

CHARGING

GREENFIELD



CITY OF GREENFIELD

Electric Vehicle Charging Plan

January 2024



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ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

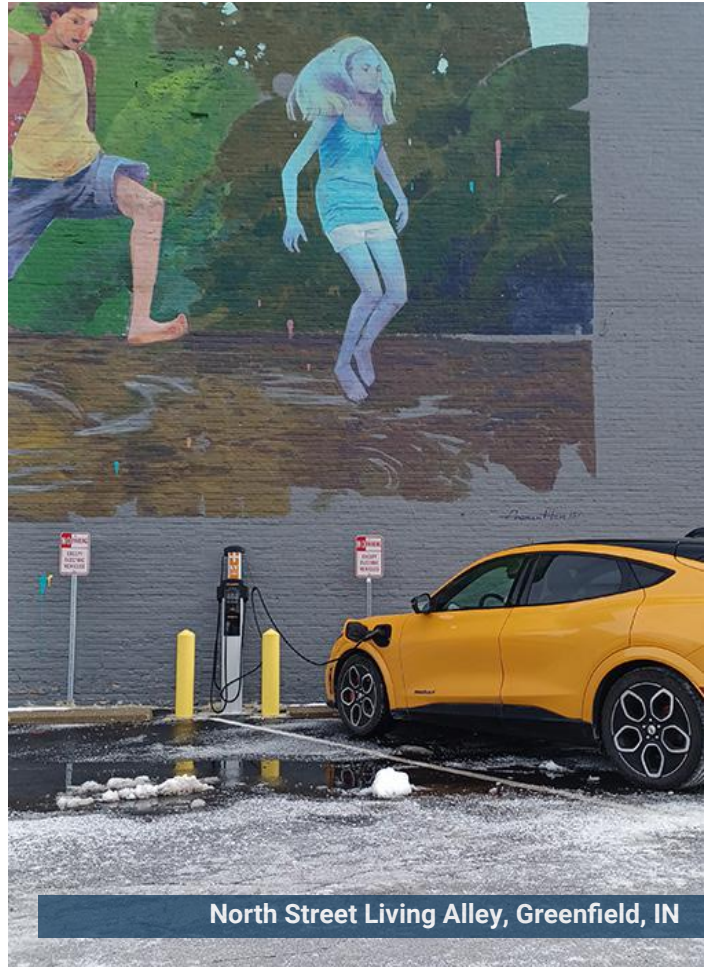


WHAT IS CHARGING GREENFIELD?

The Charging Greenfield Plan, that began as an initiative from Mayor Fewell's office, is a proactive step taken by the City of Greenfield to deploy Electric Vehicle Charging Stations (EVCS) in the Greenfield community in support of its green initiatives, alternative transportation policies, and the city and county's economic development activities.

This plan explains why it is important to plan for electric vehicles (EVs), what role the government can play in the safe and equitable EVCS development, and how the city can prepare itself for ways the EV market can behave in the future. The intention is to provide the city with a guidebook to help their decision making regarding the EVCS.

Planning for EV charging is a component of a wider Comprehensive Plan policy because it relates to land uses, public utilities, transportation, and the use of publically owned property and thoroughfares.





KEY TERMS AND PHRASES

The EV market is emerging and has developed its own set of terms. As a rapidly evolving field, a few of these terms may change in the future. To keep this plan clear to the reader today and in the future, this section establishes the key terms, abbreviations, and phrases used throughout this plan. Also, EV Factsheets in **Appendix D** provide additional explanation and illustrations that help demystify electric vehicles and charging.

Vehicles

EV - Electric Vehicle

A vehicle that uses battery to power its movement either all the time or sometimes and can be charged. It includes all-battery and plug-in hybrid electric vehicles.

BEV - Battery Electric Vehicle

An all-battery electric vehicle that can be charged and does not use any gasoline. Sometimes, this type of vehicle is referred to as PEV (plug-in electric vehicle), but in this plan, the term BEV is used.

PHEV - Plug-in Hybrid Electric Vehicle

A vehicle that can run using both battery and gasoline and can be charged. The battery capacity is lower than that of a BEV.

Hybrid Vehicle

A vehicle that can run using both battery and gasoline, but cannot be charged. The battery size and capacity is lower than that of a PHEV.

ICE - Internal Combustion Engine

A vehicle that runs only on gasoline or another fossil fuel that powers an internal combustion engine.

Charging

Level 1 Charging

Charging an EV by plugging it into a standard 120 volt AC electric circuit. Every EV comes with a cord that can be plugged into a wall, like any other electric appliance. The charging speed is slow.

Level 2 Charging

Charging an EV using a 208/240 volt AC electric circuit. This charging involves adding an EV charging device that plugs into an outlet at home or in a parking area and then the EV is plugged into this charger. The charging speed is medium.

DCFC - Direct Current Fast Charging

This is fast charging, sometimes referred to as a Level 3 DC charging, that uses a 3-phase 480 volt AC electric circuit but delivers direct current (DC) to the vehicle. The charging speed is fast.

EVCS - Electric Vehicle Charging Station

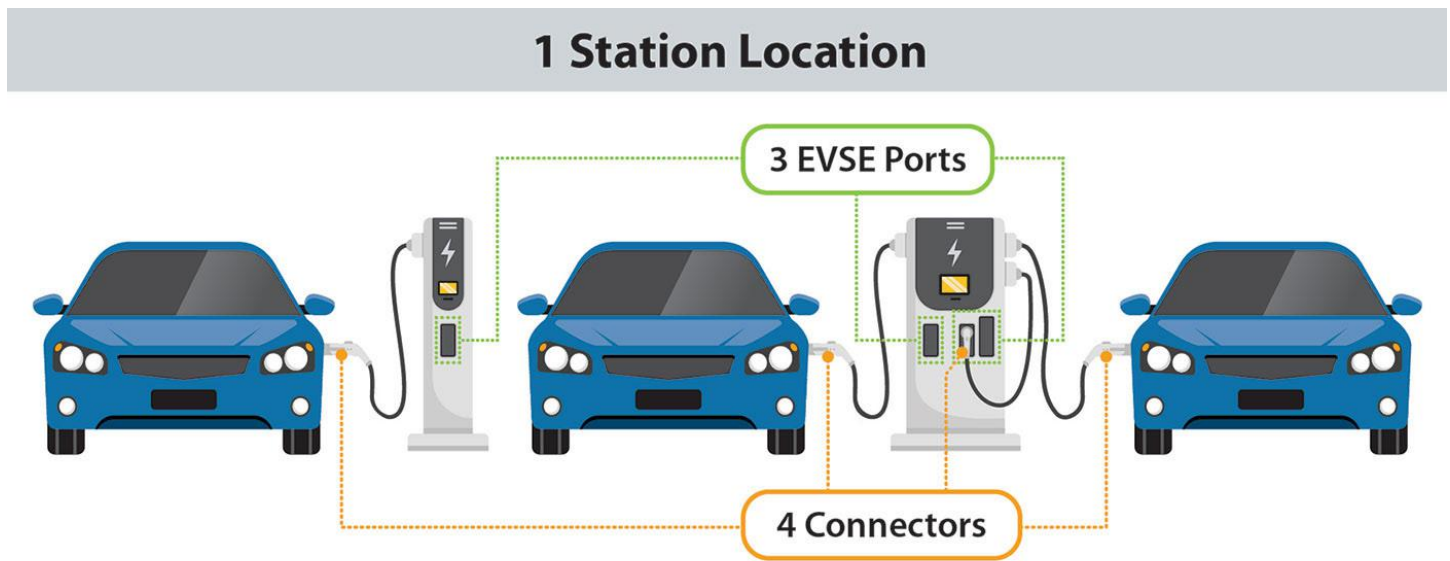
A place that has one or more electric vehicle chargers or other charging equipment. This term encompasses not just the physical hardware to charge EVs, but also the location, services, and infrastructure where EVs can be charged.

Figure 0.1 An EV charging station



Photo credit: ms consultants, inc.

Figure 0.2 Typical elements of an EV charging station. Source (1)



EVSE - Electric Vehicle Service Equipment

Hardware equipment that safely supplies and manages the flow of electricity from a host facility into an EV. EVSE may also include communication, metering, GPS, and other features that assist EV drivers and facility owners.

EVSE Port

An EVSE port provides power to charge only one vehicle at a time even though it may have multiple connectors.

Connector

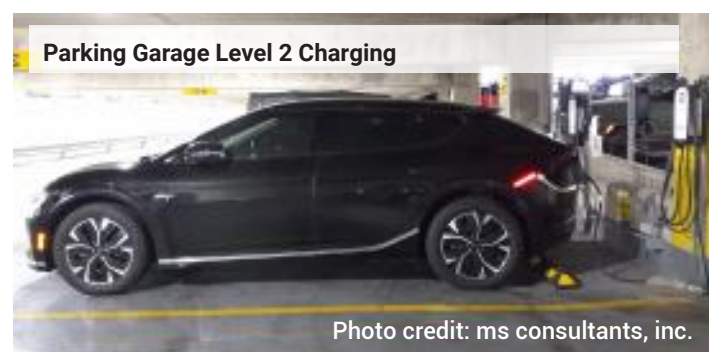
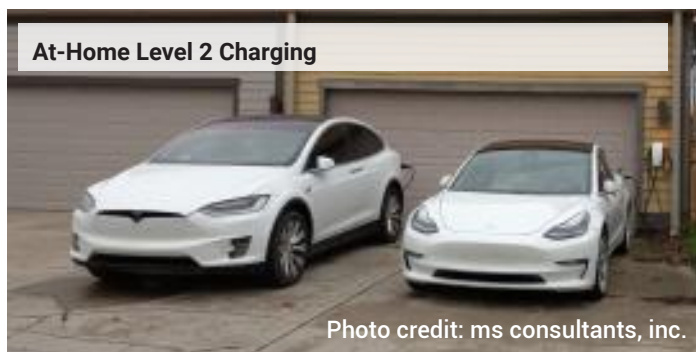
A connector is what is plugged into a vehicle to charge it. Multiple connectors and connector types (such as J1772 and CCS) can be available on one EVSE port, but only one vehicle will charge at a time. Connectors are sometimes called plugs.

Why does the number of charging ports and connectors differ?

Imagine charging your phone. A USB charger with two ports is plugged into an outlet, but you need to charge 3 phones with different plug requirements: a micro-USB, a USB-A, and a USB-C. You plug 2 charging cables to charge two phones and then charge another phone later using a third cable.

A single EV charger is like a USB charger, an EVSE port is like a USB port, and an EVSE connector is like a USB cable that has only one type of a plug (USB-A, USB-C, etc.). Instead of you carrying around "USB" cables, or connectors, to plug into the charger, the EV charging station installs several cables with several kinds of plugs. Sometime two EV connectors are internally connected into one port. So, while an EV charger may look like it has 3 cables and able to charge three cars at a time, it actually is able to charge only two if it has only two ports.

Figure 0.3 Charging at home and elsewhere





PLANNING CONTEXT

Planning for EV charging infrastructure is a new specialization in planning. It is helpful to understand the types of planning because each one has a different set of considerations of who needs EV charging, what kinds, and where.

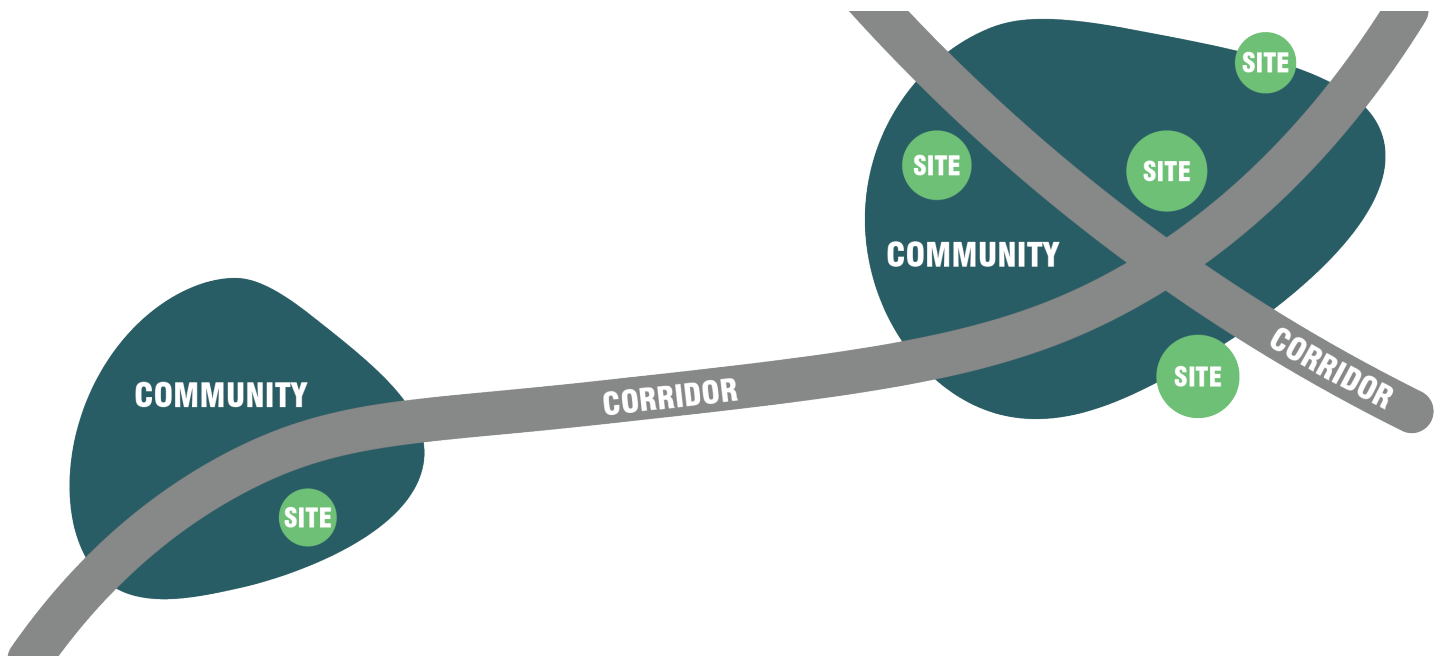
There are three main geographic levels of electric vehicle charging infrastructure planning (see figure below for illustration).

- **Corridor.** Corridor-level planning supports infrastructure along the roads that facilitate interregional travel. It focuses on the needs of travelers and fleet operators that mostly need fast charging.
- **Community.** Community-level planning focuses on the various needs for EV charging within a small region, city, or a town.
- **Site.** Site-level planning focuses on developing a specific predetermined site by installing EV charging infrastructure.

Charging Greenfield Plan serves as a *community-level* planning guide with some recommendations for sites best suited for EV charging development. Also discussed is how Greenfield fits into the current corridor-level state plan for EV charging.

EV drivers use all levels of charging starting with at-home charging and finishing with fast 20-30-minute charging sessions at a variety of locations. Some residents may not be able to have at-home charging, so there is a need to think about the areas and type of charging that could fit the needs of all residents.

Keeping in mind the community-level planning context, the main focus of this plan is to understand the current and future needs for EV charging in Greenfield and to determine which areas within Greenfield may need additional EV charging infrastructure support.





VISION AND GOALS OF THIS PLAN

VISION

The City of Greenfield will be proactive and flexible to respond to the adoption of electric vehicles and be EV-ready.

CURRENT & FUTURE DEMAND

GOAL

Understand the current and future needs for EV charging stations in Greenfield.

Chapter 1 goes over the current EV market trends. Chapter 2 focuses on the needs in Greenfield and Hancock County. Finally, Chapter 3 presents estimated future EVCS demand scenarios.

PUBLIC SUPPORT

GOAL

Develop educational materials to inform Greenfield residents about EVs and constructing charging stations to meet market demand.

The plan contains factsheets that explain what EVs and EV charging stations are, list their benefits and answer other frequently asked questions.

POSSIBLE HOST SITES

GOAL

Determine locations throughout Greenfield which could potentially host EV charging stations.

Chapter 3 combines analysis of the possible EV charging market needs in Greenfield, travel patterns, and consumer preferences to propose a list of potential EV charging locations.

GRANTS & FUNDING

GOAL

Identify funding sources for EV charging station installation and compile data for grant application readiness.

Chapter 4 lists funding sources that Greenfield could tap into for EV charging infrastructure projects. While the intent of most grants is for a private entity to eventually operate EVCS, the eligible applicants for grants are government entities.

GOVERNMENT POLICIES

GOAL

The City of Greenfield will be mindful about policies that could encourage EV market growth while also providing for safe EV charging integration.

Chapters 1 and 2 explain why government's role in the EV market is important. Chapter 4 compiles examples of policies that can help Greenfield reach the stated goal.



PLAN HIGHLIGHTS

To serve as a good guide to the city leadership and community about EVs and EVCS, the Charging Greenfield Plan provides information, analysis, and recommendations that help answer the following questions:

- What is the current and future market demand for EVs in Greenfield?
- What are consumers interested in?
- Who will need access to publicly accessible EVCS in Greenfield?
- What EV charging infrastructure may be needed in Greenfield in the next 5-10 years?
- What are the most suitable EVCS locations in Greenfield?
- What role can the local government play in the EV market?
- How can the government make the best decisions regarding EVs and EVCS policies and projects?

Charging Greenfield Plan is structured in the following way.

CHAPTER 1. WHY PLAN FOR EVs?

This chapter goes over the state of EVs today and the need for EV planning in general. It explains what EVs and EV charging stations are, goes over EV market trends. It shows the kinds of actions other cities have taken to help with EV integration into the community. It explains what barriers to EV charging currently exist and explains the need for a more proactive approach to providing EV charging infrastructure.

CHAPTER 2. EVs IN GREENFIELD TODAY

This chapter describes the current state of the EV market in Greenfield and Hancock County. It shows how planning for EVCS is connected to other planning policies in Greenfield. It records the existing EVCS and provides housing and vehicle analysis to explain where the need for EV charging may occur in the future. It also records the results of the public engagement activities to show what Greenfield residents think of EVs today and what future EVCS needs they may have.

CHAPTER 3. EVs IN GREENFIELD TOMORROW

This chapter provides the answers to the most important questions listed above. It records the possible scenarios of how the EV market could play out in Greenfield in the next 5-10 years, what EVCS would be needed and where. It also establishes priority areas for EVCS projects in Greenfield.

CHAPTER 4. MAKING GREENFIELD EV-READY

This chapter provides more detailed information about the sites that are most suitable for EVCS development based on the market analysis, travel pattern analysis, and public engagement results. The roles of participants in designing, installing, and operating EVCS are explained. The chapter also covers grants and funding recommendations that could be suitable for Greenfield projects, should the city choose to apply for them. Finally it provides recommendations for policy updates regarding land use regulations, utility and public safety policies.

APPENDICES

Information that is highly technical is recorded in the Appendices, like additional data, methodologies, and ordinance language examples as well as educational EV factsheets.



KEY FINDINGS

CURRENT & FUTURE DEMAND

Understand the current and future needs for EV charging stations in Greenfield.

- **EV market growth.** The EV market has been rapidly growing in the US and Indiana and is not stopping. While EV adoption in Greenfield currently is at its infancy, it will be growing. Market trends are discussed in more detail in Chapters 1 and 2.
- **Priority Locations in Greenfield.** Greenfield residents living close to US 40 and SR 9 are likely to need access to publicly accessible EV charging in the future because of the highest shares of multi-family housing, rental housing, and older homes that may not be able to provide for at-home charging. The discussion of the priority areas is in Chapter 2 and the priority areas are shown in Chapter 3.
- **Future demand for publicly accessible EV charging.** Scenarios of future EV charging needs in Greenfield show that anywhere between 106-278 charging ports (or about 10-30 station locations) could be needed in 10 years. The Table below summarizes the number and kind of charging ports per scenario.

Total Number of Publicly Accessible Charging Ports Needed

SCENARIOS OF FUTURE CHARGING PORT NEEDS		LOW 2028-2030 5YR 700 BEV		MEDIUM 2031-2033 10 YR AVG 2000 BEV		HIGH 2033 10 YR OPT 4000 BEV	
		61 %	75 %	61 %	75 %	61 %	75 %
Public	Level 2	46	33	120	94	247	194
	DCFC	6	6	15	12	31	25
	Total public	52	39	135	106	278	219

POSSIBLE HOST SITES

Determine locations throughout Greenfield which could potentially host EV charging stations.

- **Possible EV charging locations.** A detailed analysis of land uses and trips in Greenfield, coupled with input from the public and stakeholders, resulted in recommending **41 publicly- and privately-owned sites** across the city that can successfully deploy EVCS.
- **Publicly-owned sites suitable for EV charging.** Six sites, owned by the city or non-for-profits from the list of 41 recommended sites may be suitable for addition of EV charging: Downtown area, Brandywine Park, Riley Park, Beckenholdt Park, Hancock Public Library, and Greenfield-Central High School. Preliminary site analysis with infrastructure recommendations are presented in Chapter 4.



GOVERNMENT POLICIES

The City of Greenfield will be mindful about policies that could encourage EV market growth while also provide for safe EV charging integration.

- **Becoming EV-Ready.** Certain policies will need to be put in place to prepare the community for EV adoption including updating ordinances & permitting, public safety training, and utility policies. Chapter 4 goes over all of these areas and lists recommendations.
- **Land Use and Building Standards.** Examples of land use and building standards are provided in Chapter 4 that could prepare the city for the review of EV projects.
- **Public Safety.** Chapter 4 has resources and guidelines on how the public safety personnel could prepare itself for EV-related situations.
- **Electric Utility.** Charging suitability based on grid capabilities and some strategies to control electricity use are discussed in Chapter 4.
- **EVCS Partnerships.** Chapter 4 describes what roles various actors can play in building and operating an EV charging station. The city and electric utility already play a permitting role, but could also take on other roles.

GRANTS & FUNDING

Identify funding sources for EV charging station installation and compile data for grant application readiness.

- **Grant Choice.** While there are several grants out there that Greenfield could be eligible for, the most feasible would be a federal Community CFI grant and some TIP grants from Indianapolis MPO. More details can be found in Chapter 4.
- **Grant Readiness.** Scenario planning, public engagement, priority areas based on equity analysis, and city-wide site recommendations in this plan can be used to justify the need for the grants. Also, no matter what grant path is chosen, federal minimum EVCS standards will likely be applicable to all of them.

PUBLIC SUPPORT

Develop educational materials to inform Greenfield residents about EVs and constructing charging stations to meet market demand.

- **EV FAQs.** At the end of this plan, there is a great resource called EV Factsheets to share with the public to teach them about the electric vehicles, charging, associated costs and maintenance and many other topics.
- **Website.** Devoting a page on the city's website to share EV Factsheets and this plan and sharing updates on city-led EV policies, projects and initiatives would be a good way to connect to Greenfield community on the EV-readiness topic.



REFERENCES

1. U.S. Department of Energy. Office of Energy Efficiency & Renewable Energy. Alternative Fuels Data Center. *Developing Infrastructure to Charge Electric Vehicles*. Link: https://afdc.energy.gov/fuels/electricity_infrastructure.html.