

Public Access Electric Vehicle Charging Station Placement in Grandview Heights, OH

Prepared for:
Smart Columbus
Kevin McSweeney
Smart Columbus Transportation Specialist
kmmcsweeney@columbus.gov

Prepared By:
The Ohio State University EEDS Capstone Group
Kate Boening; boening.3@osu.edu
Makenna Dunlap; dunlap.287@osu.edu
DJ Helminiak; helminiak.9@osu.edu
Erik Schommer; schommer.10@osu.edu
Jimmy Uhland; uhland.2@osu.edu

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Executive Summary

By 2050, electric vehicles (EV) are forecasted to make up 65% of light-duty vehicle sales and from 2012-2016, United States EV purchases grew by 32% (Rissman 2017). With Columbus being a city undergoing rapid growth and population increase, there's a demand for new infrastructure on top of the increasing need to accommodate electric vehicle implementation. AEP Ohio and Smart Columbus plan on installing hundreds of charging stations in Columbus using the USDOT grant as well as private capital like the Volkswagen settlement funds. Since Columbus now has the money to start implementing EV charging stations, it's just a matter of determining optimal locations given certain factors, which will be discussed more in depth later in this report.

Our project focused specifically on Grandview Heights, a suburb 2 miles northwest of downtown Columbus, where development is booming and the demographic is changing just as quickly. In 2000, the median household income in this area was \$51,328 whereas the 2017 income was nearly double at \$99,521 and the population grew 8.2% during this time as well (CityData 2018). With growing amenities, office spaces, and residences, this space seemed ideal to install EV charging stations.

The research goals were to optimize the most ideal public locations for electric vehicle charging stations using benchmarking and Geographic Information Systems (GIS) given certain references: proximity to reliable power source, proximity to highway, proximity to places of interest, amount typically spent in the area, proximity to fire hydrants, and if the location is seasonally used or not. With these criteria in mind, specific locations were determined as high, moderate, or low priority for installation of a DC Fast Charger (20-30 minutes from empty to full charge), Level 2 (2-3 hours from empty to full charge), or both.

After benchmarking, field work, and GIS analysis, our recommendation for high priority charging stations would be located primarily in areas with a high amount of foot traffic for a decent amount of time such as: Hofbrauhaus, Giant Eagle Market District, LA Fitness, Panera Bread, Grandview Avenue Street Parking, GetGo Gas Station, and Spectrum cable services.

Introduction

Goals and objectives of this project were to determine the most feasible and optimal locations for public electric vehicle charging stations in Grandview Heights. We used and developed criteria that indicated easier access and use. Our project aligns closely with one of the City of Columbus Office of Sustainability's Transportation Key Initiatives: Alternative Fuels.

The motivation behind EV adoption is to move away from our gasoline powered transportation system as it is generally detrimental to public health, the environment, and ecosystems. Buyers are also increasingly purchasing electric vehicles but public infrastructure has yet to develop in a way to support the growing demand for electric-powered cars. Electric vehicles are becoming more popular among consumers due to the positive impacts they have on human health and the planet as well as a reduction in greenhouse gas emissions. From a technical standpoint, EVs are also three times as efficient compared to their petroleum-powered counterparts. For electric vehicles 59%-62% of energy can be converted to mechanical energy whereas gas-fired cars are only able to use 17%-21% of the chemical energy from the fuel to turn their wheels. Electric vehicles are also composed of less parts and therefore cost less to maintain (Rissman 2017). Since EVs are more efficient, are cost effective, and are less harmful on health and the planet, promoting the implementation for a new, growing market would be beneficial for Columbus.

After our analysis, the group has determined 20 ideal locations for EV charging stations with 7 being high priority, 9 consisting of moderate priority, and 4 low priority spots. Of the 20, we determined 11 ideal locations for Level 2 chargers, 5 DC Chargers, and 4 areas that should have both types of stations. This can be seen in Table 4 on page 16.

Data Collected

Several different kinds of data were collected by team members, most notably Geographical Information System (GIS) mapping layers and field data collected in Grandview Heights. Some of the first GIS layers used were public domain layers found on the City of Columbus's Department of Technology GIS Maps and Applications Gallery website that focused on traffic flow, demographics, current and future land use, and parking meter locations. These layers gave preliminary hotspot areas for the team to further investigate in the field using a checklist to better determine the suitability of the areas. Location data from the checklist was then put back into GIS and prioritized. Benchmarking data for Portland, Oregon was also collected to use as a supplement to the Grandview Heights data.

Analysis Methods

The main analysis bridged together data layers obtained in GIS and the team's observations in Grandview Heights. The team looked at some criteria that were more subjective, which involved the use of the locations in question, such as if there were recreational, commercial or residential areas close by or how long people would stay in the vicinity. Other criteria were more physical attributes of the locations such as proximity to highways, street corners, or fire hydrants. Table 1 below shows the criteria checked by the team and the way the

criteria was looked at or measured. The team was told in a meeting with Smart Columbus Officials that the proximity to a highway or byway corridor was important as EV users in need of a quick charge up will not want to drive more than a mile or a mile and a half out of their way. Ideally, the charging station would be within a half mile of the corridor. If a charging station is to be introduced in a parking land space along the road, such as on Grandview Ave, then proximity to the street corner and fire hydrants needs to be considered, as well as how the charging station would interrupt parking meters in the area. If a space is seasonally used was also considered, such as parks and other recreation facilities, as this would affect how much the chargers would be expected to be used throughout the year.

Table 1. Chart depicting criteria each location was evaluated by

| Criteria | Measured Metrics |
|---|-------------------------|
| Proximity to Highway | < ½ mi, 1 mi, 1 mi+ |
| Proximity to Fire Hydrants | >10ft |
| Proximity to Street Corner | >10 ft |
| Proximity to Reliable Power Source | <200ft, <500ft, <1000ft |
| Proximity to Place of Interest | <1000ft |
| Amount of Time Typically Spent in Adjacent Area | <30 min, 30min+, 1 hr+ |
| Parking Lane, Garage, or Lot | |
| Seasonally Used Space | Y or N |

One criterion of higher importance is the proximity to reliable power. This was the hardest for the team to quantify as most electrical grids are not public domain. The Grandview

Heights fire department (GHFD) was contacted and met with to go over locations in Grandview they believed sufficient energy from power lines, buildings and transformers could be drawn from, as well as places of interest avoiding fire hydrants.

Figure 1 below depicts the areas GHFD considered to be ideal, which are circled in purple. Ideal locations are primarily those that have surrounding amenities that would attract EV drivers. Red stars indicate that they have a reliable power source to tap into. This figure was then taken into account before going out again with the checklist. The official Grandview Heights jurisdiction area stops midway between 3rd and 5th Ave, so the official power reliability along 5th and the corner of 5th and Grandview Ave was not located. Along 5th Avenue the team instead looked at nearby power lines and other visible electricity infrastructure.

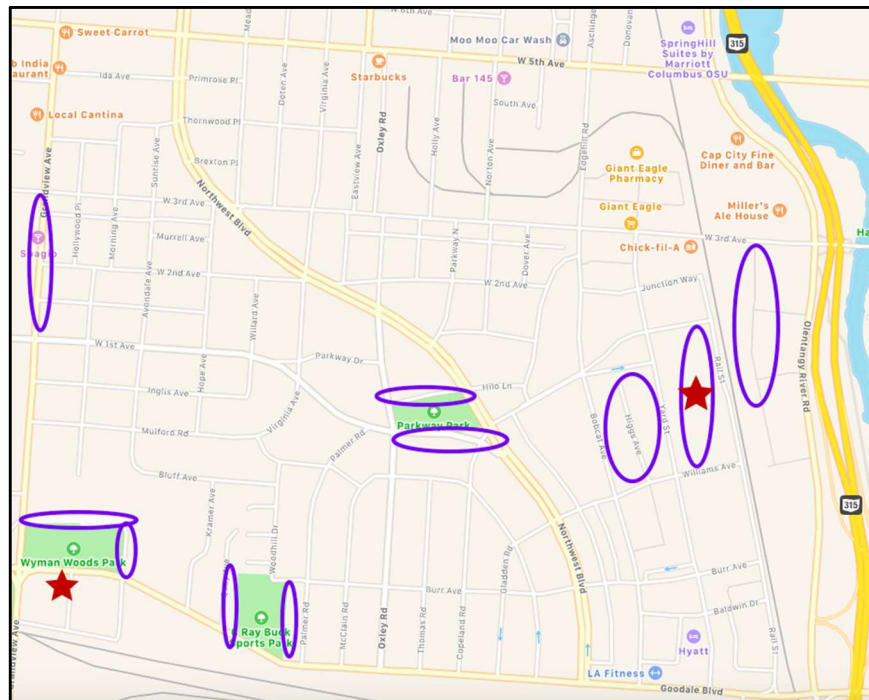


Figure 1. Areas of interest concluded after meeting with Grandview Heights Fire Department.

Six different categorized areas were looked at as areas of interest within Grandview Heights. These categories were either localized hotspot areas, such as the garages and lots around the Grandview Yard development, or similar locations such as the park and recreation areas. The

table in Appendix 2 shows the complete checklist and all six categories with a total of twenty-six individual locations that were checked by the team by driving around the Grandview Heights area. A shortened checklist showing only two of the six areas is found below in Table 2 while the complete checklist can be found in the Appendix.

Table 2. Fieldwork Checklist highlighting 2 of 6 areas in Grandview Heights

| Location | Proximity to Highway | Proximity to Fire Hydrant | Proximity to Street Corner | Proximity to Places of Interest | Parking Lane, Lot or Garage | Amount of Time Spent in Area | Proximity to Reliable Power Source | Seasonal Use |
|--|----------------------|---------------------------|----------------------------|---------------------------------|-----------------------------|------------------------------|------------------------------------|--------------|
| | <1/2 mi, <1mi, 1mi+ | >10ft | >10ft | <1000ft | | <30min, 30 min+, 1hr+ | <200ft, <500ft, <1000ft | Y or N |
| <i>The Yard Rail St. Garage and Lot</i> | | | | | | | | |
| Hofbrauhaus Lot | <1/2 mi | X | N/A | X | Lot | 1hr+ | <200ft | N |
| Courtyard Marriott Strip (SW Corner) | <1/2 mi | N/A | N/A | X | Garage | 1hr+ | <200ft | N |
| Grand Event Center Strip (SE Corner) | <1/2 mi | N/A | N/A | X | Garage | 1hr+ | <200ft | N |
| <i>North Grandview Ave and 5th Ave Intersection Quadrant</i> | | | | | | | | |
| Street Front: USPS | 1 mi+ | X | X | X | Lane | <30min | <200ft | N |
| Street Front: Z Cucina di Spirito | 1 mi+ | X | X | X | Lane | 30min+ | <200ft | N |
| Street Front: Local Cantina | 1 mi+ | X | X | X | Lane | 30min+ | <200ft | N |
| Lot next to USPS | 1 mi+ | N/A | N/A | X | Lot | 30min+ | <200ft | N |
| Walgreens Lot | 1 mi+ | N/A | N/A | X | Lot | <30min | <500ft | N |
| 5/3rd Bank/ UPS Lot | 1 mi+ | N/A | N/A | X | Lot | <30min | <500ft | N |
| Columbus Mercantile Company | 1 mi+ | N/A | N/A | X | Lot | <30min | <500ft | N |

Benchmarking Findings

Upon meeting the Smart Columbus executives, Portland Oregon was a city of interest identified to be researched for EV charging strategies. Portland has taken interest in the potential of electric transportation and has implemented a charging network starting around 2011. As of 2017, Portland had a total of 182 charging ports open to the public. Because of such an intensive network, the team decided to research the decisions made when implementing such a network.

Table 3 (below) displays all current charging stations in Portland with the ports they are fitted with as well as the company they are assigned to. The figure also displays how each site was paid for whether it be by a grant or auto manufactures etc.

Table 3. Total number of charging stations and ports in Portland, Oregon.

| Network Provider | Connector Type | Funding Source | No. of Sites | No. of Chargers | Installation Date |
|------------------|----------------|--------------------|--------------|-----------------|-------------------|
| Aerovironment | CHAdeMO | ARRA Grant | 44 | 44 | 2012-2013 |
| Blink | CHAdeMO | USDOE Grant | 14 | 14 | 2011-2012 |
| Chargepoint | Dual-head | Auto Manufacturers | 7 | 7 | 2016 |
| | CHAdeMO | Auto Manufacturers | 3 | 3 | 2016 |
| EVgo | Dual-head | Self-funded | 8 | 8 | 2015-2016 |
| Greenlots | Dual-head | Auto Manufacturers | 2 | 2 | 2016 |
| Opconnect | Dual-head | Auto Manufacturers | 8 | 8 | 2014-15 |
| | Dual-head | Private Party | 2 | 2 | 2014 |
| Tesla | Tesla | Self-funded | 12 | 87 | 2013-2016 |
| Other | CHAdeMO | Business owners | 3 | 3 | 2010-2012 |
| | Dual-head | World Trade Center | 1 | 4 | 2015 |
| Total | | | 104 | 182 | |

More specifically within Portland, the Lloyd District is a small area that was researched to compare to Grandview. Lloyd District was chosen for a number of parameters: similar amenities, similar in size, similar mix of commercial and residential areas, as well as a close proximity to a major highway. Currently, Lloyd District has a total of 65 charging ports to only 5 found in Grandview. This shows a substantial potential for the implementation of an increased number of charging stations within Grandview. One of the major reasons people do not adopt electric vehicles is because of range anxiety (i.e. most electric vehicles can only go somewhere between 100-200 miles on a full charge). Constructing a more intensive charging network will help eliminate this anxiety and more people will in turn feel more comfortable about driving electric vehicles.

While Portland's infrastructure has many positives regarding their EV network, there are also some problems that they are currently trying to address. One of those issues is a lack of maintenance contracts for existing electric vehicle charging stations. Like Columbus, the city received a sizable amount of grant money and used it to construct the charging stations. While many companies were interested in building the stations, the city failed to set up maintenance contracts after the stations were built. This has left Portland riddled with stations that do not currently work therefore increasing range anxiety. Another issue is that the stations were built by a number of companies so the payment options are plentiful but no one subscription fits all stations. Having multiple companies constructing charging stations also led to issues where they were biased towards some auto manufacturers. There are two main heads for charging stations, CHAdeMo and SAE combo ports. 90% of electric vehicle manufacturers are compatible with one or the other of these charging ports. When the initial charging stations were built, this was not taken into account, leading to only 16% of charging stations equipped with both charging ports (PGE 2017).

The city also found that sporadically placing one or two stations at each location is not actually the preferred method by users. Because of this, the city is now looking into creating charging stations that are more similar to traditional gas stations. Portland General Electric is the company leading the way in this practice. PGE has one station in place equipped with 4 DC fast chargers as well as 1 level two charger. These stations will be equipped with both the CHAdeMO and SAE combo ports to ensure almost all vehicles can charge at their stations. All new stations will be constructed with the same 4 DC fast chargers as well as 1 level 2 charger equipped with both charging heads. The new stations are also being equipped with larger conduit

to ensure that the ports can be upgraded in the future when greater than 100 kW chargers become available.

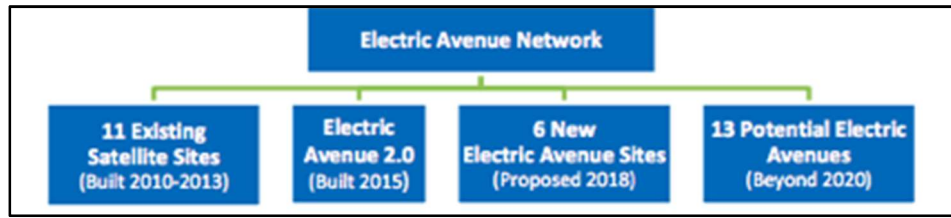


Figure 2. Portland General Electric’s plan to implement charging stations by 2020.

The above figure represents Portland General Electric’s specific plan on future construction of charging stations as well as consolidation of other charging stations. The plan includes increasing the current “gas station” themed station into a total of 20 stations after the year 2020.

GIS and Fieldwork Results

Our final maps were the result of data compiled together from the fieldwork and then using GIS to organize it. Specifically, we used ArcGIS as our program of choice. Initially, many locations were chosen but these were specified down to ideal spots that followed the guidelines most closely. The locations within the map were chosen based off the fieldwork results’ checklist, which was provided by the city of Columbus regarding the barriers of placement for the electric vehicle chargers and also improved upon by the team. The locations in the map below were the final spots selected that best fit the checklist.

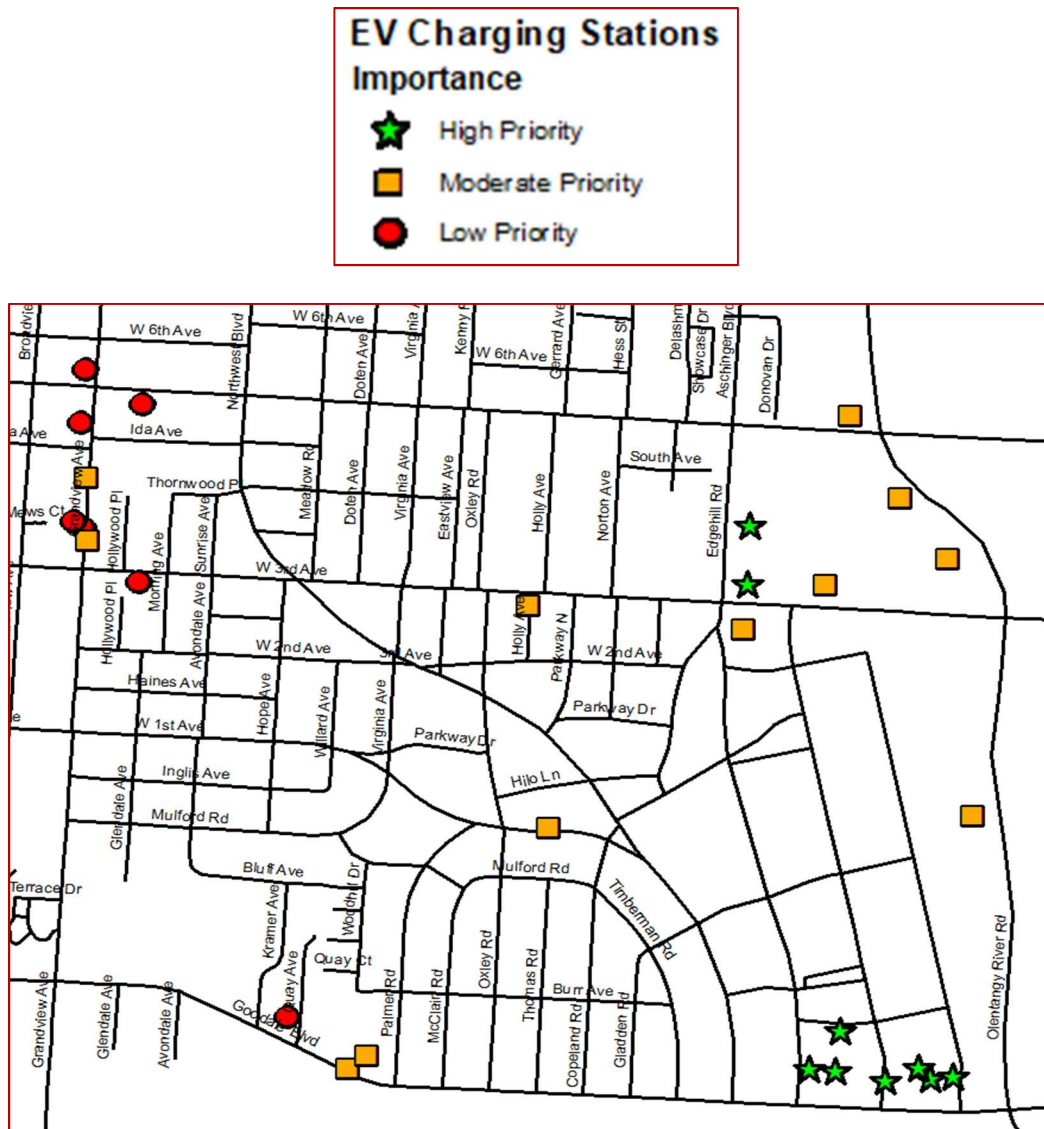


Figure 3. Priority Levels of Selected Electric Vehicle Charging Stations in Grandview

The data used in the creation of the maps included many layers mainly a Grandview street layer, which was pulled out of a larger Franklin County roads shapefile obtained by the US Census Bureau and a google map satellite layer. A point-based shapefile was created within ArcGIS of the electric vehicle charging locations entirely by our team. These layers are shown above in Figure 3. Each point was carefully chosen based on certain geographic locations and represents a single charging station. From there, a new field within the attribute table was added representing the priority level of implementing these chargers. It was based off a spectrum of one

to three, with one being higher priority and three being lower priority. This field was then categorized for the points within the map to clearly display the priority of each charger at every geographic location chosen. A green star was chosen for high priority (rank 1), an orange square was chosen for moderate priority (rank 2), and a red circle was chosen for low priority (rank 3). The rankings were the result of a critical analysis combining our benchmarking, fieldwork, and the electric vehicle location checklist. The next step was to indicate which charger, whether a level 2 or DC fast charger, would be optimal for the given location. This decision was solely based on the electric vehicle location checklist and GIS results.

There were 28 locations chosen which include a balance of parking garages, parking lots, and street parking. Only 20 places were selected and prioritized but some of these locations would include more than one charger. For example, the Grandview Post Office has two chargers nearby: one in the parking lot and one on the street. This does not necessarily mean both need to be implemented but both are optimal locations. Many of these chargers are clustered together in areas such as downtown Grandview and the Grandview Yard. The Grandview Yard is the most significant hotspot as all the locations there were of high priority. This location follows many important guidelines based off the checklist including proximity to highway as its minutes of SR-315 and I670, proximity to a reliable power source, and the high amount of time spent in the area because of the restaurants and hotels in the area. A satellite image of the Grandview Yard with the charging locations can be seen below in figure 4. Locations were selected at specific areas of parking garages and parking lots directly corresponding to the parking of each business. In the final prioritized list some of the Grandview Yard locations dropped slightly in priority. The team chose this so that EV charging stations would be implemented in more locations to begin with and not be so concentrated until wider EV adoption occurs.

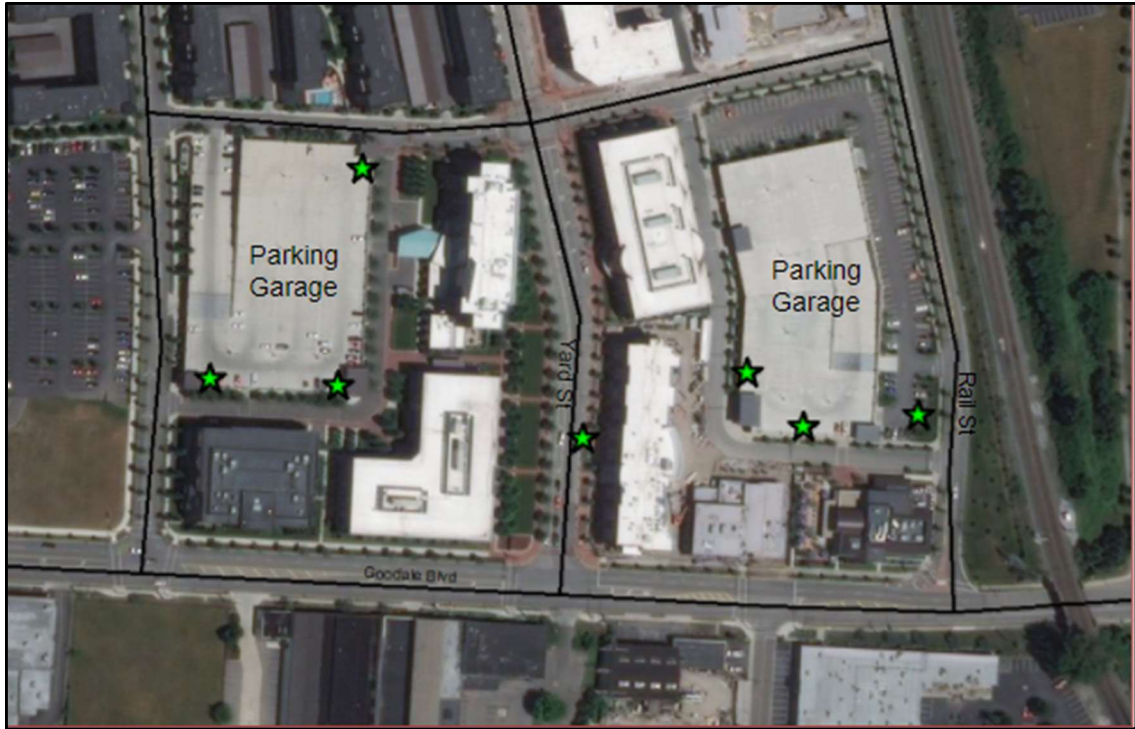


Figure 4. Grandview Yard satellite image with optimum locations

Barriers to Success

The obstacles faced for achieving mass adoption of charging stations primarily consists of proximity to reliable power sources because as distance increases, costs for installation increases. The funding needed to not only install the chargers but to also maintain them increases as well. There are also currently no state tax incentives or subsidies for electric vehicles, making fleet adoption less enticing for future buyers (DMV). Low current public charging station location numbers also make purchasing electric vehicles less desirable.

From an economic standpoint right now, petroleum-powered cars are less expensive for consumers and therefore, in order for mass adoption, the cost of electric vehicles has to meet equilibrium or be less expensive to buy, operate, and maintain (Rissman 2017).

Recommendations

The team has prioritized 20 of the 26 checked locations for charging locations. This prioritized list (Table 4) was determined primarily based on the type of chargers suitable to the area based on how much time is typically spent and the perceived costs associated with the installation and usage on the power grid. DC Fast chargers typically take anywhere from twenty minutes to an hour to fully charge an EV depending on the make and model of the car. For this reason the DC chargers were recommended in areas where people would be expected to stay around thirty minutes or less (banks, gas stations, post office) as the typical EV user does not let the car battery go completely empty. Level 2 chargers can take from 2-6 hours for a full charge, so they would be more appropriately placed where users spend at least an hour of time such as gyms or restaurants. Some locations were also identified as benefiting from both types of chargers such as the grocery store and lots used by a variety of businesses.

If an area had a lot of high priority locations from the GIS analysis (Figure 3), some of those locations dropped lower in the final prioritized list to give a more well rounded, diverse recommendation. The green highlighted locations are areas the team believes immediate EV charging station placement would be welcomed and highly used. The yellow and orange areas are still good locations for EV chargers to be considered, just at later times depending on EV adoption and funding. A combination of DC Fast chargers and Level 2 chargers can be found in each level of prioritization.

Table 4. Prioritization of Charger Location Placement

| Location | DC Fast Charger | Level 2 | Both Level 2 and DC Fast |
|-----------------------------------|-----------------|---------|--------------------------|
| Hofbrauhaus Lot | | X | |
| Market District | | | X |
| LA Fitness Strip | | X | |
| Panera Bread | | X | |
| Grandview Ave Street Parking | X | | |
| GetGo Gas Station | X | | |
| Spectrum | | | X |
| AAA Car Care Center | X | | |
| Lot next to USPS | | | X |
| Snap Fitness | | X | |
| Speedway | X | | |
| Walgreens Lot | | | X |
| 5/3rd Bank/ UPS Lot | X | | |
| Grand Event Center Garage Strip | | X | |
| Eddie George's Grill Garage Strip | | X | |
| Columbus Fish Market | | X | |
| Grandview Heights Municipal Pool | | X | |
| Hyatt Place Garage Strip | | X | |
| Pierce Field Park | | X | |
| Columbus Mercantile Company | | X | |

We also recommend several features of EVCS implementation in Grandview based on our assessment Portland’s electric vehicle charging network. First, we recommend that when charging stations are constructed, a firm maintenance contract is put in place. Portland did not have an efficient plan and it led to many stations being in disrepair. We also recommend that the new stations are equipped with both the CHAdeMO and SAE Combo charging heads. This will help reduce range anxiety by giving 90% of current electric vehicles the ability to charge at all

stations constructed. Learning from Portland’s new EV plan, it would be wise to fit charging stations with increased conduit and space to allow for future upgrades. Charging stations are becoming more powerful and thus need to be upgraded with more heavy duty materials. These stations should be constructed in areas where there is enough space to increase or add on to the existing infrastructure when new technology becomes available.

| | Monthly Fee (\$/mo.) | | Off-Peak Charge (\$/charge) | | On-Peak Energy Charge (\$/kWh) |
|---|-------------------------|---|-----------------------------------|---|---|
| Option 1: Monthly Subscription | \$25.00 | + | - | + | \$0.19 |
| Option 2: Pay-per-Use (registered) | - | | \$5.00 | | \$0.19 |

Figure 5. Current price breakdown for Portland General Electric

Figure 5 represents the pricing that Portland General Electric plans to use for their charging stations. This could be used as a baseline for Columbus and Grandview moving forward. Once compared with actual utility costs for Columbus, a similar payment plan can be made to finance the electricity as well as operating costs of the charging stations.

Conclusion

Given our analysis, we have determined that Grandview Heights is an optimal location for the future development of electric vehicle infrastructure in Columbus. Specifically, Grandview Yard and the Market District are areas of high interest and should be prioritized when developing electric vehicle infrastructure in Grandview Heights since these areas most closely fit our electric vehicle placement criteria. Grandview Yard, in particular, has a large amount of public parking, including both street and garage, is optimally located near major highways, key

amenities, and a power source, and attracts large crowds of people to the area for a substantial amount of time. Grandview Yard and the Market District also appeal to a particular high income demographic that are the most likely owners of electric vehicles. While these two locations are currently our primary recommendations for electric vehicle charging placement, we also recommend that Columbus takes into consideration the changing electric vehicle landscape in Portland. As Portland moves more towards the co-location of electric vehicle chargers to improve accessibility and convenience, Columbus may also look to adopt this approach for charger placement. If a co-location approach was implemented, the prioritization of locations included in this report would likely change. Overall, as electric vehicle technology continues to improve and EVs become more cost-competitive in relation to standard internal combustion vehicles, sales are expected to rapidly grow over the next decade (IEA, 2017). Based on our analysis, we believe that Grandview Heights is well-equipped to take full advantage of this emerging market and propel Columbus towards a more innovative and sustainable future.

Appendix 1- Data Sources and Works Cited

The City of Columbus. *Columbus Maps and Apps*.

<http://columbus.maps.arcgis.com/home/index.html>

DMV. *Green Driver State Incentives in Ohio*. <https://www.dmv.org/oh-ohio/green-driver-state-incentives.php>

Grandview Heights, Ohio City Data. City-Data. <http://www.city-data.com/city/Grandview-Heights-Ohio.html>

International Energy Agency. 2017. *Global EV Outlook*.

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<https://www.forbes.com/sites/energyinnovation/2017/09/14/the-future-of-electric-vehicles-in-the-u-s-part-1-65-75-new-light-duty-vehicle-sales-by-2050/2/#6a1376922c21>

Transportation Electrification Plan. 2017. Portland General Electric

<https://www.portlandgeneral.com/-/media/public/residential/electric-vehicles-charging-stations/documents/pge-ev-plan.pdf?la=en>

United States Census Bureau. 2017. *TIGER Products*. <https://www.census.gov/geo/maps-data/data/tiger.html>

The Forbes Source was used in the introduction to determine and state the current and future market for electric vehicle purchases and the growth among consumers. The City-Data source was used in the executive summary to evaluate the growth and socioeconomic standing of

Grandview Heights. The Transportation Electrification Plan source was used to find detailed information on how Portland, Oregon is transitioning into traditional “gas station” approach to electric vehicle charging stations. The source also breaks down current payment as well as ownership of Portland’s EV network. The City of Columbus and U.S. Census sources were used for the incorporation of the relevant shapefiles into our created maps. The International Energy Agency and DMV sources were used for supplemental information on the current and future states of electric vehicle development.

Appendix 2- Electric Vehicle Charger Fieldwork Checklist

| Location | Proximity to Highway | Proximity to Fire Hydrant | Proximity to Street Corner | Proximity to Places of Interest | Parking Lane, Lot or Garage | Amount of Time Spent in Area | Proximity to Reliable Power Source | Seasonal Use |
|--|----------------------|---------------------------|----------------------------|---------------------------------|-----------------------------|------------------------------|------------------------------------|--------------|
| | <1/2 mi, <1mi, 1mi+ | >10ft | >10ft | <1000ft | | <30min, 30 min+, 1hr+ | <200ft, <500ft, <1000ft | Y or N |
| The Yard Rail St. Garage and Lot | | | | | | | | |
| Hofbrauhaus Lot | <1/2 mi | X | N/A | X | Lot | 1hr+ | <200ft | N |
| Courtyard Marriott Strip (SW Corner) | <1/2 mi | N/A | N/A | X | Garage | 1hr+ | <200ft | N |
| Grand Event Center Strip (SE Corner) | <1/2 mi | N/A | N/A | X | Garage | 1hr+ | <200ft | N |
| Baldwin Dr. Parking Garage | | | | | | | | |
| Hyatt Place Columbus Strip (NE Side) | <1/2 mi | N/A | N/A | X | Garage | 1hr+ | <200ft | N |
| LA Fitness Strip (SW Corner) | <1/2 mi | N/A | N/A | X | Garage | 30min+ | <200ft | N |
| Eddie George's Grill Strip (SE Corner) | <1/2 mi | N/A | N/A | X | Garage | 1hr+ | <200ft | N |
| Snap Fitness | 1mi+ | N/A | N/A | X | Lot | 1hr+ | <500ft | N |

| Location | Proximity to Highway | Proximity to Fire Hydrant | Proximity to Street Corner | Proximity to Places of Interest | Parking Lane, Lot or Garage | Amount of Time Spent in Area | Proximity to Reliable Power Source | Seasonal Use |
|---|----------------------|---------------------------|----------------------------|---------------------------------|-----------------------------|------------------------------|------------------------------------|--------------|
| | <1/2 mi, <1mi, 1mi+ | >10ft | >10ft | <1000ft | | <30min, 30 min+, 1hr+ | <200ft, <500ft, <1000ft | Y or N |
| C Ray Buck Ballpark | 1 mi+ | X | X | X | Lane or Lot | 30min+ | <200ft | Y |
| Grandview Heights Municipal Pool | 1 mi+ | N/A | N/A | X | Lot | 30min+ | <500ft | Y |
| Pierce Field Park | 1 mi+ | X | X | X | Lane | 30min+ | <500ft | Y |
| North Grandview Ave and 5th Ave Intersection Quadrant | | | | | | | | |
| Street Front: USPS | 1 mi+ | X | X | X | Lane | <30min | <200ft | N |
| Street Front: Z Cucina di Spirito | 1 mi+ | X | X | X | Lane | 30min+ | <200ft | N |
| Street Front: Local Cantina | 1 mi+ | X | X | X | Lane | 30min+ | <200ft | N |
| Lot next to USPS | 1 mi+ | N/A | N/A | X | Lot | 30min+ | <200ft | N |
| Walgreens Lot | 1 mi+ | N/A | N/A | X | Lot | <30min | <500ft | N |
| 5/3rd Bank/ UPS Lot | 1 mi+ | N/A | N/A | X | Lot | <30min | <500ft | N |
| Columbus Mercantile Company | 1 mi+ | N/A | N/A | X | Lot | <30min | <500ft | N |

| Location | Proximity to Highway | Proximity to Fire Hydrant | Proximity to Street Corner | Proximity to Places of Interest | Parking Lane, Lot or Garage | Amount of Time Spent in Area | Proximity to Reliable Power Source | Seasonal Use |
|-----------------------------|-----------------------|---------------------------|----------------------------|---------------------------------|-----------------------------|------------------------------|------------------------------------|--------------|
| | <1/2 mi, <1 mi, 1 mi+ | >10ft | >10ft | <1000ft | | <30min, 30 min+, 1hr+ | <200ft, <500ft, <1000ft | Y or N |
| | | | | | | | | |
| Giant Eagle Market District | <1mi | N/A | N/A | X | Lot | 30min+ | <500ft | N |
| Panera Bread | <1mi | N/A | N/A | X | Lot | 30min+ | <200ft | N |
| GetGo Gas Station | <1mi | N/A | N/A | X | Lot | <30min | <200ft | N |
| AAA Car Care + | <1mi | N/A | N/A | X | Lot | 30min+ | <500ft | N |
| Ohio Health Urgent Care | <1mi | N/A | N/A | X | Lot | 30min+ | <500ft | N |
| Snap Fitness | 1mi+ | N/A | N/A | X | Lot | 1hr+ | <500ft | N |
| Olentangy River Rd and 5th | | | | | | | | |
| Speedway | <1/2mi | N/A | N/A | X | Lot | <30min | <200ft | N |
| Columbus Fish Market | <1/2mi | N/A | N/A | X | Lot | 1hr+ | <500ft | N |
| Spectrum | <1mi | N/A | N/A | X | Lot | 30min+ | <200ft | N |
| Cap City Fine Diner | <1/2mi | N/A | N/A | X | Lot | 1Hr+ | <500ft | N |

