

February 25, 2015

TO: Mayor and Members of City Council
FROM: Harry Black, City Manager *HB*
SUBJECT: Electric Vehicle Chargers

201500256

Reference Document #201401374

The City Council, at its session on Wednesday, November 19, 2014, adopted the following Motion:

WE MOVE that the Administration provide a report on the feasibility of increasing the number and accessibility of electric car charging stations in the City of Cincinnati, including possible locations at City-owned facilities (including garages), incentives for private businesses - which include existing policies around inclusion - who install chargers, requirements for site selection, and any other information deemed useful and relevant: and WE MOVE further that the Administration provide such plan by January 13, 2015.

BACKGROUND

In 2009, Cincinnati City Council incentivized the adoption of electric vehicles by offering them free parking in certain parking garages and at all City parking meters. Today, there are 62 fully electric vehicles registered for that program, up from 28 just one year ago. In addition, there are an estimated 3,000 plug-in vehicles registered in southwest Ohio. This number is increasing rapidly. Plug-in vehicles are now offered in the Cincinnati metro area by Tesla, Nissan, Chevrolet, Ford, Toyota, Mitsubishi, BMW, Smart Car, and others.

There are 3 general types of electric vehicle chargers:

- Level 1 chargers are basically just ordinary 110 v electrical outlets. These outlets are very common and almost all plug-in vehicles can use a Level 1 charger, but a full charge takes 12 hours or more. Except at home, Level 1 charging generally takes too long to be practical, although it can be used to add a few miles to a vehicle's range. Depending on the distance to existing electrical service, the equipment for Level 1 charging can cost less than \$100. Installation by a qualified electrician would be additional.

- Level 2 chargers utilize a 220-240 volt connection and commonly provide 25-40 amps of current. A Level 2 charger can charge most vehicles from empty to 80% in 4-6 hours. Most publicly available electric vehicle chargers are Level 2. Depending on the distance to existing

220-240 volt electrical service, the equipment for Level 2 charging typically costs \$500-\$800 without the ability to accept payment, and an additional \$800-\$1,000 for a unit that can accept payment.

- DC Fast Chargers require 480 volt 3 phase service and can draw up to 100 amps. A DC Fast Charger (DCFC) can charge most vehicles from empty to 80% in less than half an hour. There are two challenges with DCFCs. One is that not all plug-in vehicles can accept DCFCs, although most fully electric vehicles can. The other is that DCFCs are not standardized. There are currently three competing designs being used in the United States. One is used by Nissan, Mitsubishi, and others. The second is used by Chevrolet, Ford, BMW, and others. The third is used by only Tesla. Tesla offers adapters that allow it's vehicles to charge at the other types of DCFCs.

EV owners find chargers using various websites and cell phone apps that provide the locations. One such site, Plugshare.com, lists 12 locations within Cincinnati currently equipped with EV chargers. Of those, 5 are Level 1, 6 are Level 2, and 1 (the 21c Hotel) has both Level 2 and a DC fast charger (Tesla). Eight of the existing chargers are offered for free, while four are free with paid parking. Technology exists for EV chargers to accept credit cards and cell phone payments. None of these pay-to-charge units are presently located in Cincinnati. A full charge for most EVs will require about \$2.00 worth of electricity (20 kWh at \$.10/kWh). A few have larger batteries, with some Teslas holding about \$8.50 worth of electricity (85 kWh).

DISCUSSION

Most early adopters of electric vehicles have chargers installed in their homes, and have daily travel patterns that rarely if ever require them to charge while away from home. As electric vehicles move into the mainstream, there are four primary situations that would lead an EV owner to use a public charging station:

- 1) Residents of multifamily housing structures (apartments and condos) commonly do not have their own garages, and will be able to use EVs only if chargers are present in the parking garage which they use as their home location. (Level 2 recommended.)
- 2) Some individuals have a daily commute which is too far to complete a round trip on a single charge. These individuals will be able to use EVs only if chargers are available at their work location. (Level 2 recommended.)
- 3) An EV owner who has a workable arrangement for their daily needs may occasionally want to make a trip that is beyond their range. These excursions will only be possible if chargers are available at their destination. (Level 2 or DCFC recommended.)
- 4) Sometimes, despite careful planning, something goes wrong. Whether due to mechanical or human error, an EV owner can find themselves unexpectedly in need of more range. (DCFC recommended.)

The Administration wishes to raise several other issues of which Council should be aware prior to spending money to install electric car chargers into City spaces and facilities Downtown.

First, Council should consider the socioeconomic implications of such a policy change. The average MSRP of an electric car is around \$42,000, the lowest MSRP is \$23,845. Cincinnati's average median household income is \$34,116, with 30.4% of the City's population living below the poverty level. Council should consider whether it wants to subsidize expensive, private amenities like electric cars when such an expenditure would compete for scarce General Fund dollars that would otherwise fund public safety, economic and workforce development, and other basic and social services.

Second, Council should consider whether the City is equipped to enter the marketplace as an energy provider. Traditionally, vehicle fueling stations have been the province of private enterprise with the exception of fueling the City's own fleet. City staff currently lack the expertise and experience to consistently provide the service that drivers expect. The City Administration is not entirely sure whether the chargers will work in all weather-types, the annual cost of maintenance, and the operating cost of providing free electricity, among other issues. These are issues that should be resolved prior to committing scarce capital resources.

Third, Council needs to strongly consider the technical challenges implicit within a nascent market. As the prior memo noted, there are at least three competing types of fast chargers, and providing for all three drastically increases cost. Conversely, providing one type but not the others, risks choosing Betamax over VHS.

CONCLUSION

The City currently has no identified funds to install or incentivize electric vehicle charging stations. If Council prioritizes this activity, funds will need to be identified. It is estimated that the cost of such an initiative would likely be between \$75,000 and \$100,000 in capital costs. Although the Administration is pursuing non-City sources of potential funding, there is no guarantee that we will be successful. In the event that the Council is not able to identify a budget offset, perhaps the Council may want to direct the Administration to fold this item into the broader FY 16/17 budget deliberations.

cc: Larry Falkin, Director, Environment and Sustainability

