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AN EXELON COMPANY

Department of Energy Multi Unit Dwelling Electric Vehicle Charging
Project

Lessons Learned Report

October 28, 2022

Introduction

The electrification of the transportation sector is one of the most effective ways to reduce carbon emissions and mitigate climate change. As the United States makes the transition to electric vehicles (EVs), it is important/critical for utilities to be prepared to meet the increased energy demand and to understand how electric vehicle charging equipment should be distributed across the service territory to effectively meet the demand.

EV adoption has been much slower among households in multi-unit dwellings (MUDs) than households in single family residences. [1] One reason could be due to a lack of convenient and accessible charging in or near MUD residences. This is particularly true for MUD residents in disadvantaged communities. [2] Recent legislation aims to promote equity during the energy transition and increasing EV adoption in disadvantaged communities is an area of particular concern. The Center for Sustainable Energy (CSE) was the prime recipient of a grant awarded by the DOE for the purpose of developing a replicable multi-unit dwelling Charging Toolkit. As one of many subrecipients of the grant, ComEd agreed to contribute to the Toolkit. ComEd was to evaluate grid considerations and the impact of MUD charging deployment on the grid.

ComEd is a large investor-owned utility serving over 4 million electric customers in Northern Illinois, including the City of Chicago. ComEd is working to integrate more clean energy solutions and technologies in its service territory to make the transition to renewables easier for customers. ComEd is implementing this EV charger study as part of its flagship sustainability initiative, Community of the Future (CoF). Through this innovative program, ComEd partners with communities to demonstrate advanced energy technologies which help to support the communities' own climate and sustainability goals. The program also helps ComEd gather key data as it relates to resiliency, grid planning, and decarbonization to further assist us in meeting commitments to local and state government agencies.

The historic Bronzeville neighborhood on the southside of Chicago is ComEd's first Community of the Future location. As part of the CoF initiative, ComEd is installing a microgrid, known as the Bronzeville Community Microgrid (BCM), that is connected to two feeders and over 750 kW of solar generation. The BCM serves approximately 1,000 electric customers in the community. ComEd established an advisory council at the inception of the Community of the Future initiative to directly engage with community leaders to better understand local needs, strengths, and priorities. The advisory council is made up of community leaders who meet quarterly to discuss sustainability goals and investments in the Bronzeville neighborhood. Through these conversations ComEd learns about ways to provide value to the Bronzeville Community and receives feedback on the initiative. The Bronzeville area has a high concentration of MUDs, with more multifamily residential development expected in the coming years, making it a highly suitable location for MUD Charging deployment.

This report will discuss ComEd's implementation, successes, and challenges to date. In the following sections we will address regulatory considerations, site selection, community engagement, permitting, and determining charging rates and charger ownership.

Regulatory Considerations

Participating in this project as the charger installer required ComEd to apply for permission from the Illinois Commerce Commission (ICC). The tariff was filed August 2, 2021, and the expected timeframe for a decision was 45 days. The tariff received final approval on August 27th of 2021. Permission to complete the study was granted under the condition ComEd would study the impact of different pricing scenarios on usage, provide periodic reports, and transfer ownership of the chargers by 2024. Chargers will remain operational until a new owner is identified. *For utilities exploring curbside charging, is important to begin having conversations with regulators early to inform them of the goals and intentions of a specific project.*

Community-Based Location Planning Process

ComEd began the location selection process by engaging the Bronzeville community through the CoF advisory council. Over the course of several sessions, a list of potential sites emerged, including both planned new MUD developments and existing MUDs. The project team began meeting with decision-makers for each site and found that none of the sites could accommodate the installation of on-site Charging (within a parking lot or parking structure) because of a severe shortage of onsite parking and limitations on site access during construction of new MUDs during the MUD Charging project period. The project team came to understand that these constraints arose out of conditions that are commonly faced by MUD residents. *It became apparent that in communities where vehicle owners were reliant on street parking at their place of residence, curbside EVSE would be a critical enabler of EV adoption.* Upon alignment with CSE, the project team agreed to develop a curbside charging solution for inclusion in the multi-unit dwelling EV charging toolkit.

Development of a curbside solution added considerable complexity to the project. In conversation with the City of Chicago, it was found that there were no existing curbside EV chargers in the City of Chicago, and, therefore, no established permitting process specific to curbside charging. The permitting process required all stakeholders to align on the purpose of the deployment within the scope of the grant, as well as upon the considerations for potential future curbside EV charging installations.

Following another round of conversations with site decision-makers, the project team selected two sites— each in the vicinity of multiple MUDs—for the deployment. In recognition of its original intent to study grid implications of MUD charger installations from a utility vantage point, the ComEd team also developed a methodology to identify MUD charger sites, beginning with the transformer data to find whether adding chargers to existing transformers would violate the rating of the transformer. AMI data on all customers connected to a transformer was pulled and used to create a model load profile of the existing customer loads. The transformer model load profile represents a ‘high loading’ 24-hour day based on real historic customer data. After creating the model profile, EV charger loads were added to the model to see whether the transformer rating was violated. *This methodology is important to ComEd as it allows us to determine what site upgrades are required or whether existing infrastructure can be utilized when installing new public charging stations. Results from the methodology help ComEd strategize before engaging community stakeholders with their proposed locations.*

Since the project team had already selected sites for deployment based on community input, the study team used the site identification methodology to determine which location in the vicinity of each community-identified site was most suitable from a grid perspective, and then sought input and support from decision-makers for each site as well as from the local aldermen.

The first location is near a 99-unit MUD development: 2 chargers with 4 total ports were proposed for this location. The second location is in the vicinity of multiple MUDs: 3 chargers with 6 total ports were proposed for this location. An additional location was added to the deployment plan based on input from an advisory council member who identified it as a location where people spent extended periods of time during the day. The project team agreed that it would be beneficial to include a case study in the VCI-MUD toolkit detailing a ROW charging location with prospective demand for daytime charging, as additional daytime usage of the stations might bolster the benefit-to-cost ratio and incentivize deployment. Daytime usage could also subsidize overnight charging costs for local MUD residents. To accommodate a third location, one charger was reallocated from the first site to the third site (see Table 1).

Table 1: Sites and Proposed EVSE Installation

#	Location	# of Chargers	Total ports
1	Curbside site near 99-unit MUD development	1	2
2	Curbside site near a school and multiple MUDs	3	6
3	Parking lot across the street from large MUD development	1	2

As described above, Location 1 was selected based on a suggestion from a CoF Advisory Council member and upon multiple conversations with the site owner and community stakeholders. The project team started the permit process and discussions with the City of Chicago in the summer of 2021. Permits were obtained in the first week of April 2022. Construction of the installation site was completed on April 20th, and on April 28th the project team successfully commissioned the BTC Power dual port pedestal charger EV charger location at Location 1. The charging ports are currently free to use, to gauge the initial usage of the charger without a cost barrier to customers.

Construction at Location 2 began on April 6, 2022, but was halted because of an unforeseen problem with the site location, which is detailed in the next section. The project team has identified a location (Location 3) for the charger reallocated from Location 1 through the same community engagement process detailed above. The third location has been identified as an ideal location for a charger due to its proximity to the Illinois Tech campus as well as new MUD buildings.

Obstacles Encountered and Considerations for Large Scale Deployment

ComEd conducted a 6-month long process to identify locations that would be the best fit for the EV chargers. Early in 2021 ComEd met with the Bronzeville Community Advisory Council who provided insights into community plans and upcoming MUD developments. As discussed above, our first installation location emerged when we learned that a local developer was planning to break ground on a new mixed-use, mixed income residential complex on the corner of a highly trafficked area in Bronzeville. Several additional planning discussions with stakeholders led us to the next site (Location 2), adjacent to a school. The school’s leadership team informed us of their plans to utilize electric vehicles for a shuttle program they operate for students to safely travel to and from after school activities. The installation of chargers could benefit the school’s business operations as well as the surrounding residents. ComEd planned to install 3 dual port chargers at that location in the right of way for public use.

Very late in the installation process it emerged that the specific location chosen and permitted for the EVSE served as a loading zone for the school. The COVID-19 pandemic, which limited in-person interaction with external partners, was a contributing factor in this missed information. An in-person walkdown and discussion of the installation location would have been part of the site plan. As a result, ComEd was not able to proceed with the plan to install charging in front of the school. ComEd is currently working with a private parking lot across the street as a potential alternate installation site. *While additional in-person meetings and physical walkdowns of the site may help identify issues at an earlier time, this complication highlights a facet of curbside charging that stakeholders need to consider when planning for future deployment: street parking areas often serve multiple purposes, and conflicting community needs must be coordinated to ensure that EV charging solutions can coexist with other uses.*

The process ComEd employed leveraged existing relationships with community stakeholders through established channels of communication and direct dialogue with site decision-makers and elected officials. Although significant effort was made to ensure alignment on the locations, the issue at Location 2 was detected late in the process. ComEd determined that the school's use of the curbside area as a loading zone—albeit undesignated— was sufficiently critical to change its deployment plans. Depending on which entities may own and operate charging infrastructure in curbside locations in the future, there may be potential for conflicts of interest. Ensuring that allocation of space for charging satisfies the interests of charging station site owners and multiple community stakeholders will be critical to a successful and equitable deployment process.

Another lesson learned was the need to engage with community stakeholders at multiple points throughout the design process, including engaging municipal leaders, prior to completing a design. More frequent meetings, written commitments, and frequent communication are necessary to ensure shared understanding of design plans and implications among all parties. Having multiple design proposals for each location could mitigate the risk of extended delays caused by unforeseen issues with the design proposal.

Various departments within a local government may not have access to the same data, as was the case in Location 2, where the permitting office approved installation without the knowledge that the alderman's office was able to provide about the loading zone. Since the permitting phase can take up to 6 months depending on the location, it is in the charger installer's best interest to engage with permittees and all related parties before, and throughout, the permitting process. If changes need to be made based upon the permitter's assessment, engineering designs can be modified and accurate bids from contractors can be provided.

One additional learning was that the City of Chicago is early in its thinking about curbside charging as an option along residential and business corridors. Installing in the right-of-way adds complexity to the installation and operation of chargers. Because curbside charging has the potential to involve many departments within a local government, making sure all municipal stakeholders are in alignment early in discussions is key to ensure informed siting decisions. The fact that the project team was operating on a strict timeline meant that the project team expedited some municipal stakeholder discussions. Spending more time in conversation with all interested parties might have yielded a richer understanding of the local context in which the team was operating.

Establishing Rates

In mid-2022, ComEd benchmarked several utilities, municipalities, and private companies to help determine rates for charging. However, there were not many existing resources on rates and the impact on customer demand. As more EV charging infrastructure is implemented, more information should become available to help with those decisions. ComEd is planning to begin charging customers for energy use beginning in January of 2023. Pricing is subject to change over the course of the study, but we will start by charging ½ of the market rate for the area, with an even deeper discount for Bronzeville residents.

Post-Study Transfer of Ownership

ComEd agreed to take reasonable efforts to sell the chargers to a third-party owner or community partner by the end of 2024, per the special tariff approved by the ICC. Discussions have begun on how to select community-based partners to own and maintain the chargers long term. In discussions with potential post-study owners, potential partners seem to be most concerned about the impact the energy used from the chargers could have on their bills. Additionally, while the new owner is allowed to charge for usage, concerns about the time and staffing needed to make decisions about rates have made potential partners hesitant to fully commit to taking ownership without the security of having ComEd as a resource should they encounter issues. ComEd's goal is to prepare customers to be able to have all the information necessary to keep the chargers in working condition so they can be an asset to the customer and broader community.

Conclusion

ComEd and many utilities across the country will continue to be tasked with thinking about the impact of large-scale EV charger deployment and customer EV adoption. ComEd was able to leverage our existing Community of the Future program in the Bronzeville neighborhood to install chargers in locations that serve MUD residents. Collaborating with the Bronzeville Advisory Council has allowed the project team to identify locations that make sense for the future of the community. While we were able to successfully deploy

chargers in one curbside location, making sure community and company plans are coordinated is crucial to the success of charger deployment. With these early learnings, we hope to improve the planning process through completion of this study and continue to generate knowledge that will facilitate EV-adoption among MUD residents.

References

- [1] M. Nicholas, D. Hall, and N. Lutsey, "Quantifying the Electric Vehicle Charging Infrastructure Gap Across U.S. Markets" (The International Council on Clean Transportation, last modified January 2019)
https://theicct.org/sites/default/files/publications/US_charging_Gap_20190124.pdf.
- [2] K. Wood "Vehicle Charging Innovations for Multi-Unit Dwellings (VCI-MUD) Project" (June, 2020)
https://www.energy.gov/sites/default/files/2020/06/f75/ti092_wood_2020_o_4.28.20_1136PM_JL.pdf