


ITEM AT THE REQUEST OF STAFF

DATE: November 2, 2017

TO: Chairman and Members of the
Planning and Zoning Board

FROM: Joseph Yaciuk
Planning Administrator 

Project: Electric Vehicle Charging Stations

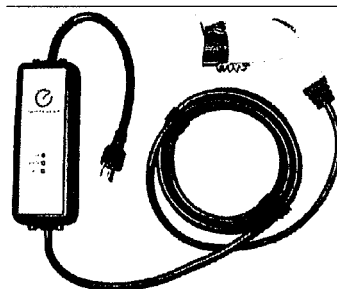
Details of Request:

City planning staff periodically reviews the City Code of Ordinances and makes recommendations on amendments to the Land Development Code. Staff has recently seen an increase in electric vehicle charging station queries throughout the City. Up until now, the City has been permitting individual units for residential use (personal garage units) as well as accessory uses to shopping centers and car dealerships (Shops at Pembroke Gardens, Audi, Cobblestone Plaza etc..). It is anticipated that there will be a further increase in charging station requests in the mid-future with the recent commitments from car manufacturers to convert car production from gas to electric engines. Staff therefore wishes to formalize development standards within the Code of Ordinances.

Background

The industry designates three specific levels for charging stations.

- Level 1 is considered slow charging and operates on a fifteen to twenty amp breaker on a one hundred twenty volt AC circuit. Level 1 electric vehicle supply equipment (EVSE) replenishes 2 to 5 miles of range during one hour of charging. Primarily used for personal home charging.



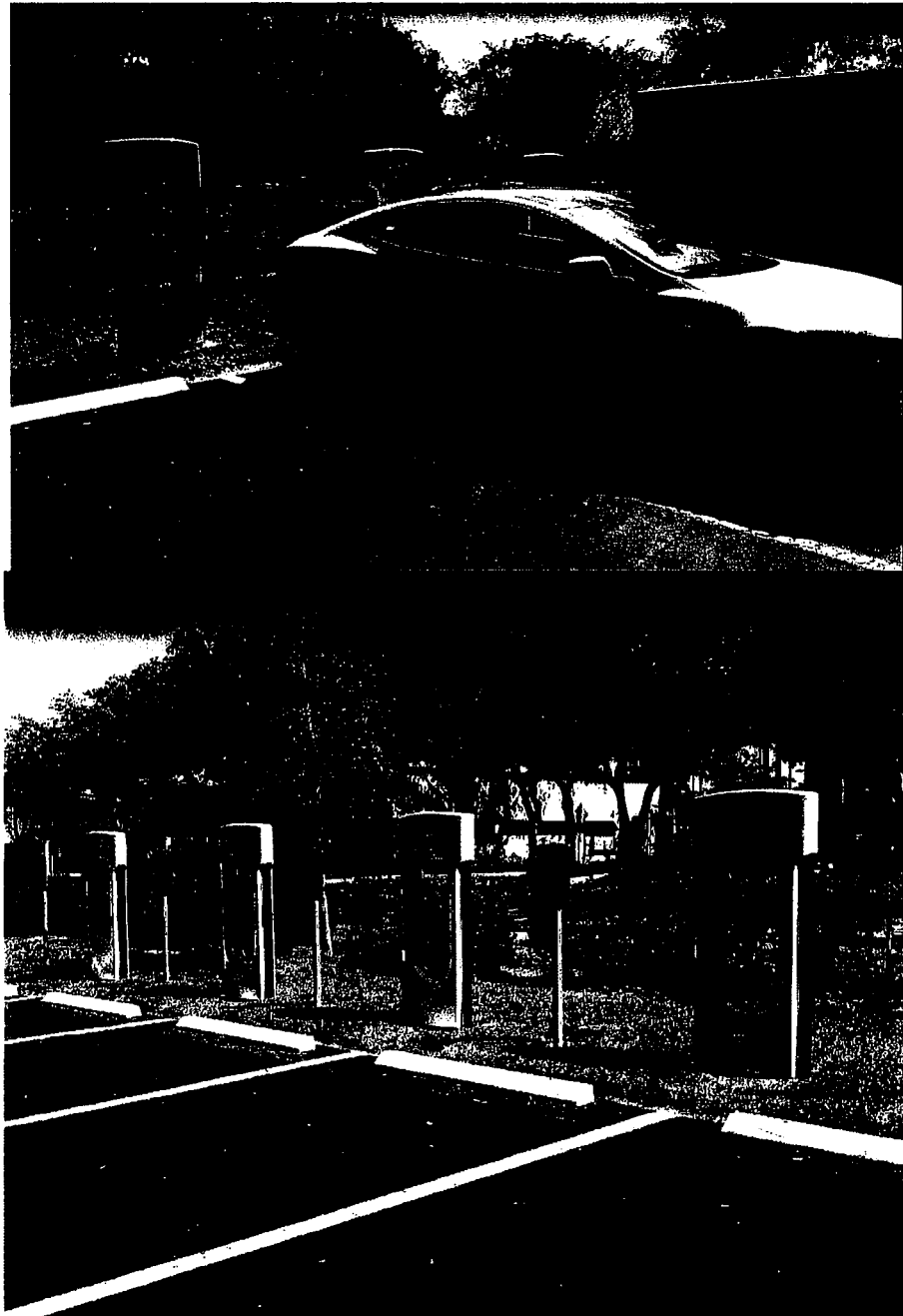
Level 1 Example

- Level 2 is considered medium charging and operated on a forty to one hundred amp breaker on a two hundred eight or two hundred forty volt AC circuit. Level 2 allows for a wide range of charging speeds, all the way up to 19.2 kilowatts (kW), or about 70 miles of range per hour of charging.



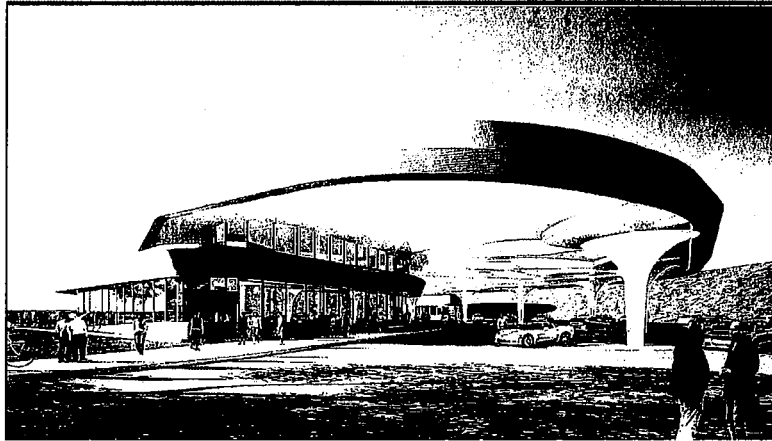
Level 2 Example

- Level 3 is considered fast or rapid charging and operated on a sixty amp or higher breaker on a four hundred eighty volt or higher three phase circuit with special grounding equipment. Level 3 stations are typically characterized by industrial grade electrical outlets that allow for faster recharging of electric vehicles. Level 3 (480 V) stations can charge a battery to 80% in 30 minutes or less.



Level 3 Example - Tesla charging station in Plantation.

- Electric Vehicle Charging Service Stations are considered a freestanding building with EV charger units and associated maintenance, repair, and retail – similar to conventional gas service stations.



Electric Vehicle Charging Service Station

Proposal

City staff requests discussion and possible action as to how these charging stations should be regulated. The following chart provides direction as to how City staff wishes to proceed.

Standard	Level 1	Level 2	Level 3	EV Service Station*
<i>Use</i>	Residential SFR / Amenity	Amenity	Accessory to Principal Use	Free Standing
<i>Power</i>	120 Volts	240 Volts	480 Volts	480 Volts or greater with repair
<i>Location</i>	No Restriction	No Restriction	Visible From Right-of-Way	Existing Service Station Location Requirements
<i>Landscape Requirements</i>	N/A	N/A	Equipment Concealed from ROW	Standard
<i>Signage Maximum</i>	1.5 sq feet per unit	1.5 sq feet per unit	1.5 sq feet per unit	Service Station Requirements
<i>License</i>	N/A	N/A	Use and LBTR	Use and LBTR
<i>Description</i>	Personal Unit for Individual User or amenity	Personal or amenity for a tenant, 5 units or less	6 -20 Units	Service Station Requirements
<i>Parking</i>	Counts towards required, Non-exclusive	Counts toward required, Non-exclusive	One Space per charging unit. Exclusive Parking (Surplus with Pavement Markings)	One Space per charging unit. Exclusive Parking plus service Station Parking Requirements
<i>Zoning</i>	Any	Any	B-3, C-1, M-1, M-2, M-3, M-4, M-5	B-3, C-1, M-1, M-2, M-3, M-4, M-5

All charging stations shall require the proper building permits for installation. It is expected that City staff will adjust these requirements as charging technology changes resulting in reduction of charging times.

Staff Recommendation: City staff to request City Attorney draft and Ordinance revising the City Code of Ordinances reflective of staff recommendations to be considered by the City Commission.

Enclosure:

Selected Articles

Are 'All-Electric' Cars the Future?

BY: Thomas Gnau, Dayton Daily News | October 4, 2017

(TNS) -- Now that leaders of General Motors apparently believe in an "all-electric" future, what happens next?

Not much immediately. But many believe long-term changes are afoot.

Perhaps you've heard: The biggest American automaker said this week that in the next 18 months, it will introduce two new all-electric vehicles.

But — and here's the kicker — that will be just the first of at least 20 new all-electric vehicles that will launch by 2023, the automaker said.

"General Motors believes in an all-electric future," Mark Reuss, GM executive vice president of product development, purchasing and supply chain, said in GM's announcement. "Although that future won't happen overnight, GM is committed to driving increased usage and acceptance of electric vehicles through no-compromise solutions that meet our customers' needs."

In many ways, Dayton loves internal combustion engines. The DMAX plant in Moraine produces diesel engines for heavy trucks, and the plant employs more than 600 people.

Asked what if anything the announcement means for the DMAX plant, Mary Ann Brown, a GM spokeswoman, said, "Specifics related to plants and resources and how they will be allocated to accomplish this strategy will be announced at a later date."

John Heitmann, a University of Dayton professor and a nationally recognized authority on the history of the automobile, thinks the internal combustion engine's days may be numbered — but that's not because of any fault with that form of technology.

"I think they're numbered, but they're numbered more by state decree — particularly in Europe, where governments are actually mandating EV (electric vehicle) use," Heitmann said.

Heitmann thinks that if consumers are asked, "I think they would be more than happy to keep the gasoline engine around."

"Nobody is asking the consumers what they really want," he added. "EVs can be great, but I think consumers need to make that decision, not just East Coast-West Coast types."

Dayton Power & Light says it has established 20 EV charging stations in the Dayton area. Locations range from universities, government buildings, schools, parking garages and the National Museum of the U.S. Air Force. (A message seeking reaction to GM's announcement was left with a DP&L spokeswoman.)

"Infrastructure remains very spotty, particularly in the heartland," Heitmann said. "You really do have to plan your trips."

GM's announcement is the latest in what is becoming something of an apparent trend.

In July, Chinese-owned Volvo Cars announced that all of its vehicles from 2019 on will have an electric motor. Ford has said it is going to make its own push toward more EVs.

"China's air pollution problems have prompted a more serious push towards cleaner automobiles," Michele Krebs, executive analyst with Auto Trader, said in reaction to Volvo's decision this summer. "European markets need to find a replacement for diesel engines as well. Can this commitment spell success in the U.S. though?"

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This article was printed from: <http://www.govtech.com/fs/transportation/Are-All-Electric-Cars-the-Future.html>

TECH OCT 21 2017, 4:12 PM ET

Where Will We Charge All Those Electric Cars We'll Soon Be Buying?

by PAUL A. EISENSTEIN

The auto industry is getting ready to plug into battery power in a big way. In recent months, virtually every major automaker has announced some form of "electrification" and, by the middle of the coming decade, conventional hybrids, plug-in hybrids, and pure battery-electric vehicles could account for nearly one-third of all new vehicle sales — even more if California regulators ban the internal combustion engine entirely, as they're now considering.

But this dramatic shift raises plenty of questions, including one of the most basic: Where will American motorists plug in? And where will all the energy come from to charge up millions of new plug-based vehicles?

While proponents see the shift to battery power as a way to clean up air pollution and reduce our dependence on foreign oil, skeptics fear it could put a massive strain on the nation's electrical grid requiring billions of dollars in new infrastructure including the addition of many new generating plants. Potentially worse, that could actually increase pollution problems, they warn, especially if those plants were to rely on coal.

When you add them all up, hybrids, plug-ins, and pure battery-electric vehicles, or BEVs, accounted for less than 3 percent of all the vehicles sold in the U.S. in 2016. The numbers have been rising this year, and is expect to surge with the arrival of more long-range models such as those coming from Audi, Ford, Nissan, and Volkswagen. Tesla alone is forecasting 2018 will see sales of 500,000 BEVs, primarily its new Model 3, or about six times its previous annual record.

There is beginning to be a moderate network of regional chargers, especially in areas where sales of plug-based vehicles has been strongest: states like California, Florida and Georgia. But "there is no good U.S. long-distance road trip network today," other than one Tesla is setting up specifically for its owners, said Anton Wahlman, an analyst and investor following the electrified vehicle market.

Related: GM Is Going All Electric

That's also expected to grow, in part, ironically due to the Volkswagen diesel scandal. The automaker committed to spending \$500 million over just the next 30 months to back the development of a charger network, a program called Electrify America. Along with other government and private initiatives, said Wahlman, we could reach a point in the coming decade where "'coverage' will no longer be the main problem and 'capacity' will be the big issue."

How to power the power?

There are somewhere on the order of 120,000 gas stations in the United States, according to industry data. The question is whether we will need to essentially duplicate that vast and convenient network with charging stations.

A one-for-one match would be a major challenge, according to Pasquale Romano, president and CEO of Chargepoint, which claims to operate the world's largest vehicle charging network. Even a modest-sized station, with six high-speed chargers — capable of "filling up" a battery in under a half-hour — would draw "a couple of megawatts," said Romano, and would "need an electrical sub-station next door."

A major charging station, like those at big freeway interchanges or Costco outlets, would draw as much power as the gigantic data centers used by Facebook and Google. In turn, experts add, a nationwide network could require dozens of new power plants or massive new investments in solar and wind farms.

Related: Go Inside Facebook's Newest Arctic Data Center

That would be the scenario, anyway, if we were to duplicate the existing refueling system, and if motorists were to charge up their battery cars just like they gas up today. But many believe that even as plug-based vehicles become the norm, we'll see a major shift in consumer behavior.

Today, 85 to 90 percent of BEV and plug-in hybrid owners tend to do the vast majority of their charging at home overnight, occasionally topping off their batteries at the chargers popping up at more and more workplaces, said Dave Schembri, the CEO of the other major U.S. charging company, California-based EVgo.

The debate is what will happen as millions more battery cars take to the road. "More and more will not be able to charge at home or office, so dependence on public chargers will grow," said Schembri. But he quickly added his belief that the U.S. will never need as many as chargers as it does gas pumps.

Charging at home, at work, and on the road

Charging at home offers major advantages, both to EV owners and to the electrical grid. Overnight electrical demand is generally far lower than during the day, and even today's generating capacity is believed sufficient to handle millions more battery-based vehicles, experts believe. In fact, utilities typically offer lower rates for dedicated EV chargers, encouraging overnight charging. In some cases, that's as little as two cents a kilowatt-hour, or barely 10 percent of what commercial EV stations often charge during the day.

Charging up at home isn't as fast as with the latest public high-speed chargers. Even with a 220-volt "Level 2" system, a motorist might only be able to add another 50 to 100 miles of range overnight, but that's more than enough to top off a battery for most American motorists, who typically drive fewer than 50 miles a day.

Chargepoint's Romano believes that the most likely scenario will see most drivers charging up at home overnight and only turning to public chargers for longer trips, such as vacation travel. This scenario, he stressed, relies on the shift to the long-range vehicles like the Chevrolet Bolt EV and Tesla Model 3, getting more than 200 miles per charge. And, indeed, automakers expect to soon phase out most short-range models as batteries get better and costs continue to drop.

To keep EV owners charging at home — and to reduce the need for a major expansion of the country's electrical infrastructure — some states and a number of municipalities, such as Santa Monica, California and New York City, are now requiring the installation of chargers with new homes, apartment buildings, and even parking structures.

Will we have to spend tens of billions of dollars to expand the country's electrical grid?

But there's also a big push to develop the public charging network to make it easier for battery-car owners to "fill up" on the fly. Tesla's proprietary Supercharger network is seeing so much demand there are often lines of motorists waiting at peak hours along heavily traveled routes like California's I-5 between Los Angeles and San Francisco.

Adding more chargers will help, but so will the development of next-generation hardware. For a 200-mile range, using a home or public 220-volt Level 2 charger can take as long as a day if the battery is completely drained. New high-speed chargers can give an 80 percent charge-up in under an hour. EVgo is focusing on those Level 3 chargers at its public stations, while "future-proofing" its facilities to handle even more advanced — read high-speed — technology in the years to come.

That future is coming fast. Toyota is hinting it will replace current lithium-ion batteries with next-gen solid-state batteries when it launches a new line of electric vehicles in 2021. Some experts forecast that technology could boost range to over 300 miles while reducing charging times to as little as 10 minutes, or more like what it takes now to fill up a gas tank.

That raises the question of whether motorists will fall back on old habits and simply charge up during the day once or twice a week. The answer to that question could determine whether or not we'll need to spend tens of billions of dollars to expand the country's electrical grid and add new sub-stations on seemingly every corner.