



SCEP
STATE & COMMUNITY ENERGY PROGRAMS

Fleet Electrification Framework

Cabell Hodge
National Renewable Energy Laboratory (NREL)
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Fleet Electrification Planning

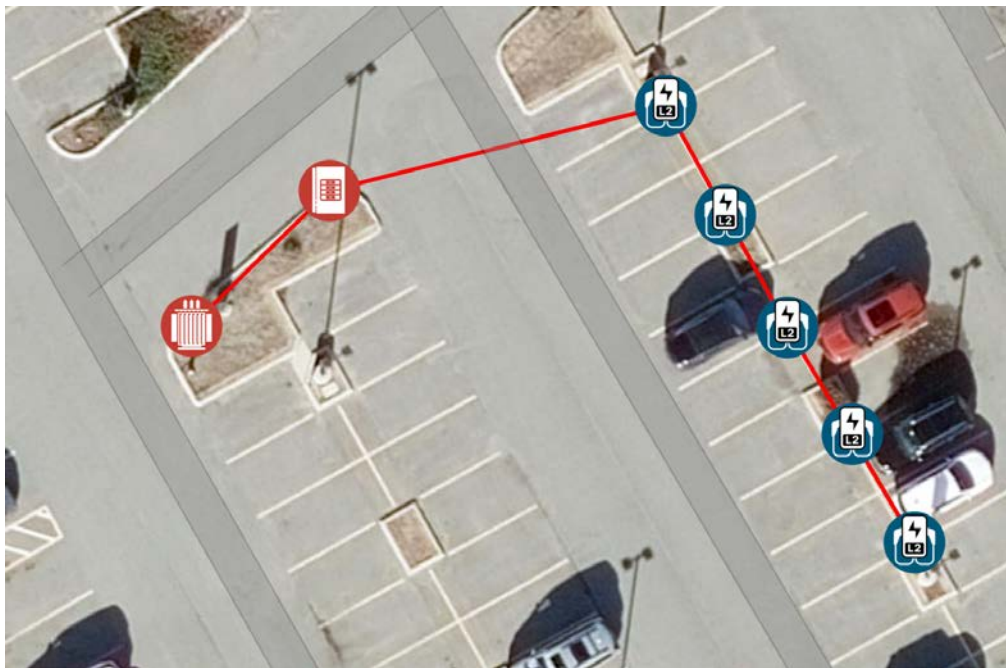
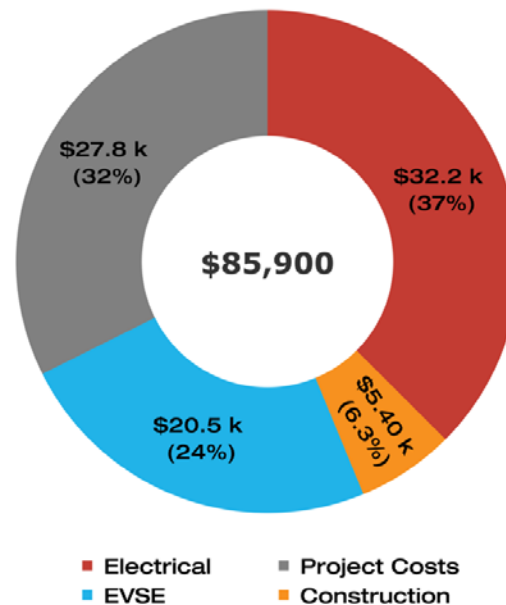


Image by NREL, <https://evi-locate.nrel.gov>

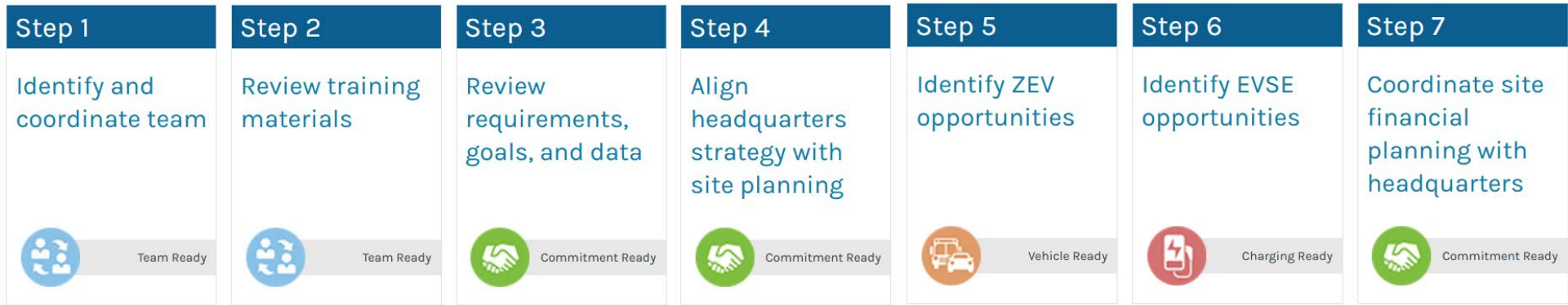
Estimated Cost of EVSE Installation



Electric vehicle supply equipment (EVSE) provides electricity to electric vehicles (EVs).

Fleet Transitions: Zero-Emission Vehicle (ZEV) Ready Framework

Step-by-step approach to fleet planning.
Every step has a corresponding webpage.

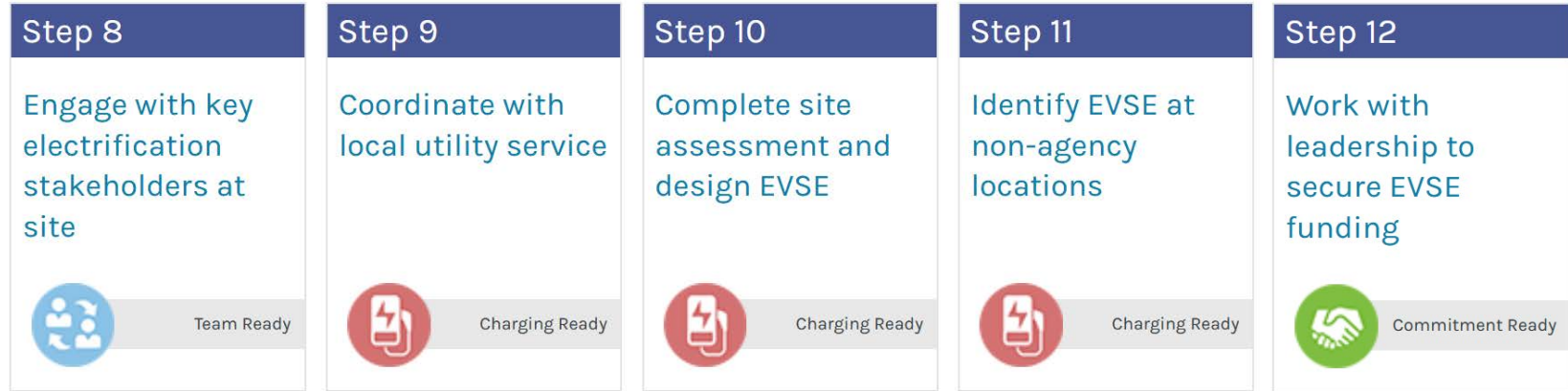


Screenshots from the Federal Energy Management Program

Many steps have accompanying tools:

<https://www.energy.gov/femp/federal-fleet-zev-ready-center>

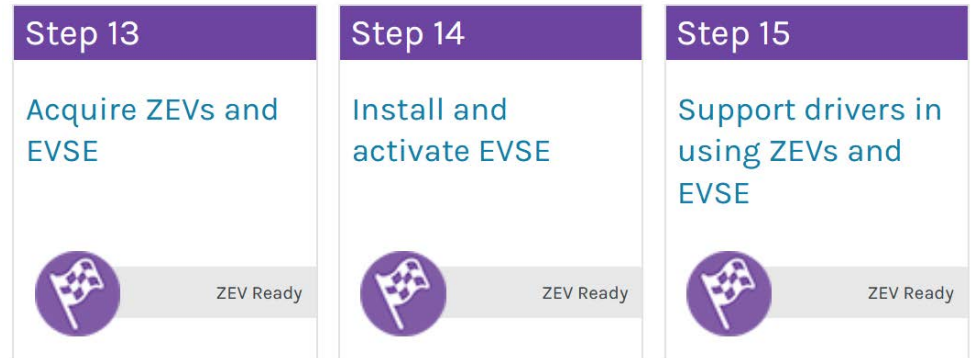
Design Phase



ZEV Active Phase






ZEV Ready Framework































<https://www.energy.gov/femp/federal-fleet-zev-ready-center>



Federal Fleet ZEV Ready Tracker

Site Champions: Track completion of ZEV Ready actions within each step and designate site as ZEV Ready
View your ZEV Ready status below (auto-populates based on completed actions)

 Team Ready	Ready	 Vehicle Ready	Not Started	 ZEV Ready
 Commitment Ready	Not Started	 Charging Ready	Not Started	In Progress

ZEV Ready Step	Action	Complete?	Stakeholders
1. Identify and coordinate team  Team Ready	Identify a site ZEV champion	Complete <input type="checkbox"/>	 
	Identify key electrification stakeholders at site	Complete <input type="checkbox"/>	   
	Identify other stakeholders to ensure a coordinated approach	Complete <input type="checkbox"/>	   
	Site ZEV champion begins engaging key stakeholders	Complete <input type="checkbox"/>	     
2. Review training materials  Team Ready	Key electrification stakeholders complete required trainings	Complete <input type="checkbox"/>	     
	Key electrification stakeholders review resources and trainings	Complete <input type="checkbox"/>	     

Poll Question

What phase are you in in the process of fleet electrification or planning for EV infrastructure?

- a. Planning
- b. Design
- c. Execution.



Building a Team and Tracking Progress

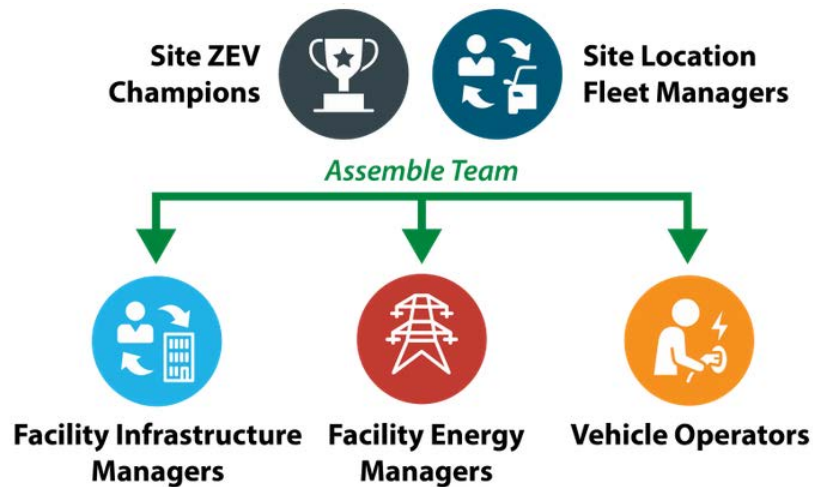







Image from ZEV Ready Center,
<https://www.energy.gov/femp/federal-fleet-zev-ready-center>

		ZEV Ready Step	Action
PLANNING	1. Identify and coordinate team  Team Ready	Identify a site ZEV champion	
		Identify key electrification stakeholders at site	
		Identify other stakeholders to ensure a coordinated approach	
	2. Review training materials  Team Ready	Site ZEV champion begins engaging key stakeholders	
		Key electrification stakeholders complete required trainings	
3. Review requirements, goals, and data  Commitment Ready	Key electrification stakeholders review recommended trainings		
	Review federal fleet requirements and how electrification helps meet those requirements		
4. Align HQ strategy with site planning  Commitment Ready	Coordinate with headquarters on annual Zero-Emission Fleet Strategic Plan		
	5. Identify ZEV opportunities  Vehicle Ready	Identify ZEV opportunities for the entire fleet at the fleet location over the next 5 years	
		Coordinate ZEV replacement opportunities with personnel responsible for placing orders	

Poll Question

What role do you play in your organization regarding fleet electrification?

- a. ZEV champion
- b. Fleet manager
- c. Facility infrastructure manager
- d. Facility energy manager
- e. Sustainability manager
- f. Other.



EV TECHNOLOGY OVERVIEW



EV FINANCIAL CONSIDERATIONS



EVSE INFRASTRUCTURE



DRIVING ELECTRIC VEHICLES



Step 2

Review training materials



Team Ready

Screenshots from the
Federal Energy
Management Program

<https://www.energy.gov/eere/femp/electric-vehicle-training>

Requirements and Policies

Step 3

Review requirements, goals, and data



Commitment Ready

Step 4

Align headquarters strategy with site planning



Commitment Ready

Executive Order 14057 (Example)

- One hundred percent ZEV light-duty acquisitions by 2027.
- One hundred percent ZEV medium- and heavy-duty acquisitions by 2035.

Agency Policies (Examples)

- Install chargers before electric vehicles arrive.
- Plan ZEV acquisitions for the next three years.
- Allow privately owned vehicles to use fleet chargers where there is no conflict with site mission.
- Install additional EVSE whenever new construction projects are undertaken.

Poll Question

Are there federal agencies located in your vicinity?

- a. Yes, but we never talk to them.
- b. Yes, and we talk to them.
- c. No, not as far as I know.
- d. We are a federal agency.



Step 5

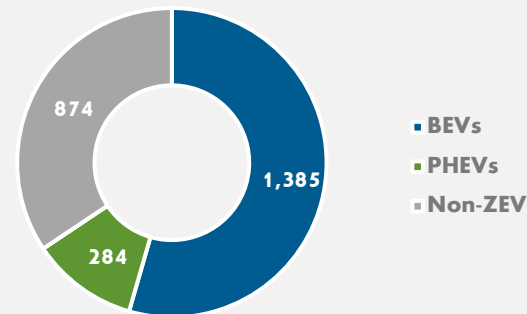
Identify ZEV opportunities



Vehicle Ready

ZEV Planning and Charging (ZPAC) Tool

Vehicle Acquisition Potential



BEV = battery electric vehicle; PHEV = plug-in hybrid electric vehicle.

- ZPAC uses gasoline fueling transactions and machine learning methodology to identify ZEV opportunities.
- Users select which vehicles they would like to replace with ZEVs.
- Groups vehicles by lot to support EVSE planning.

ZPAC: Targeting ZEV Candidates

Fleet managers review the vehicle analysis, determine which vehicles will be planned for ZEV replacement, and estimate a replacement year.

BEV Considerations				
BEV Availability	Modeled BEV Range Concerns*	Reported BEV Range Concerns (Dropdown)	BEV GHG Emission Reduction Potential	Quality of BEV Candidate
2 - Similar BEV	3 - Unknown		1 - Very High	2 - Good
2 - Similar BEV	2 - Some Public Charging Likely		1 - Very High	2 - Good
	Minimally Disruptive			2 - Good
	Minimally Disruptive			2 - Good
2 - Similar BEV	4 - Frequent Public Charging Likely		1 - Very High	3 - Mediocre
2 - Similar BEV	5 - Very Frequent Public Charging Likely		1 - Very High	4 - Challenging

ZEV replacement available?

Nightly charging sufficient?
Limit mission disruption.

Fuel, cost, and emissions benefits?

Decision Point	
ZEV Preference	Plan Year of Acquisition
BEV	2024
BEV	2025
BEV	2025
BEV	2030
Eliminate	2025

User identifies ZEV targets.

ZPAC: Identifying Charger Needs

ZEV plans are summarized by defined sites to support evaluation of charging port requirements.

Priority	Site Information			BEVs - Level 2 Charging Ports		PHEVs - Level 1 Charging Ports	
Priority EVSE Deployment	Agency	Site Name	ZIP	Existing Level 2 Ports at Site	Planned Additional Level 2 Ports at Site	Existing Level 1 Ports at Site	Planned Additional Level 1 Ports at Site
Yes	Federal Agency	Site 1	ZIP 1	2	12	1	1

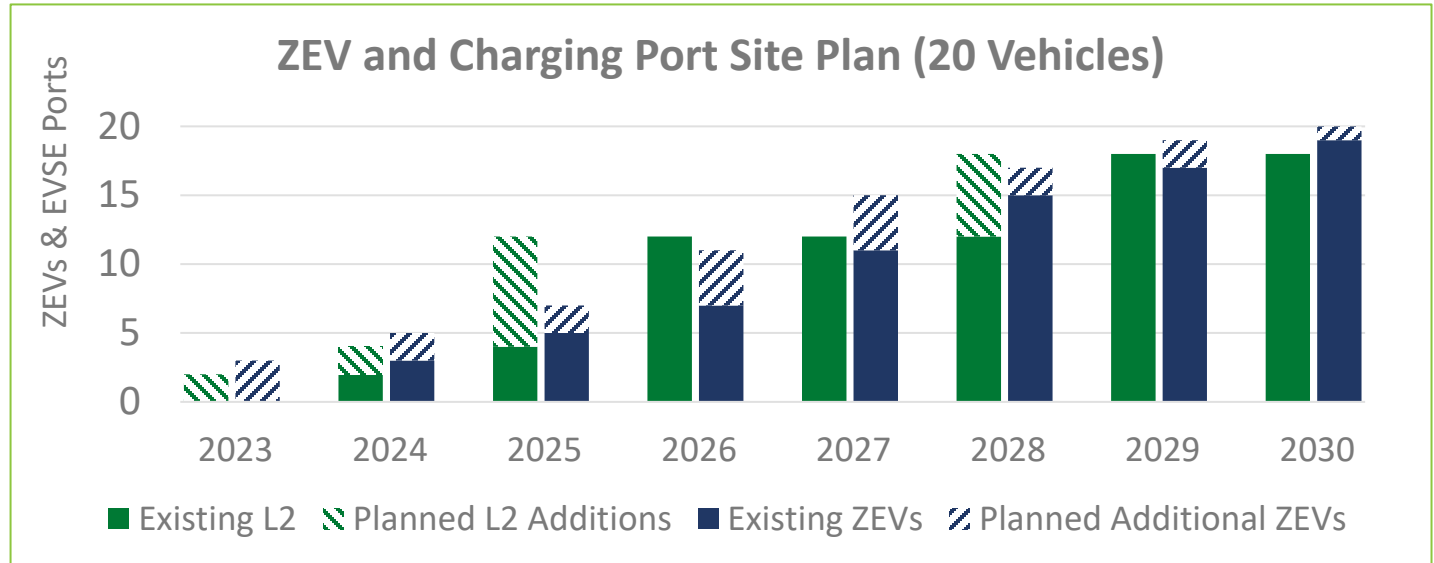
Vehicle location summary.

Size EVSE for specific locations and ZEV targets.

Evaluate Summary Plan

Track electrification plans.

Will port plans keep pace with ZEV acquisition goals?



Updates scheduled for April 2024.

Contact mark.singer@nrel.gov for your copy of the tool.

Poll Question

Do you have plans to install EV chargers?

- a. Yes, in the next six months.
- b. Yes, in the next year.
- c. Yes, someday.
- d. No.
- e. We have all the chargers we will ever need.



Step 6

Identify EVSE opportunities



Charging Ready

EVI-Fleet

Requires telematics trip data and generates more precise results than ZPAC.

1

Energy needed per charge.

2

Number of ports of what power level and where.

3

Average charging demand by charging window.

4

Peak fleet charging demand.

Image from Slide Egg.

EVI = electric vehicle infrastructure

Email cabell.hodge@nrel.gov for information about EVI-Fleet.

Design Phase

Which charger is right for you?



EV Utility Finder (EV U-Finder)

- Reach out to your utility EVSE contact using our database and Excel tool.

EV U-Finder

EV U-Finder: Electric Vehicle Utility Finder

Enter ZIP Code to identify local utilities, electric vehicle support programs, and Clean Cities Coalitions.

72863

Powered by the U.S. Utility Rate Database (<https://openei.org/apps/USURDB/>)
Utility territories last updated February 2021.

See Introduction worksheet for notes on using EV U-Finder.

***Customer Types:**

G: Government or Public; C: Commercial; R: Residential

Identified active utilities in 72863

Utility	Utility Name	Utility Ownership	Known EVSE Funding Eligibility?*	Known Advisory Services Eligibility?*	Known Federal EVSE Incentives?	GS
1	Entergy Arkansas Inc	INVESTOR	GCR		Y	
2	Arkansas Valley Elec Coop Corp	COOPERATIVE				
3	Village of Brainard, Nebraska (Utility Company)	PUBLIC				

Screenshots from the Federal Energy Management Program

<https://www.energy.gov/femp/articles/ev-utility-finder-ev-u-finder>

EV U-Finder Incentive Listing

Identified incentive details are listed below.

Edison Electric Institute Investor Owned Utility Incentives

For more details see "EEI Database" worksheet

Increase row heights to view complete details.

Incentive	EEI Electric Company	EEI Holding Company	Program Name	Description
1	Entergy Mississippi	Entergy Corporation	Utility Owned Direct Current Fast Charging DCFC Pilot and	EML filed an application in Docket No. EC-123-0082-00 for a pilot to construct, own, operate and maintain up to three (3) public direct current fast charging ("DCFC")
2	Entergy Louisiana	Entergy	eTech Program	The eTech program provides customer support by dedicated field representatives
3	Entergy Mississippi	Entergy	eTech Program	The eTech program provides customer support by dedicated field representatives

American Public Power Association Public Utility Incentives

For more details see "APPA Database" worksheet

Increase row heights to view complete details.

Incentive	Utility	EVSE Incentives	Program Website
1	City of Colton (CA)	Residential: Up to \$500 for Level 2 charger.	https://www.ci.colton.ca.us/
2	-	-	

Alternative Fuels Data Center (AFDC) Laws and Incentives

<https://afdc.energy.gov/laws/state>

Increase row heights to view complete details.

Incentive	State or Utility?	Title	Incentive Description
1	STATE	AFV Incentives - San Joaquin Valley	The San Joaquin Valley Air Pollution Control District administers the
2	STATE	Technology Advancement Funding - South Coast	The South Coast Air Quality Management District's (SCAQMD) Clean Fuels
3	STATE	Alternative Fuel and Vehicle Incentives	The California Energy Commission (CEC) administers the Clean
4	STATE	EVSE Incentive Program Support	The California Electric Vehicle Infrastructure Project (CALeVIP), funded

Poll Question

Have you engaged with your local utility on EV charging?

- a. Yes, we completed a project with them.
- b. Yes, we spoke at a high level.
- c. Yes, we are in detailed discussions.
- d. Not yet.

Please provide examples in the webinar chat.



Step 10

Complete site
assessment
and design
EVSE



Charging Ready

Electric Vehicle Infrastructure-Locally Optimized Charging Assessment Tool and Estimator (EVI-LOCATE)

- EVSE site planning and cost estimation tool.
- Tool assesses electrical upgrades required and calculates costs.
- Not available to the public until the end of 2024.

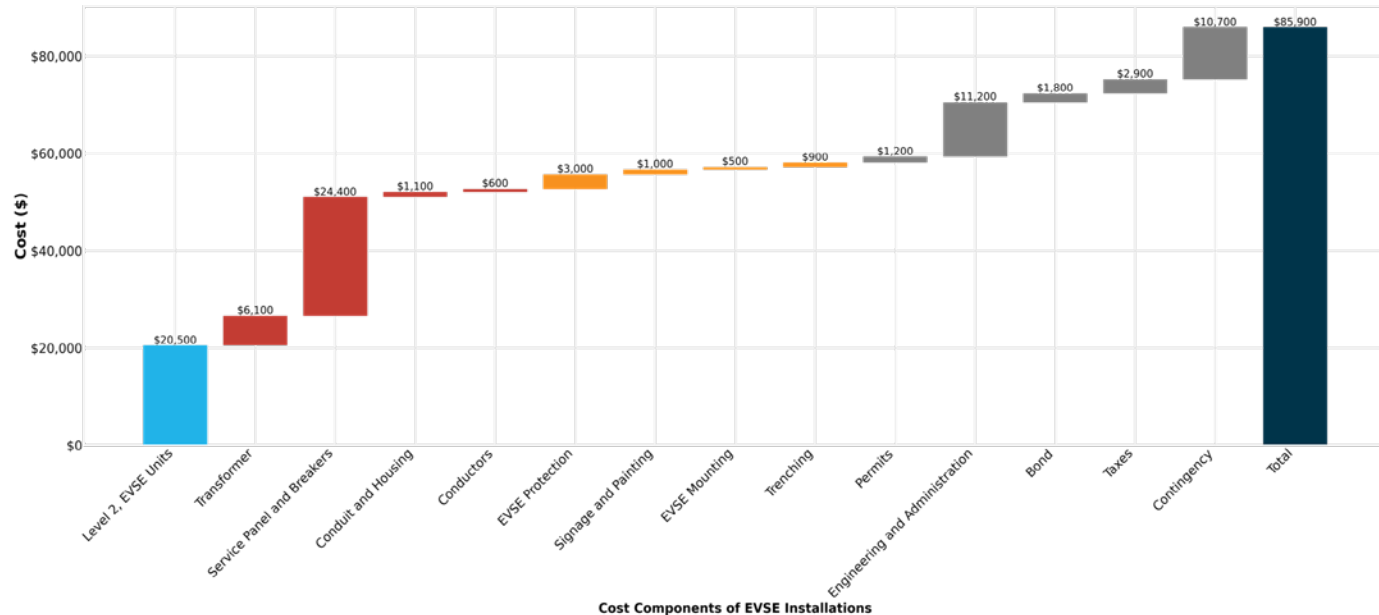


Image by NREL.

<https://evi-locate.nrel.gov>

Step 11

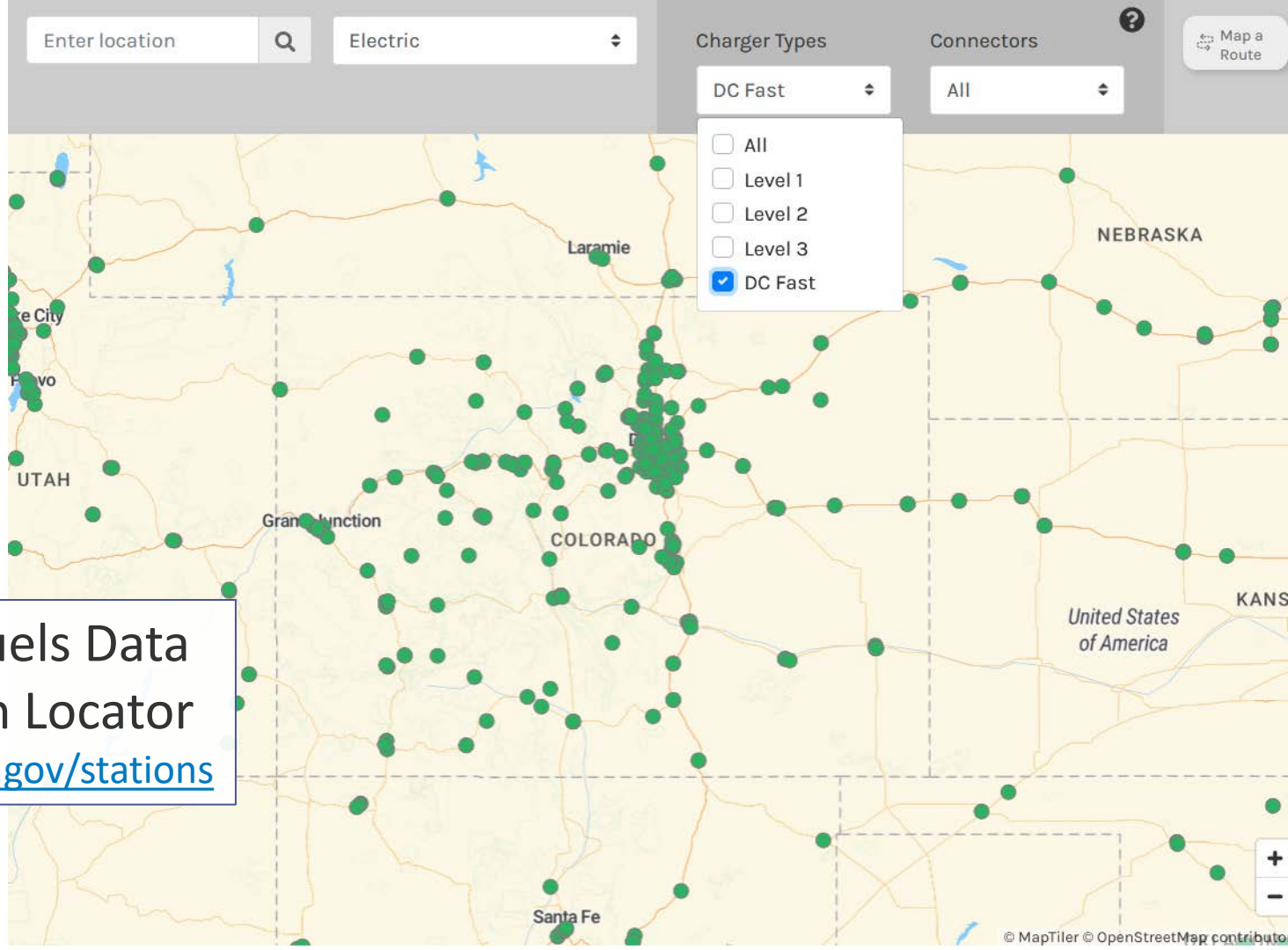
Identify EVSE at non-agency locations



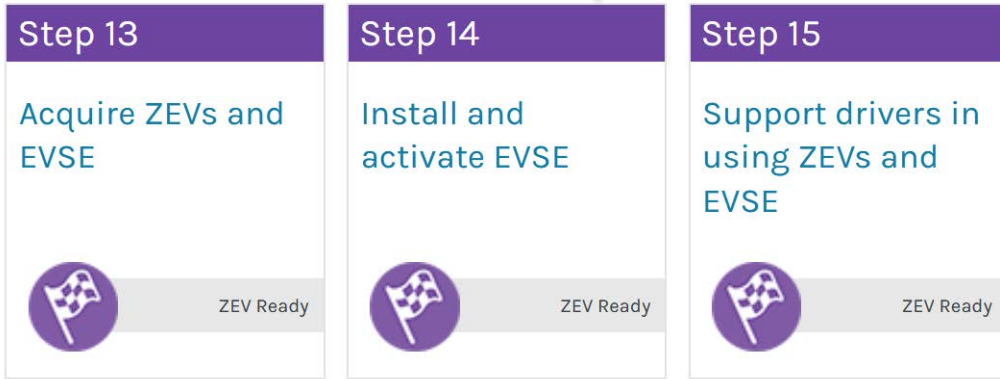
Charging Ready

Alternative Fuels Data
Center Station Locator

<https://afdc.energy.gov/stations>



ZEV Active Phase



Study	Internal Combustion Engine Vehicle	BEV		PHEV	
	Cost/Mile	Cost/Mile	Percent Savings	Cost/Mile	Percent Savings
Consumer Reports	6.1 cents	3.1 cents	49%	3 cents	51%
Argonne National Laboratory	10.1 cents	6.1 cents	40%	9 cents	11%

Image from ZEV Ready Center.

<https://www.energy.gov/femp/federal-fleet-zev-ready-center>



Case Study for Discussion

- **Fleet:**

- Twenty facility pickup trucks
- Seven shuttle buses
- Six minivans/passenger vans
- Four administrative sedans
- Three law enforcement patrol vehicles
- Five parking locations.

- **Mission:**

- University maintenance
- Student transport
- Public safety.

- **Data:**

- Thirty have telematics.
- All use fuel cards assigned to individual vehicles.

Questions for the Audience:

1. Where do you start and why?
2. How would you decide which vehicles to electrify?
3. How do you plan your charging infrastructure?
4. What issues are you going to face?

NREL Fleet Team Assistance



Photo by Dennis Schroeder, NREL 62518



Web
Resources



Direct
Assistance



Training



Data
Reporting



Guidance



Working
Groups



Fleet and
EV Support



Cybersecurity



Thank You!

Cabell Hodge, cabell.hodge@nrel.gov

www.nrel.gov

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