupling charging with on-site renewable energy or power purchase of local renewable energy should be encouraged to offset the additional electricity demand from charging in parking lots
- Incentive plans could be put in place to promote power providers to build solar on lots rather than leveling greenfield land
- Educate hosts of DC fast chargers on sites where electrical accounts previously did not see much usage, to consider strategies to mitigate demand charges
- Explore smart charging models, which defaults to automatically charge vehicles during non-peak and overnight periods. This would work best in places where people leave their vehicles for longer periods, like garages, at work, neighborhood charging hubs. Another option is creating a power output cap, to help ensure commercial sitehosts do not exceed a specific kW goal, and avoid higher tiers for demand charging
- Promote Level 1 and 2 chargers, which are also better on the EV's battery life
- The City should encourage fleet owners to publicly disclose growth plans for EVs, so that energy demand, construction schedules, and opportunities for leverage and coordination can be understood well in advance
- Resiliency should be a consideration, including on-site energy generation, storage, the development of microgrids, etc.

²⁶ <https://assets.new.siemens.com/siemens/assets/public.1561154658.a31d7c2c-8c2c-4836-998a-097fe3e10bf0.2019-cypt-report-pittsburgh-lowres.pdf>

- Bus and truck charging needs should be incorporated into planning to ensure adequate electrical connection and charging infrastructure at particular locations
- The Department of Mobility and Infrastructure, Sustainability and Resilience Division, Pittsburgh Parking Authority, and Duquesne Light Company should work collaboratively to identify the most cost-effective locations for charging infrastructure installation based on need.

Department/Organization Lead

Department of Mobility and Infrastructure

DCP- S+R

Duquesne Light Company

Pittsburgh Parking Authority

Education and Outreach

Low Priority
Low Difficulty

EVs are a new technology that will require citizens to make certain behavioral adjustments before they are widely adopted. There are many benefits to EVs that are obscured by concerns of high expense, range anxiety and misinformation. If more of the public, including low-income populations, are able to see the cost benefits of owning EVs, it will go a long way towards promoting fuel shift. Fleet managers will also be an important group to educate on the benefit of EVs. Their control over a larger group of vehicles could lead to a quick change to EVs for a large number of vehicles.

Considerations

- All EV charging infrastructure development in residential areas should require a community needs assessment and public engagement to understand neighborhood context
- Neighborhood outreach and feedback should be combined with existing neighborhood planning efforts if applicable
- All outreach materials must be accessible to a wide range of people: high and low-income, young and old, well-educated and less educated, different races and different cultures
- Materials should be available in different languages, easy and exciting to read to promote more people to share the information contained in the pamphlets, documents, etc.
- The City should leverage internal outreach assets such as the City Cable Channel, Community Affairs, and existing newsletters
- Ride and Drives and all outreach materials and events should be targeted to specific populations such as fleet managers, departments, neighborhoods, demographics, etc.
- Dealerships, nonprofit organizations working in the space, schools and utilities are all good partners for e-mobility outreach and education
- The used electric vehicle market is growing, and advantageous for low and middle income residents
- All residents should be included in an e-mobility future- education and outreach should not be limited to personal vehicles, and include e-car share, e-buses, e-bikes, etc. to align with other City goals on emissions reductions, mode shift, etc.

Examples

Drive Electric Northern Colorado

First-of-its-kind, community-wide initiative designed to achieve widespread deployment of plug-in electric vehicles (PEVs) in the Northern Colorado Region.²⁷

²⁷ <http://driveelectricnoco.org/>

Rochester EV Accelerator

Community-wide initiative aimed at achieving widespread deployment of plug-in EVs in Rochester, NY. By developing innovative public-private partnerships, a comprehensive EV ecosystem, and cultivating strong community involvement, ROC EV promotes and supports widespread EV ownership for individuals, families, businesses, and commercial vehicle fleets throughout greater Rochester.²⁸

Smart Columbus

City region initiative to create ladders of opportunity for citizens through mobility, including rapid adoption of EVs and charging through engaged EV education, Ride and Drive Roadshow programming, Dealer Electrification engagement, public and private fleet electrification, and EV charging adoption across workplaces, multi-unit dwellings and public spaces.²⁹

Department/Organization Lead

Pittsburgh Region Clean Cities

PennEnvironment

Department of City Planning

Department of Innovation and Performance

²⁸ <https://www.rochesterevs.com/>

²⁹ <https://smart.columbus.gov/playbook>

Pricing and Enforcement

Moderate Priority
Low Difficulty

EV drivers will rely on accessible charging infrastructure. The lower and more stable cost of electricity versus gasoline is a major reason that people are considering the switch to EVs. The City needs some form of standardization for EV charging pricing on City property to ensure charging pricing doesn't push people away from adopting EVs. There also must be an incentive for people to move their vehicles out of spots for charging after their vehicle is full. This could be done by a time-based fee placed on any car staying plugged into a charger after it is full or enforcement from the Pittsburgh Parking Authority.

Considerations

- The City should be very careful to ensure that EV charging is not too inexpensive or easy to discourage mode shift, so the price of electric charging must be high enough to have people consider taking mass transit instead of driving to work or other trips
- Various pricing mechanisms to encourage off-peak charging should be explored to help offset potential surges to the City's electrical grid network during peak charging times
- The cost of charging must be equitable to ensure the EVs are not only affordable to high income residents, and a valid alternative to combustion engines
- Consider pricing plans that charge a higher fee after a few hours of charging, or penalty pricing once EV is at full charge, particularly for DC Fast Chargers
- The City and Parking Authority may want to pilot different price points and models of timing enforcement to see how residents respond
- The Parking Authority should use one system for ease of use, and explore compatibility with the existing parking app and existing chargers
- Revenues from EV Charging should be funneled back into building out for EV charging infrastructure at the curbside and in Parking Authority lots

Department/Organization Lead

Pittsburgh Parking Authority

Leveraging New and Existing Infrastructure

Moderate Priority
Moderate Difficulty

As the City installs infrastructure to satisfy its goal of fossil fuel free fleet by 2030, it should also consider ways to leverage those investments to share with other adjacent fleets and the public to encourage additional electrification and air quality improvements. Often, the hurdle for fleet operators is figuring out what infrastructure to install where. Allowing fleets to test out and share charging infrastructure could increase the rate of adoption among fleets.

Considerations

- The Second Avenue Parking Lot, where the City is installing level 2 chargers for its own fleet, is a good location for other fleets operating Downtown
- A DC Fast Charger in close proximity to Downtown could allay fears of electrification for other fleets, taxi and rideshare operators, who would be concerned with range anxiety
- While Second Avenue is the first of such projects, if the model of sharing fleet charging is successful it should be scaled to other areas of the City
- Explore opportunities for mixed workplace and public charging, which can be controlled by time-of-day to account for workday vs. evening hours
- Determine financing, ownership, maintenance and operations models of charging infrastructure
- Incorporate other types of charging where applicable to ensure equitable access to City infrastructure for all, including wheelchairs, micro-mobility, etc.

Department/Organization Lead

Pittsburgh Parking Authority

Department of City Planning- Sustainability and Resilience Division

Department of Mobility and Infrastructure

Summary of Recommendations

Recommendation	Priority	Difficulty	Lead Department	Supporting Orgs
Plan for Converting PPA Facilities	High	Moderate	PPA, DCP	Duquesne Light Company
Neighborhood Mobility Hubs	High	High	DCP, DOMI, PPA	Duquesne Light Company
Residential On-Street Pilot to Determine Policy	High	High	DOMI, PPA, DCP	
Commercial District On-Street Charging	Low	Moderate	PPA, DOMI	
EV Readiness in New Construction and Planning	Moderate	Moderate	DCP, PLI, URA	
Permitting DC Fast Charging	Low	Low	DCP, PLI	Duquesne Light Company
Design Standards and Consistent Signage	Moderate	Low	PPA, PLI, DCP, DOMI, DPW	
Energy and Infrastructure Alignments	Moderate	High	DOMI, PPA, DCP	Duquesne Light Company
Education and Outreach	Low	Low	DCP, I+P	Pittsburgh Region Clean Cities, PennEnvironment
Pricing and Enforcement	Moderate	Low	PPA	
Leveraging New and Existing Infrastructure	Moderate	Moderate	PPA, DCP, DOMI	

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