Workplace Charging Toolkit

Developed for the City of Indianapolis, IN with Bloomberg American Cities Climate Challenge

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Introduction

Purpose of this Toolkit

This toolkit was developed through the Bloomberg American Cities Climate Challenge for the City of Indianapolis. It is intended to demonstrate the benefits of workplace charging and help employers develop and implement a workplace charging program. A successful workplace charging program can be straightforward, with dedicated time and resources to secure leadership support and develop a plan. While not a revenue-building venture, implementing workplace charging is a strategy to provide an amenity for employees that also benefits the employer and the environment.

Audience for this Toolkit

Workplaces interested in or ready to implement a workplace charging program but want some additional guidance and resources throughout the process.

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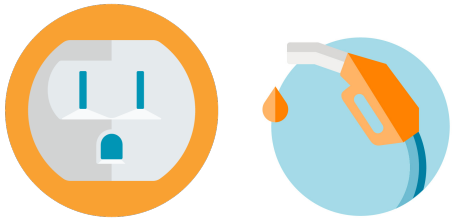
Hyperlinks To Sections

Types of Electric Vehicles

	Hybrid Electric Vehicle (HEV)	*Plug-In Electric Vehicle (EV)*	
		Plug-In Hybrid Electric Vehicle (PHEV)	Battery Electric Vehicle (BEV)
Source of Energy			
Examples	Toyota Prius	Chevy Volt, Honda Clarity Plug-In Hybrid, Chrysler Pacifica PHEV	Nissan Leaf, Chevy Bolt, Tesla Model S

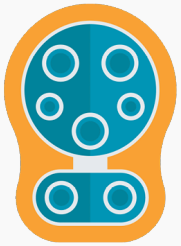
Types of Electric Vehicle Charging

***Level 1* (120V AC):**

3-5 miles of charge added per hour; great for Plug-in Hybrids and short commutes

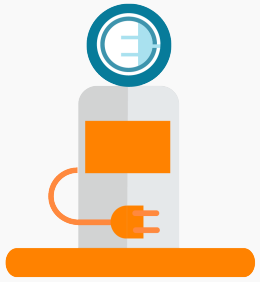
***Level 2* (240V AC):**

20-40 miles of charge added per hour; better suited for BEVs with longer commutes



***DC Fast* (480V AC):**

80% charge in 20-40 minutes; perfect for road trips and high-mileage drivers



Electric Vehicle Supply Equipment (EVSE)

Or EV charging stations

Why Install Workplace Charging?

Employees Want To Charge At Work

Workplaces are the second most likely location for EV owners to charge. Offering workplace charging demonstrates a commitment to sustainability and the environment, as well as attracts and retains sustainability-minded employees and customers.

Benefits To Workplace Charging

- ***Motivates*** employees to purchase or lease EVs themselves through greater awareness and access to charging infrastructure
- ***Supports*** fleet transitions by providing access to charging for fleet vehicles
- ***Shortens commutes*** for EV drivers, granted access to HOV lanes
- ***Saves money*** for employees by offering a low-cost source of fuel
- ***Earns*** LEED points

Hewlett Packard on Workplace Charging: Why Employers Plug In
Watch video here
Read more here

Why Promote Workplace Charging In My City?

- It is a critical component of a strategy to lower your region's greenhouse gas emissions through EV adoption
- Many city dwellers do not have access to charging at home and need workplace or public charging to make the switch to EVs feasible
- EV adoption and workplace charging align well with city-employer relations regarding other sustainability and 'green business' measures
- City supported programs and messaging around workplace charging can have a huge impact on employers' choice to move forward with an installation
- It is a cost-effective way for a city to enable increased access to charging for its residents as opposed to installing infrastructure itself

View: **Forth's Why Workplace Charging Collateral**

Case Study: Workplace Charging

Burns & McDonnell (Kansas City, MO)

Burns & McDonnell is a construction engineering company. It hosts access restricted workplace chargers in addition to four public chargers sponsored by the local utility.

- ***Company Size*:** 3,500 in Kansas City
- ***Number of EV drivers:*** ~50 and rising
- Installed 5 non-networked chargers In 2015. In 2018, upgraded to 10 networked chargers due to demand
- Free to use, with a 4-hour limit due to demand

Today Burns & McDonnell has 16 networked charging stations with roughly 30 regular EV drivers. Click here for more information on this case study and other workplace charging stories.

Program Roadmap

Stakeholder Outreach

- Demonstrate the benefits of workplace charging
- Secure leadership buy-in
- Create team of key stakeholders to support process

Site Assessment

- Request assessment of electrical and construction upgrade costs
- Evaluate parking facility impacts

Planning

- Estimate demand
- Identify quantity and vendor of EVSE
- Craft Long-Term Management Plan

Installation

- Secure necessary equipment and installer
- Obtain permits
- Complete installation

Program Implementation

- Communicate with employees, encourage use and EV adoption through outreach efforts
- Evaluate to improve program regularly

Stakeholder Outreach

Forming A Team

Create a team to implement the program, sign off on key decisions and work with external partners and vendors.

Current EV owners, or EV Champions, are often the most energetic about moving a workplace charging program forward.

Potential Stakeholders To Secure *Buy-in* For Moving Forward With Program Development:

- Leadership Team
- Parking and Facilities Managers
- Fleet Managers
- Parking Enforcement
- All Employees
- Board of Directors, if applicable

Appendix E provides tools for these champions to help make the case to stakeholders.

Site Assessment

A site assessment is an important step to complete early on in the process to get a full picture of what's possible for an installation. This informs the team of any major barriers, such as limited electrical capacity, that could inform the planning process.

Key Considerations When Siting Charging Stations:

- Minimize the distance between the chargers and the utility panel: trenching and excavation between the service panel and chargers is often the greatest cost of installation.
- Look for opportunities in advance of any charging projects where parking may be developed or asphalt is being removed. It can be much less expensive per unit to lay conduit for future EV chargers during a large renovation project than to install conduit for new chargers one at a time.
- Future-proof your renovation or parking structure by installing a service panel with additional capacity and installing enough conduit for several future EV chargers.

Site Assessment

Individuals To Engage When Siting Charging Stations:

- An **electrician** can estimate the total costs of installing EV chargers. Your utility may be able to suggest an electrician with experience installing charging stations. Tesla's website can help identify qualified electricians in your area.
- Engage your **parking or facilities manager** who is most familiar with existing electrical service and facility usage. *Appendix C provides information on ADA Compliance.*
- Contact your **utility** to:
  - Determine existing excess power capacity.
  - Determine whether chargers can be installed without requiring costly service upgrades.
  - Inquire about special EV charging rates, which could offer savings.
  - Inquire about rebates or free chargers relating to their transportation electrification programming. Some cities and states also offer rebates, incentives or tax exemptions from hardware and/or installation costs.

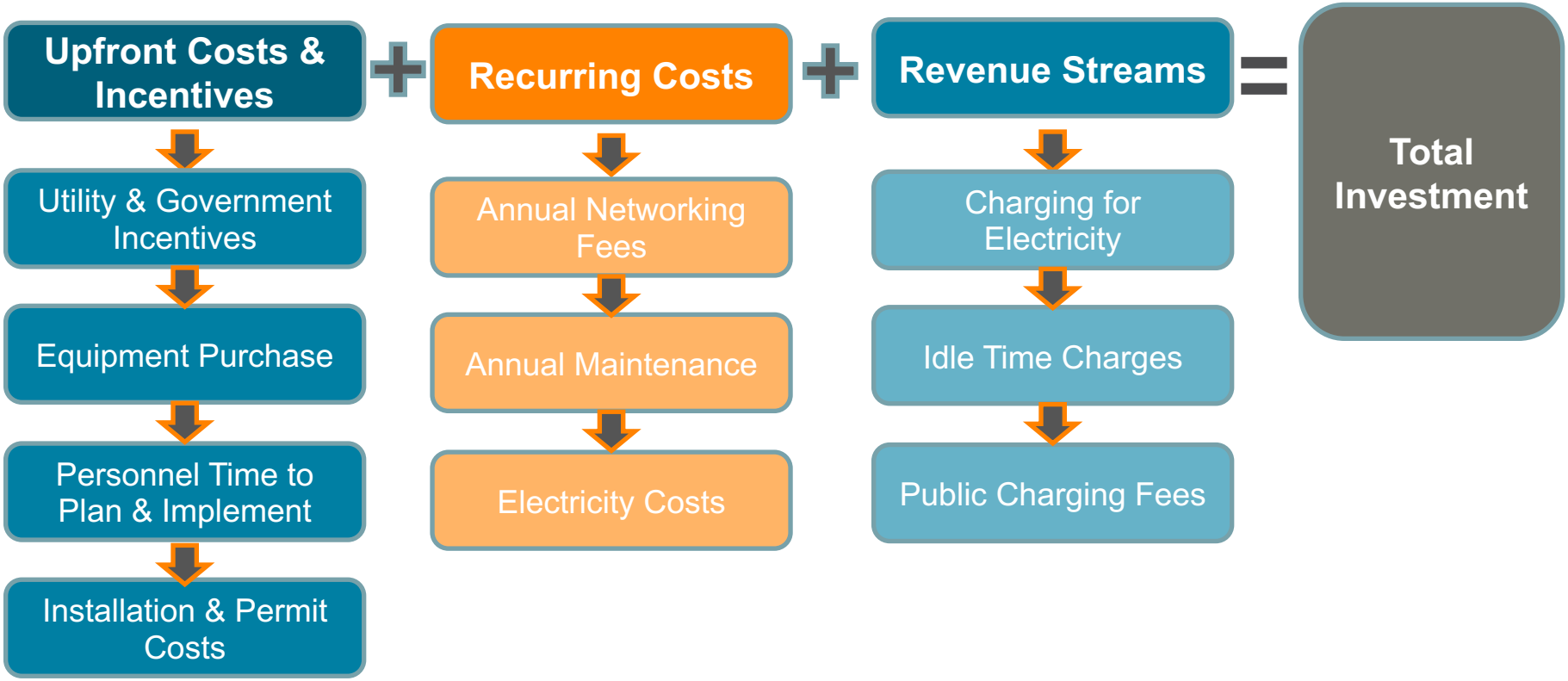
Questions To Guide Planning Stage

Determine which stakeholders you will need to engage to fully address the following questions:

- Do you plan to offer workplace charging for free to your employees or require payment?
- Does your company have, or plan to have, a fleet of vehicles that might also need to utilize the chargers?
- Will your charging stations be restricted to employee use only or will customers and the general public have access?
- How will you ensure access by all employees who wish to use the chargers?
- How many charging stations will you install?
- What is the plan for increased demand for charging stations in the future?
- What is the budget? Is this budget aligned with expected outcomes?

Estimating **Total Investment** In Implementing Workplace Charging

Actual figures can be provided by EVSE vendors and other potential contractors. Check with your local utility or municipality for potential incentives.



View: Alternative Fuel Infrastructure Tax Credit

Planning: Data Collection & Estimating Demand

Surveys

Employee surveys can reveal how many employees already have or plan to buy an EV (Sample Survey)

- The survey should inform how many employees would utilize a workplace EV charger now and in the near future; this should help decide the **number of chargers**.
- Plan ahead for future growth: EV adoption is increasing and demand for chargers will follow.

Utilizing Survey Result For Installation Decisions

Depending on your parking facility, adding 120-volt outlets along with Level 2 charging stations can be a low-cost improvement to increase charging capacity.

- Planning to provide free charging? You can expect higher utilization and thus higher demand for chargers
- We recommend **1 charger for every 2 EV drivers**

Planning: Charger Manufacturer Selection

Many employers choose to install a combination of Level 1 and Level 2 charging. Level 2 charging station options are vast, with the largest difference being whether they are networked or non-networked. Networked chargers are connected to the internet through wi-fi or cellular connection and can be managed by local facilities or a third party entity. Non-networked chargers lack additional monitoring and management functionality. The following table compares the options and limitations of each. *Appendix B provides a list of networked and non-networked charging station vendors.*

Networked

- Higher upfront costs as well as ongoing network and financial transaction fees
- Allows employers potential to recoup costs by charging users for access
- Can feature reservation services, idle fees, and notifications for employees
- Can restrict use for certain user groups
- Can notify owner when the charger is not properly functioning
- Can internally meter and track usage for data analysis

Non-Networked

- Lower purchase price and no network fees
- Simple interface for users: just plug in to charge
- Cannot easily recoup installation or electricity costs
- Limited smart features
- Some offer access restrictions through PIN and key locks

Determining A Long-Term Management And Maintenance Plan

Management

- Your EVSE vendor should provide a customer service point-of-contact for users who require assistance or need to report an issue. This service should be offered in relevant languages for your area. Designate a point-of-contact to coordinate repairs.
- Your internal plan should include payment and parking policy guidelines regarding time limits, applicable costs to access charging, variable access restrictions, notifications and idle fee systems.
    - A single Level 2 charger should be able to serve multiple EVs each day. Create processes to remind employees to move their car once charging is complete and to notify waiting employees of an available charger. Some workplaces accomplish this through an internal calendar system while others use the functionality of the chargers themselves. *Appendix D provides an overview of management strategies.*

Maintenance

Work with the EVSE vendor to identify preventive and corrective maintenance plan. Standard plan cycles are up to 5 years. Warranties on the hardware range from 3-5 years.

View: **Example of Workplace Charging Policy and Program Guidelines**

Planning: Finalize Plan for Approval

- With a site assessment complete, demand estimated, and charging station manufacturers identified, you'll likely want to request quotes from the following:
  - Electricians and/or contractors to complete installation
  - Charging station manufacturers

- A complete financial picture and proposed long-term management plan should be presented to leadership and other decision-making stakeholders for final approval before moving forward with an installation.

Installation

Once vendors and contractors have been identified and approved:

Order and arrange for delivery of the equipment.

Schedule a pre-installation walkthrough of the site with the contractor or electrician to confirm design plans.

Apply for permits from the utility and/or the City or County. This will likely be a joint venture between you and the electrician or contractor completing the installation.

Finalize a timeline with the selected contractor or electrician and schedule the installation.

Program Implementation: Engaging Employees

Consider engaging with your employees in multiple ways and leverage the EV drivers at your organization.

- Highlight the new chargers with a ribbon-cutting or unveiling ceremony; invite company leaders or prominent local officials to attend
- Host a lunch and learn to allow employees to learn about EVs from their fellow employees (Forth can also help with this).
- Host a Ride and Drive event
  - These events can increase awareness of EVs and excitement around the charging stations. Contact Forth if you're interested in learning more about these types of events or would like assistance in planning one.
  - Local EV groups and associations often host ride and drive events around Earth Day and during National Drive Electric Week each September. Be sure to check for local events that you might direct employees to.

Program Implementation: Routine Review

Evaluate the level of success of your program and whether demand for charging infrastructure is outpacing the available supply of chargers. Survey employees periodically to answer these key questions:

- Are there enough chargers?
- If charging at work costs money, is the cost appropriate? Should the cost be increased or decreased?
- If there are time limits for charging, are they appropriate?
- If there is a notification system, is it widely used and appreciated? If there are employee complaints, should they be considered?
- Are users requesting any features or changes to the program?

Recap of Content and Toolkit Links

Additional Workplace Charging Toolkit Documents

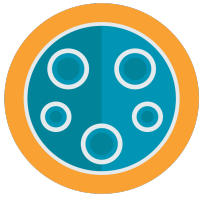
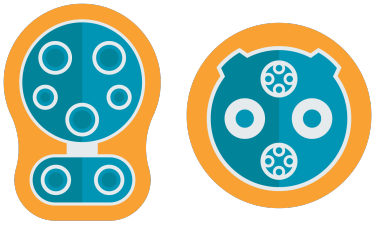
Stakeholder Outreach

- Forth's EV 101
- Forth's Charging 101
- Workplace Charging Case Studies
- EV Champions: Securing Buy-In for Workplace Charging Slide Presentation

Planning

- Sample Employee Survey
- Example of Workplace Charging Policy and Program Guidelines
- Alternative Fuel Infrastructure Tax Credit
- Infrastructure Procurement

Appendix A: Charging Technology

Level of Charging	*Level 1 Charging: Slow and Steady*	*Level 2 Charging: Standard Workplace Charging*	*Level 3: DC Fast Charging (DCFC)*
Plug Shape			
Plug Standards	J1772 standard	J1772 standard	CHAdeMO CCS Combo Tesla*
Miles of range per hour of charging	2 - 5 miles	10 - 25 miles	75++ miles

*The Tesla DCFC charging standard, not shown, can also support CHAdeMO via an adapter for the Tesla 3, S, and X.

Appendix B: Level 2 Charging Station Providers

Provider Name	*Networked / Non-networked*	*Option to restrict access for employees/public?*	*Ability to require payment?*
Greenlots	Networked	Yes	Yes
FLO	Networked	Yes	Yes
EV Connect	Networked	Yes	Yes
OpConnect	Networked	Yes	Yes
Blink	Networked	Yes	Yes
Chargepoint	Networked	Yes	Yes
SemaConnect	Networked	Yes	Yes
EVBox	Networked	Yes	Yes
Juicebox by Enel X	Networked & Non-networked	No	No
Wallbox	Non-networked	No	No
ClipperCreek	Non-networked	Yes	No

Note: This is not a comprehensive list of all providers.

Appendix C: ADA Compliance

When designing the program for EVSE charging, it is important to adhere to compliance requirements from the American Disability Act (ADA).

While the ADA does not provide design standards for charging station-equipped parking spots, there are some industry best practices:

- Consider accessibility, ease of use, and safety for disabled drives and those using wheelchairs or other assistive equipment.
- Ensure adequate space for exiting and entering the vehicle, unobstructed access to the EVSE, free movement around the EVSE and connection point to the vehicle, and clear paths and close proximity to building entrances.
- The U.S. Department of Energy provides more information on this topic.
- Check with your local and state governments for any additional protocols or standards that might be in effect in your area.

U.S. DOE provides more details here

Appendix D: Should It Cost to Charge?

- ***Free charging*** can provide a significant value to employees without being a major cost to employers. Amortizing the upfront cost of a non-networked workplace charger over ten years and adding estimated monthly electricity costs shows that that the cost of offering workplace charging is minimal (~$400/year) compared to other benefits such as health care. Offering free workplace charging makes the most sense with Level-1 charging. Free level-2 charging should be networked or configured to ensure that it is used by several employees per day. Developing a waitlist or notification system through the use of a smart charger becomes critical if free level-2 chargers are installed and there are significantly more EVs than chargers.
- ***Paid charging*** makes sense for employers that want to recoup the cost of the charger, installation, and ongoing energy costs. Employers can charge their employees either a per kWh cost or based on charging time spent. Some states only allow utilities to charge per unit of energy, so employers in certain jurisdictions may be limited to only time-based pricing. Paid charging can also be a way to manage charging demand by helping to ensure that only those that need charging, and are willing to pay for the kWh, are utilizing the EVSE.
- ***Idle fees*** encourage employees to move their vehicles after they finish charging, after a time limit, or after an energy threshold has been met. Idle fees encourage EV owners who have finished charging to disconnect from the charging station and free up the charging spot. Employers with parking enforcement or a security team can message and warn EV owners directly or via a receptionist, but networked chargers which can feature automated notification systems and integrated idle fees may work better and reduce the likelihood of employee complaint.

Appendix E: Tools for EV Champions

EV Champions are EV owners, and sometimes non EV-owners, that see the benefits of driving electric and hope to convince their employers to promote EV adoption through strategies such as implementing a workplace charging program.

The following resources, in addition to those in Appendix B, may be helpful to EV Champions attempting to make their case to leadership and other key stakeholders:

- Employee Survey
- Letter To Leadership Summarizing Employee Survey Results (Sample Here)
- Forth's EV 101
- Forth's Charging 101
- EV Champions: Securing Buy-In for Workplace Charging Slide Presentation
- Indianapolis Resources: Knozone Intiative
- Additional Workplace Charging Resource from U.S. Department of Energy

Questions?

Reach out to our Program Manager!

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