



## **Electric Vehicle Charging Station Infrastructure:** Insights on community planning activities to meet demand, achieve efficiencies and ensure inclusivity.

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As auto companies prepare to roll out dozens of electric vehicle models and environmental trends ultimately tighten carbon emission regulations, communities nationwide will soon face decisions about deploying electric vehicle charging stations. In this series, HNTB's Katie Zehnder and Loreana Marciante explore the process and best practices of planning a comprehensive charging infrastructure to efficiently meet anticipated community needs.

In this white paper:

- Context setting: Projected demand for EV charging
- Data: Sources and resources required for planning
- Prioritizing: Setting parameters for decision making

Next:

In part two, we'll explore the role of public and private partnerships, incentives and public infrastructure.

## EV supply drives charging demand

With nearly every major automaker committed to expanding their electric vehicle lines, EVs will soon flood the market as prices for battery packs continue to fall. According to Inside EVs, sales of plug-in EVs increased 81 percent in the U.S. from 2017 to 2018, and Bloomberg NEF's Electric Vehicle Outlook 2019 forecasts EVs will make up 57 percent of global passenger car sales by 2040. With these factors in play, the industry seems to agree that EVs will reach price parity with internal combustion vehicles in the next five years.

According to the U.S. Department of Energy, more than 80 percent of EV charging occurs at home locations. Those living without dedicated parking or in multifamily developments without EV charging, however, will need public access to charging stations. In addition, shared mobility services such as ride-hailing and car-sharing are predicted to lead the shift toward electric vehicles and will require public charging stations along their routes. Intercity travelers, too, will want confidence in recharging to make the trip. So, the success of the shift to EVs is dependent in large part on the availability of public access charging stations.

**Note:** Multi-unit-dwelling charging, workplace charging and fleet charging strategies also are needed. This paper is focused on public access charging.

### Critical data inputs

Our work with the Smart Columbus project to plan for public access charging in Columbus, Ohio, can serve as a model for other communities as they begin to plan for anticipated rapid increases in market demand.

### Trip origin and destination

To begin, you'll need to look at the concentration of EV ownership in your community. Where do EV owners live? The local bureau of motor vehicles is a good place to start.

Next, consider where those EV owners are going. What are the most common destinations, and what are the traffic patterns for reaching them? Among the sources to consider:

- Traffic analysis from state and local departments of transportation
- Parking meter usage
- Taxi waypoints

Anyone in transportation planning will find this process familiar. New methodologies, technologies and cutting-edge tools, such as GPS data sources,

are delivering more accurate, precise and actionable information.

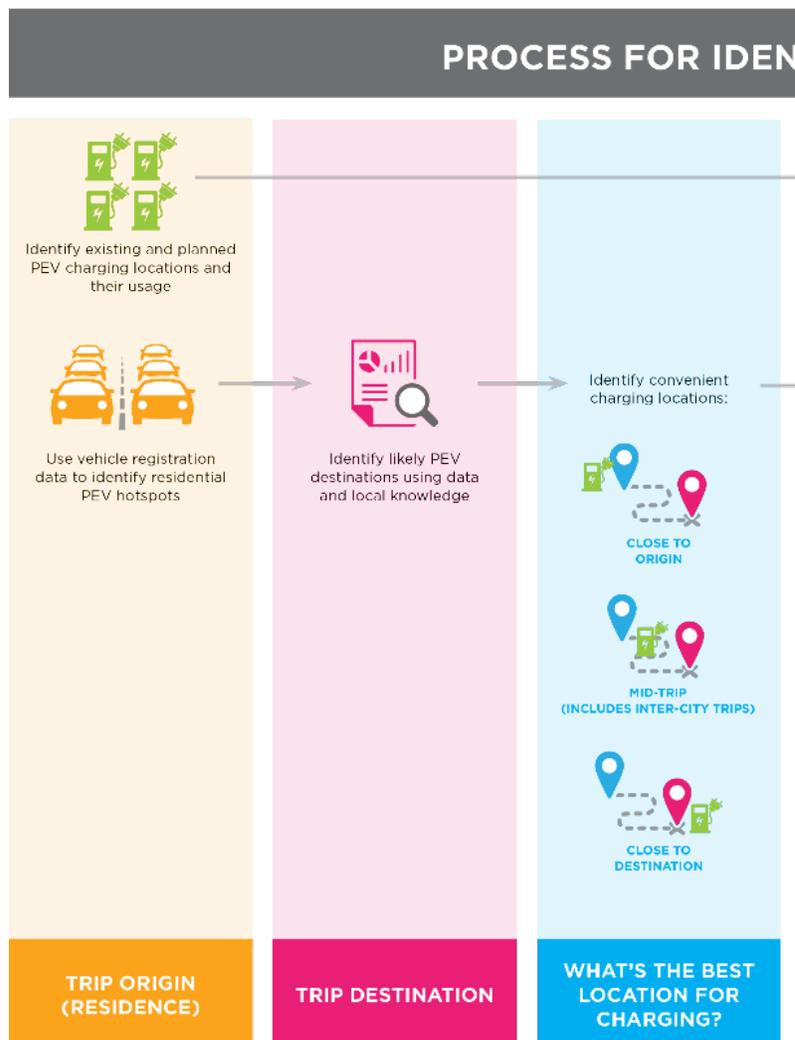
To refine the data, you might look for groups that can help analyze the objective information you're able to gather. This might include business development experts, utility company leaders and parking and infrastructure planners. Local knowledge is critical to this analysis.

### Best charging locations and types

Multiple factors affect charging station location decisions:

- Where are current charging stations located?
- How many ports are available?
- What types of charging are provided?
- What types of technology are available?
- Who are the suppliers, and what systems do they use?

Once you have documented these criteria, consider other potential locations. State DOTs also can look at intercity travel considerations



and potential related locations, such as their top attractions, alternative fuel corridors, state facilities like parks, rest areas and park and rides administrative and central offices. Parking usage and revenue data also determine where charging infrastructure will be most wanted.

You will need to consider which types of charging to provide – Level 2 or DC Fast Chargers. Power source availability also is a factor.

Columbus organized an EV Expo, inviting dozens of charging vendors and current providers to exhibit. This was an efficient way to increase the planning team’s knowledge of options and identify potential partners.

### Prioritizing locations

Deciding where to place initial stations depends on your community’s priorities. Data is important to this analysis, and so are your own community’s values and circumstances.

- How do you define critical need?
- Who are your potential business and civic partners?

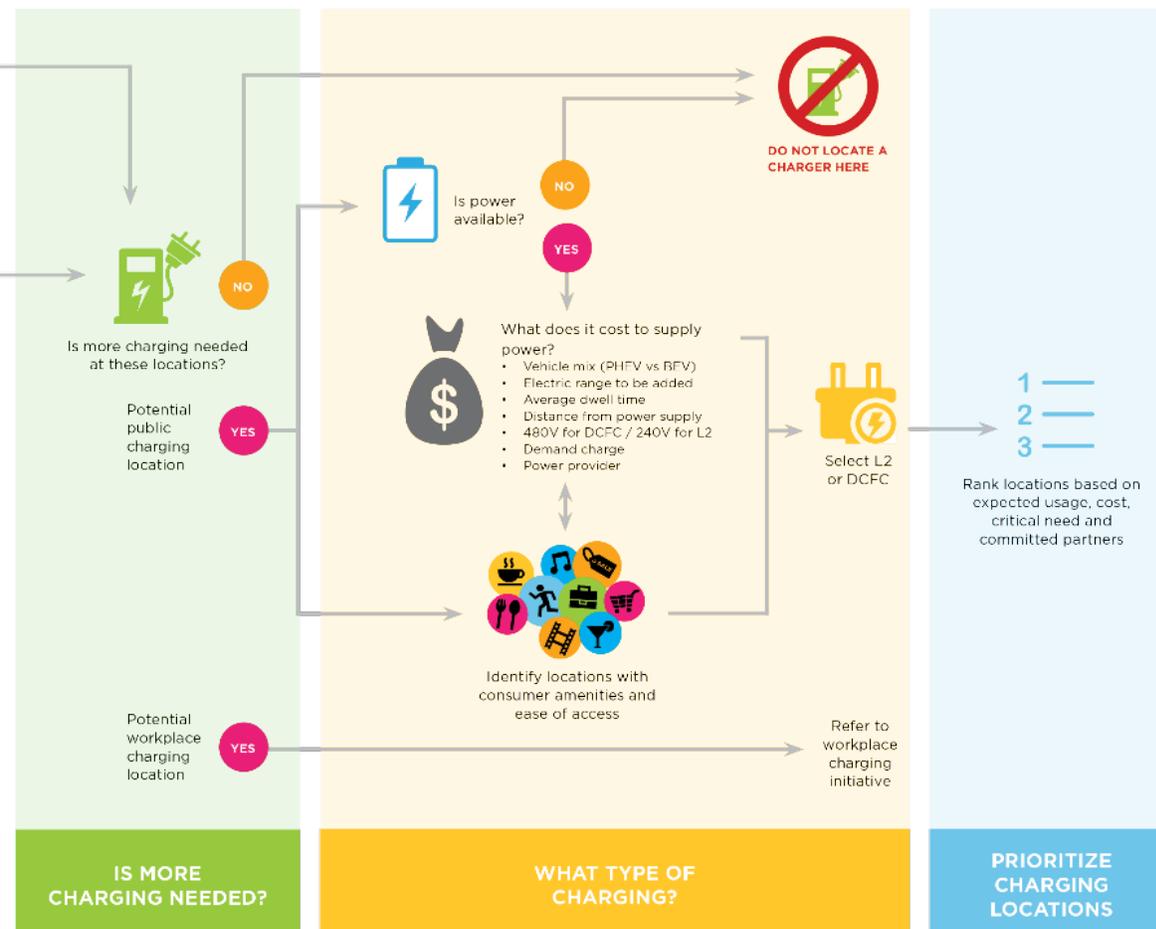
- How do you include lower-income communities?
- Do you want to try to drive demand by locating stations in low-EV use areas?

Once the data is collected and evaluated, assembling a diverse team of experts allows the team to leverage local knowledge and identify data anomalies when finalizing a plan for charging locations. In the case of Columbus:

- The team dug a little deeper into high concentrations of ownership and found that one of the ZIP codes included a company that purchased a considerable number EVs for a local vehicle leasing office, but most of the vehicles were destined for other regions. They removed that volume from their calculations.
- Rather than looking solely at traffic patterns, the team pinpointed locations of high public access potential – such as arenas and health care complexes.
- They also took a common-sense approach to identify where consumers were likely to need charges to extend trips beyond their at-home-charging capacity –

namely near highway access points.

## IDENTIFYING PUBLIC CHARGING LOCATIONS



### Master planning resources

Planning, design and engineering know-how are necessary elements of this type of complex planning. HNTB has the deep expertise and technology available to assist state and local communities in developing a strategic approach that meets immediate needs and sets the foundation for the inevitable and ongoing expansion and adaptation of charging infrastructure. ■

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