



MEMORANDUM

To: Administration/Public Works Committee Members

From: Rick C. Brown, Director of Public Works / City Engineer

Date: April 30, 2021

Re: Electric Vehicle Charging Infrastructure In Town Center

Council Member Rambaud has researched the possible installation of a new electric vehicle (EV) charging station in the Town Center area. Please see the attached information provided by CM Rambaud, which I have attempted to summarize as follows.

EV Charging Station Levels: There are three types of EV charging stations:

(See also <https://www.ameren.com/missouri/residential/electric-vehicles/charging>)

- Level 1 Charging (Easy): These require the longest duration for EV charging, typically 4 miles of driving/charging hour and utilize common 120-volt AC outlets.
- Level 2 Charging (Fast): These can charge at a faster rate of 25 miles of driving/charging hour; however, they also require higher voltage and amperage. Commonly used for public, work or home.
- Level 3 Charging /DC Fast Charging (Fastest): These charge most rapidly. Typically, at level 3 stations, EVs can obtain 80% charge in 30-45 minutes or less but require the highest voltage and DC power. Level 3 EV stations are the most desirable due to their short charging duration, and lack of availability in this area.

Installation Cost:

- Level 1 stations are the cheapest to install.
- Level 3 stations are the most expensive, due to their higher voltage/amperage and DC power requirements.
- To reduce the installation cost, financial incentives are available from Ameren ranging from \$5,000-\$20,000 per port, or up to 50% of the project cost, whichever is less.

The EV charging stations could be offered to the public as a free service; however, most level 2/3 stations provide connection to an online charging network by utilizing a smart phone app (Plugshare.com, Opencharge.org, EVGO.com) and some charge a fee. Per Ameren's website, there are more than 100 public chargers in the Greater St. Louis area.

Installation Cost Proposal: As a result of Council Member Rambaud's efforts, we met last week with Jason Becker, Director of Critical Power, with Industrial Battery Products (IBP) to discuss the feasibility of installing an EV charging station in the garage across from City Hall. (IBP is a contractor recommended by Ameren with experience in this field.) After discussion, it was agreed that IBP will furnish a cost estimate to install a Level 2/3 EV charging station in the northeast corner of the garage on the lower lever. IBP agreed to submit the cost estimate by the afternoon of May 4th, for subsequent review by the Committee that evening.

CID: It is important to note that the garage is not owned by the City but by the Crossings Community Improvement District (CID). Thus, the CID would have to approve and accept ownership of an EV charging station, if installed within the garage.

RCB

I'm interested in gauging support for EV charging stations in Wildwood. The strong Public Works and Business Development cases and other rationales for doing this can be made elsewhere and else-when, but currently available subsidies and tax credits (below) might make it feasible and desirable to act now on some sort of EV charging station (aka EVCI). Wildwood could be the first city in this area to add a robust "Level 3" or "DC Fast Charging" station, aka DCFC, and I've been told by Ameren representatives that we could thus gain a lot of free, positive publicity from Ameren PR Dept. and other media entities at low to no cost.

The Town Center Garage may be a great location for our City to take a step toward Electric Vehicle Charging Infrastructure (EVCI). It is adjacent to the Hotel, across from City Hall, our Police Station, and B&B Theaters, close to shopping and dining, and to existing and planned residence projects. As I've said elsewhere, the cost/benefit sweet spot for our City to begin might be to provide "*a top-off charge that would add sufficient charge in an hour or two for an EV to drive from Town Center to the Arch*", such as that provided by "Level 2" systems (described below).

Here is some initial leg work on EVCI. Any stated opinions or mistakes are my own. I can also share preliminary cost and maintenance estimates and other information, but there are too many moving parts to do so in an email.

Utility & Vendor info & contacts

Ameren will provide business and muni accounts with incentives up to \$5K/port and up to \$20K/DC port @ 50kW nominal max., (see "Technology", below) or 50% of total project cost, whichever is less. Pre-approval (after submitting bids and a prelim. site plan) will hold Ameren funds for 6 months prior to construction. Per Ameren, if Wildwood were to provide DC charging it would make us a municipal leader, and Ameren PR department would jump at the chance to tell our story.

Bryan Shannon, Ameren Business Development Manager, Office 314.554.4690, Cell 314.691.3501
Ameren incentive program online application: <https://www.ameren.com/missouri/business/electric-vehicles/incentives>

IBP is one contracting firm recommended by Bryan Shannon that partners with Ameren to provide turn-key EV charging station (aka EVCI) installations. I spoke to Jay Becker at IBP, and he stated that IBP can help Wildwood take advantage of existing Federal EVCI tax credits, thus further reducing project cost.

Jay Becker, Director of EV and Critical Power, IBP Midwest, 1250 Ambassador Blvd., Saint Louis, MO 63132
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Existing Town Center infrastructure

I understand that our City garage is owned by a CID, whose board must be involved before moving forward. I did visit the garage on 3/31 to view the building electricity infrastructure and determine rough contours of a charging infrastructure installation. The garage is fed by 480/277V, with a main disconnect for 2 lightly loaded panels. Bryan Shannon has verified that the 3-phase 1000kVA transformer feeding the garage is loaded at less than 50% of capacity. In short, we could easily add AC and/or DC chargers without any upgrades on the Ameren side. Thus, their entire project subsidy would apply to actual installation cost, reducing overall cost to Wildwood.

Technology, very high-level sketch

As with gas vehicle "miles per gallon", EV range depends on the vehicle; analogous parameters include: range on a full charge, remaining % power stored in the vehicle battery ("gas in the tank"), and miles of added range per charging hour (time to fill up). The cost of electricity to charge an EV is low enough that lower charging-speed stations are often offered free, with the modest energy cost paid by the facility owners; higher-power charging stations often have credit card readers and other point-of-sale (POS) payment methods. It might be simplest for CID or City to pay for power as a public good, and consider adding a modular payment mechanism once established. Most "public" charging stations participate in an

online network or networks, which folks check via a smart phone app or a system in their car to locate nearby stations.

EV chargers come in several categories. The simplest and cheapest provide AC power via a dedicated breaker and outlet, into which a car owner can plug an onboard cable that then uses an onboard inverter (rectifier) to store power in the battery. More sophisticated systems move the rectifier into the charging station for many engineering reasons, and supply DC power directly to vehicle batteries at a much higher rate. Annoyingly imprecise marketing jargon has assigned arbitrary “Levels” to these facility types.

“Level 1” stations consist of a dedicated 15A, 115V AC wall outlet (*exactly* the same as in everyone’s home), which add a few miles of range per charging hour. A 20-amp dedicated outlet improves the charge rate a bit, to ~6-8 miles of driving range per hour of charge. These types of systems can be added to serve a couple of dedicated parking spots at a cost of next-to-nothing; e.g. some hardware store wiring products and a sign. However, short-term visitors Town Center wouldn’t find much utility. Business people that spend several hours a day at Town Center, Hotel guests, our Police, and similar users that find slow charging useful might love them.

“Level 2” stations also provide AC power for on-board rectification, but they are wired at 230V and generally supply higher amperage in the 20-80A range although many current EV’s can’t handle the higher amps. A 20A circuit will add up to ~15 miles range per hour and a 50A outlet will add ~30 miles per charging hour. The good news is that such charging stations are quite inexpensive, starting at under \$2K. (Attractive station upgrades, contractor services, and other materials and labor would drive this cost higher, but Ameren subsidies would cut it back down.) All current US EV’s can use a standard, SAE J1772-style connector, although Tesla owners need to use a plug adaptor (provided with their vehicle).

“Level 3” stations move the rectification off the car and into the charging station, thus providing DC power at whatever rate the car’s system can accommodate, directly to the car battery, dramatically improving efficiency and charge rate; typical EVs get 80% charge in ½ hour or less. This is clearly the direction, but infrastructure (and standards) have yet to develop.

The typical, maddening “unsettled standards environment” frustrations apply to connectors at “Level 3”. The three main ones are Tesla Supercharger (proprietary), CHAdeMO, and SAE CCS. All manufacturers can be accommodated with a single charging unit equipped with two connectors, which look and work very much like the hose on a gas pump, but again, Tesla owners need an adaptor (this one is a Tesla extra-cost option). This kind of infrastructure is often referred to as DCFC, for Direct Current Fast Charge. Since Tesla has a proprietary DCFC network, it may be wise to contact them about a subsidized Supercharger station for our garage. There are many other subtleties in DCFC that we can discuss later; distinguishing features come down to the user network and app environment for each type of system.

My suggested next steps:

- meet at the garage with an Ameren-approved contractor to determine actual costs, location, etc.
- determine support in City Garage CID Board
- assess interest among Wildwood Business Development stakeholders
- speak to Tesla about potential partnership in DCFC subsidy
- deliver draft proposal and cost estimates to Wildwood committee or committees TBD
- etc.