



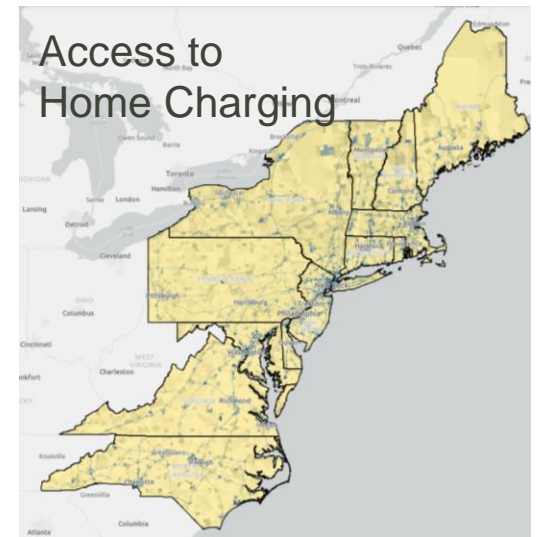
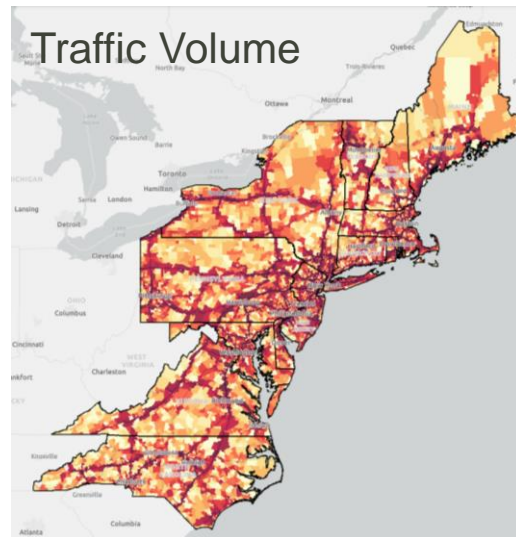
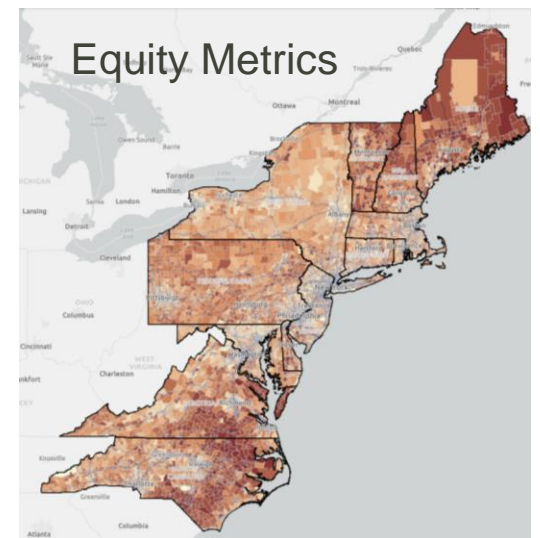
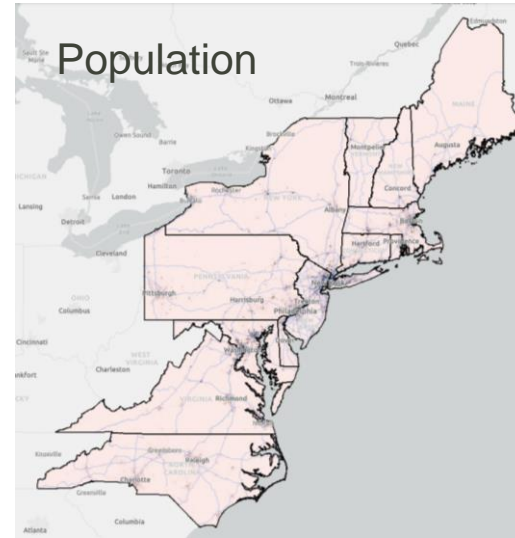
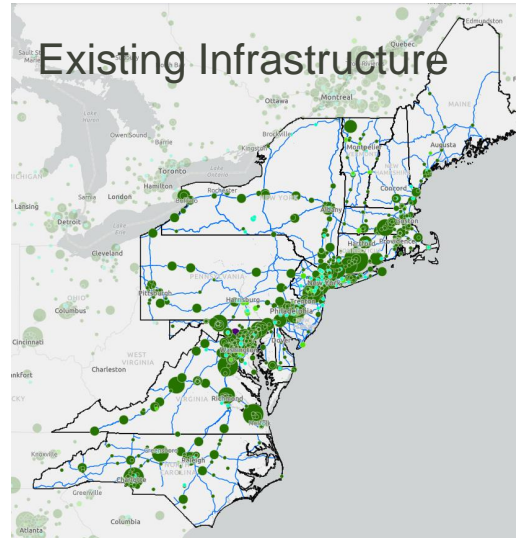
Regional EV Charging Infrastructure Location Identification Toolkit

Version 4.0 Analysis Summary

August 2021

What question are we answering?

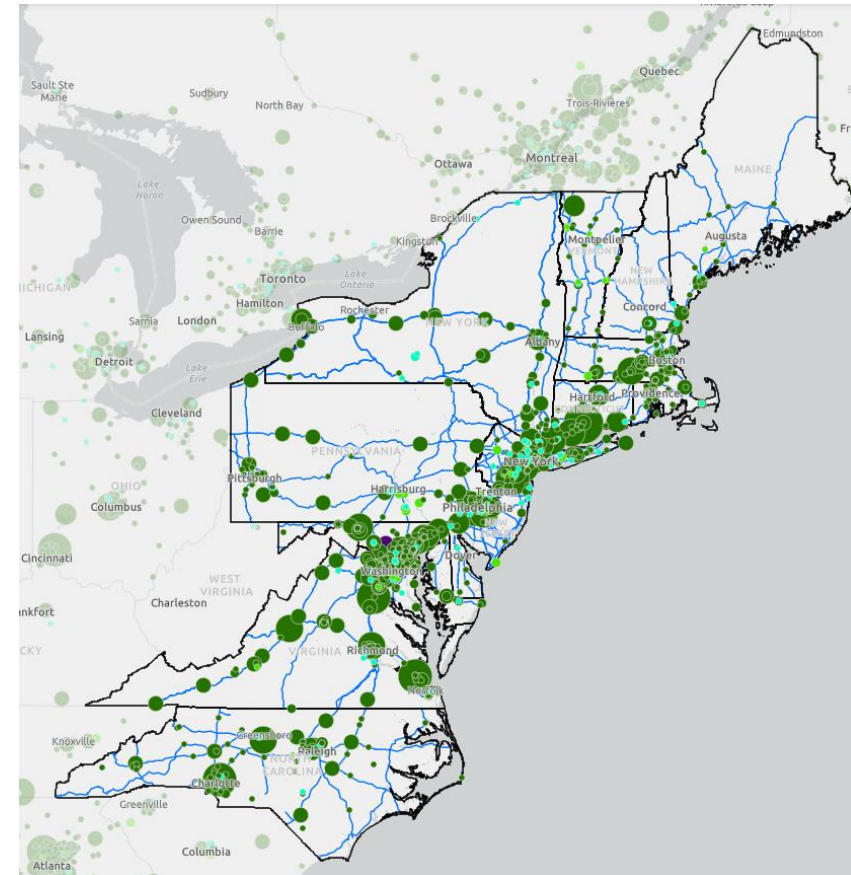
What locations may be suited for electric vehicle fast charging infrastructure, taking into account state and other stakeholder priorities?



How did we answer this question?

The Regional EV Charging Infrastructure Location Identification Toolkit (ILIT) is a suite of planning resources that includes an Excel-based analytical tool and interactive maps that identifies potential priority locations for additional EV charging infrastructure development in the Northeast, Mid-Atlantic, and Southeast states from Maine to North Carolina

- The Toolkit was developed as a resource to state governments and other who are conducting regional, state-wide, or local EV fast charging infrastructure planning and to inform discussions between policymakers, local communities, and other stakeholders in considering priority locations for EV fast charging infrastructure investments
- It incorporates data, by census tract as well as the existing charging network across all included states
- MJB&A worked with state participants to refine dataset, parameters, and metrics
- The Toolkit calculates and displays metrics for each possible location that can be weighted and combined into one final score



What does the Toolkit contain?

1 Ranking Tool

Set your priorities to identify locations that are best suited for fast charging infrastructure

EV Charging Infrastructure Location Identification Tool (ILIT)
Version 4.0 - Released August 2021
DCFC charging infrastructure current as of July 22, 2021

Analysis Parameters

States
Select state(s) included in analysis:

Connecticut Massachusetts Pennsylvania
 Delaware New Hampshire Rhode Island
 Washington, D.C. New Jersey Vermont
 Maine New York Virginia
 Maryland North Carolina

Select Metro Area:
 Select County:

Included Census Tracts
Include all census tracts or only those within one mile of "Priority Corridors"
 Priority Corridors (ILIT) *Priority Corridors (ILIT) approximates the range of previous ILIT versions by including tracts near priority roadways identified by states
 All Census Tracts

DCFC Plug Types
Plug types considered for proximity: SAE CHADEMO Tesla
 Traffic Type:
Considers total vehicle miles traveled and maximum roadway traffic within tracts

Equity Considerations

Qualified Opportunity Zones (QOZ)
Filter census tracts by QOZ status: Click for more information

U.S. EPA EJSCREEN EJ Index Metrics
Filter census tracts by EPA EJSCREEN index values
 Select EJ Index:
 EJ index state percentile is above: Click for more information

Metric Weighting
Weighting Method:

		Pre-Weight	Custom
Proximity	Closest DCFC	15%	20%
	Port Density	15%	15%
Demand	Traffic	30%	25%
	Nearby Activity	30%	25%
Demographics	Pop. Density	5%	5%
	Home Charging	5%	10%
Total		100%	100%

Tract rankings calculated; view/download results
Calc. time dependent on scope; multiple states = long calc. time

Results: Top Census Tracts
Tract ranking results calculated and ready for download
 Download full results view all ranked/scored census tracts within defined scope
 Total Ranked Tracts in Scope: **3,215**

Rank	Census Tract	Metric Designations (1=low score, 10=high score)					Final Score	
		Closest DCFC	DCFC Density	Traffic	Nearby Activity	Pop. Density		Home Access
1	Adams, PA (Tract 301.01)	8	10	8	2	2	3	
2	Adams, PA (Tract 301.01)	8	10	8	2	2	3	
3	Adams, PA (Tract 301.01)	8	10	8	2	2	3	
4	Adams, PA (Tract 301.01)	8	10	8	2	2	3	
5	Adams, PA (Tract 301.01)	8	10	8	2	2	3	
6	Adams, PA (Tract 301.01)	8	10	8	2	2	3	
7	Adams, PA (Tract 301.01)	8	10	8	2	2	3	
8	Adams, PA (Tract 301.01)	8	10	8	2	2	3	
9	Adams, PA (Tract 301.01)	8	10	8	2	2	3	
10	Adams, PA (Tract 301.01)	8	10	8	2	2	3	

Data Resources

The Results Mapper is an interactive resource that executes the same analysis as this Excel tool but dynamically displays results and provides additional features to enhance DCFC planning support The Visualization Mapper is an interactive map that displays analysis layers, provides detailed data, and enables the filtering of tracts by geography, ILIT metrics, and EJ considerations

2 Data Viewer

Explore the existing charging network, traffic data, and other key variables behind the ILIT Model

Regional EV Charging ILIT Data Viewer (version 4.0)

Layers

- State Percentile: Demographic Index
- State Percentile: People of Color (% population)
- State Percentile: Low-income (% households)
- State Percentile: Climate EJ Index
- State Percentile: NATA Respiratory Hazard EJ Index

ILIT Model Filters

- Define Geographical Scope
- Consider Equity Metrics
- Tracts are in Qualified Opportunity Zones (QOZ)?
- State % of Demographic Index: (1-100; 1=low vulnerability, 100=high vulnerability)
- Vulnerable population ("Demographic EJ Index") state percentile is at least: (1-100; 1=low vulnerability, 100=high vulnerability)
- Climate exposure ("Climate EJ Index") state percentile is at least: (1-100; 1=low vulnerability, 100=high vulnerability)
- Respiratory hazard ("NATA Respiratory Hazard EJ Index") state percentile is at least: (1-100; 1=low vulnerability, 100=high vulnerability)
- Display Tracts Based on Metric Deciles
- DCFC w/in TCI Region (filter by typenetwork)
- DCFC Plug Types
- EVSE Network
- Electric Utility Service Territories (territories may overlap)

3 Results Mapper

Explore the existing charging network, traffic data, and other key variables behind the ILIT Model

Regional EV Charging Infrastructure Location Identification Toolkit

Inputs & Filters

Select State(s):
 Select Metro Area(s):
 Select County(ies):
 Tracts within 1 mi. of Priority Corridors?
 DCFC Plug Types (for proximity): SAE CHADEMO
 Traffic Type (for traffic volumes):

Results

Ranked Tracts

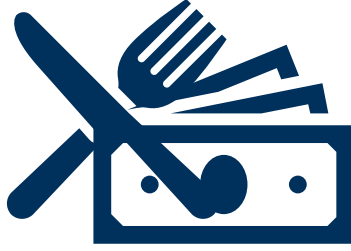
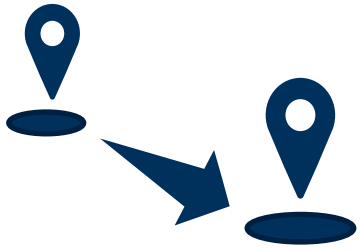
Census Tract	Rank
Luzerne, PA (Tract 2182)	1
Banks, PA (Tract 111.01)	2
Morven, NY (Tract 94)	2
Lynchburg City, VA (Tra...	4
Luzerne, PA (Tract 2125)	6
Westborough, NH (Tract ...	7
Merrimack, NH (Tract 3...	7
Honolulu City, VA (T...	7
New Hanover, NC (Trac...	7
Hampdenburg City, VA (T...	7

Metric Weighting %
Enter percent values for each metric (must sum to 100%)

DCFC Proximity Metrics	Demand Metrics	Demographic Metrics	Total (sum=100)
Distance: 15	Port Density: 30	Pop. Density: 5	100
Traffic: 30	Nearby Activity: 30	Home Charging: 5	

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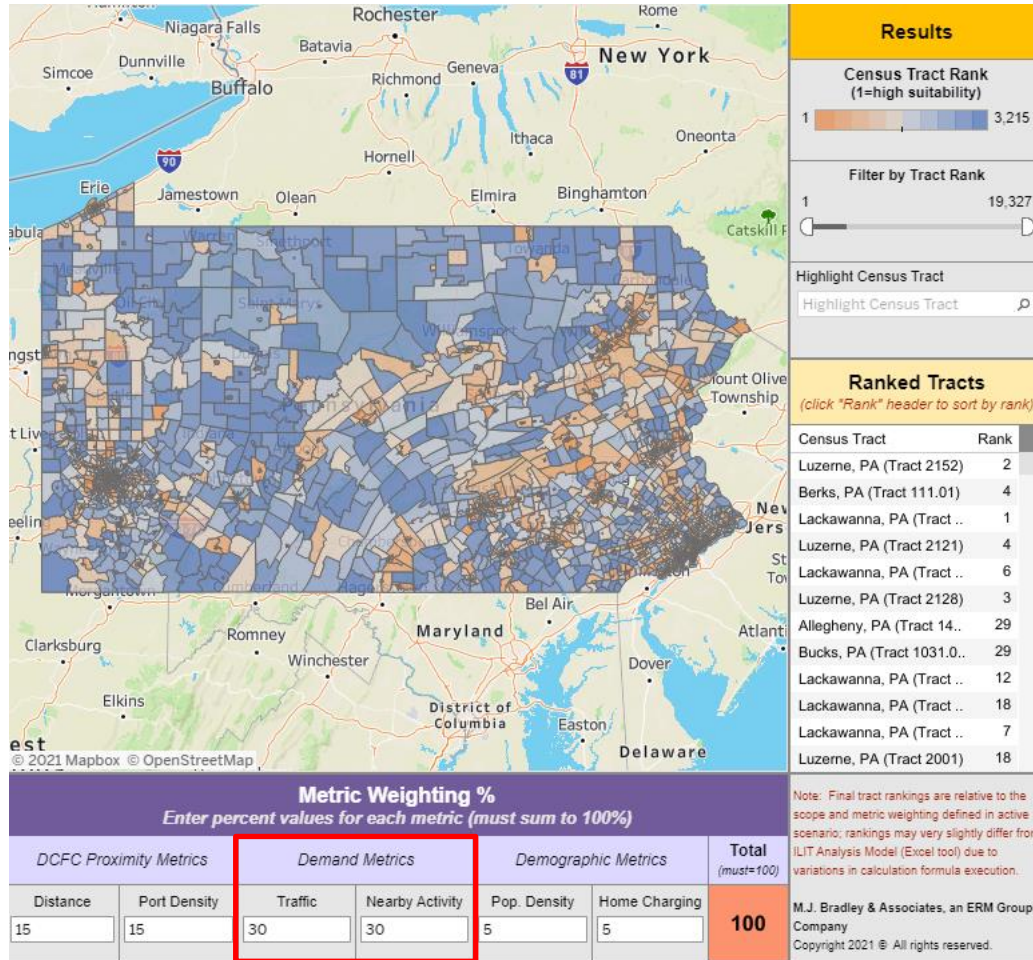
What factors does the Toolkit consider?



Proximity to Existing Charging	Traffic Volume	Commercial Activity	Population Density	Home Charger Access	Equity Considerations
<p>Including all or a subset based on plug type:</p> <ul style="list-style-type: none"> Distance to nearest DCFC station Density of existing stations 	<p>various traffic volume measurements on the roadways running through and near each census tract</p>	<p>density of points of interest and commercial establishments (restaurants, shops/stores, gas stations, etc.) within each census tract;</p>	<p>Population density of surrounding census tract</p>	<p>availability of home charger access (based on prevalence of multi-unit dwelling residence)</p>	<p>Further refine area by Qualified Opportunity Zones (QOZ) and/or U.S. EPA EJSCREEN EJ Index Metrics</p>

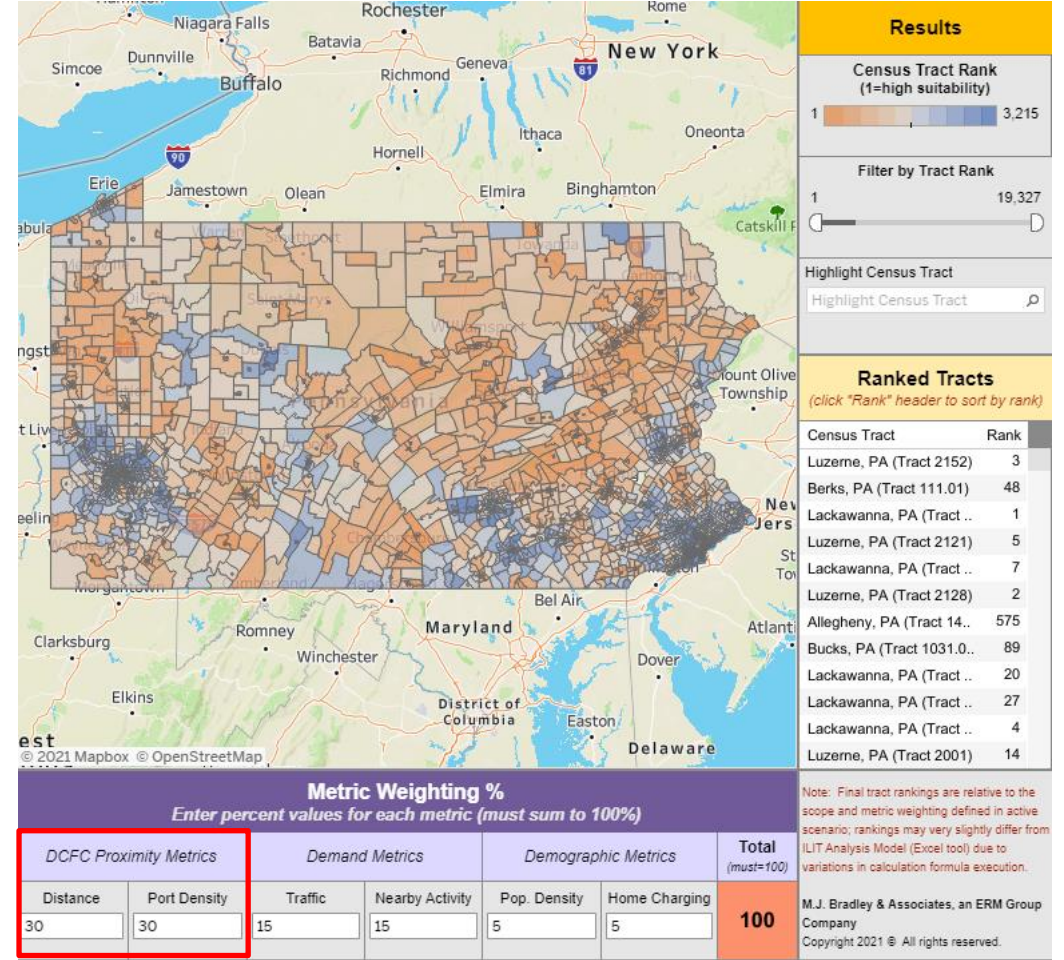
What do the results show?

Through Traffic weighting highlights areas with high traffic volume and commercial activity



This example highlights how changing metric weightings—reflecting differing priorities—can shift Toolkit results

Fill Gaps weighting highlights areas without significant levels of existing charging infrastructure

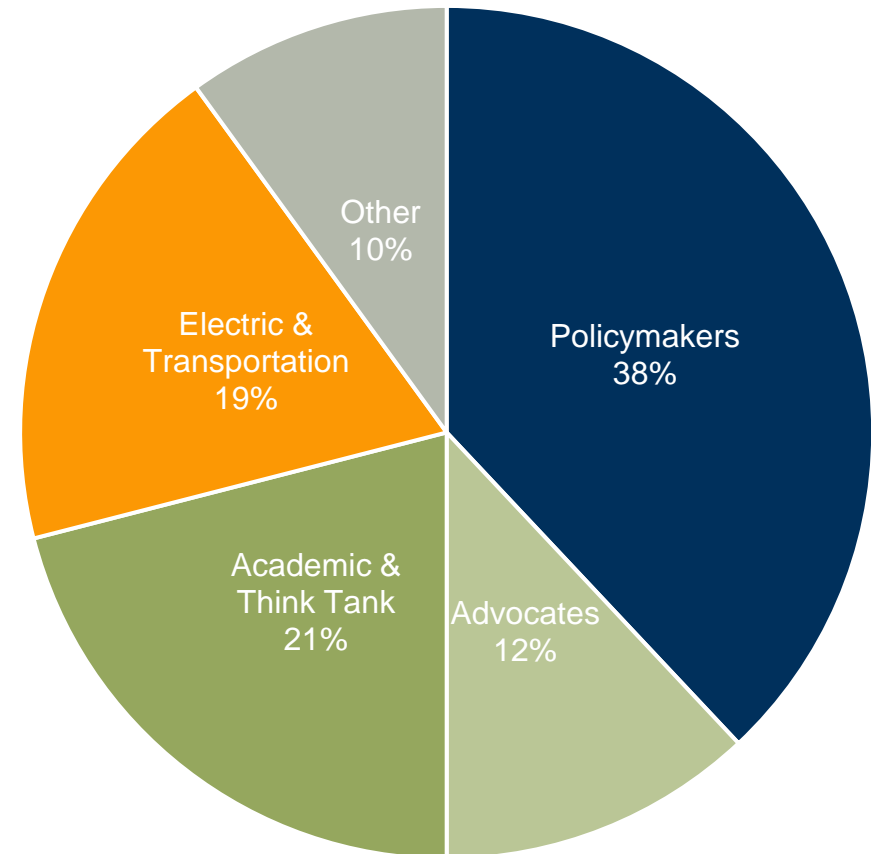


How can the tools be used, and who uses them?

Uses

- Scenario and planning analysis based on customized priorities
- Scoping analysis for state infrastructure development initiatives
- Support for Public Utilities Commission electric vehicle proceedings
- Utility or private developer review / comparison of potential development locations

Users*



* Based on registered users as of spring 2021

Appendix

Primary Sources

- **Electric Vehicle Charging Station Locations, Alternative Fuels Data Center; U.S. Department of Energy, Energy Efficiency and Renewable Energy (https://afdc.energy.gov/fuels/electricity_locations.html#/analyze?fuel=ELEC)**
 - Location, DCFC ports, DCFC connector type(s), EVSE network, etc.
- **Highway Performance Monitoring System (HPMS), Office of Highway Policy Information; U.S. Department of Transportation, Federal Highway Administration (<https://www.fhwa.dot.gov/policyinformation/tables/performancenetwork/>)**
 - Annual average daily traffic (AADT) of primarily non-local roadways
 - ~170,000 miles of roadway in region; ~700 billion vehicle miles traveled
- **National Performance Management Research Data Set (NPMRDS), Office of Highway Policy Information; U.S. Department of Transportation, Federal Highway Administration (<https://www.fhwa.dot.gov/policyinformation/tables/performancenetwork/>)**
 - Combination of HPMS and Transportation Management Center (TMC) spatial data used for peak traffic information (k-factor)
- **OpenStreetMap (OSM) extracts via Geofabrik (<https://download.geofabrik.de/>)**
 - Commercial/retail locations, eating establishments, and other points of interest (museums, entertainment, parks, etc.)
- **American Community Survey (ACS) 2020, 5-year estimates; U.S. Census Bureau (<https://www.census.gov/programs-surveys/acs>)**
 - Population density and single-family/multi-unit dwelling residence
- **Opportunity Zones; created under Tax Cuts and Jobs Act of 2017 (<https://www.irs.gov/credits-deductions/businesses/opportunity-zones>)**
 - Census tracts designated as Qualified Opportunity Zones
- **U.S. Environmental Protection Agency EJSCREEN (<https://www.epa.gov/ejscreen>)**
 - State percentiles (by census block group; maximum percentile of each tract used in analysis) of EJ Index values

Brief Methodology

Metric Data for all Tracts

Proximity

- Closest DCFC
 - **Calculation:** Average distance (Euclidean) within a tract from existing public DCFC stations (specific to connector types selected in tool)
- DCFC Port Density
 - **Calculation:** Average density of DCFC ports within 2, 5, and 10 miles (specific to connector types selected in tool)

Traffic

- **Primary Data Source:** Average annual daily traffic (AADT) of all non-local roadways (functional systems 1-6)
- **Primary Data Source + Calculation:** Peak traffic factor of all roadways
- **Calculation:** Vehicle miles traveled (VMT) and average/maximum design hourly volumes (DHV) near and within tracts (line density calculation to account for roadways that are consequentially near – within 0.25 miles – but not technically contained within tracts)

Nearby Activity

- **Calculation:** Average density of points/locations of interest within one mile

Demographics

- **Primary Data Source:** Population density
- **Calculation:** Share of population with access to home charging

Ranking Calculation

- Metric data are converted to deciles (1-10 values) and relative to scope defined by user (i.e., values change as data distribution within metrics change)
- Decile value of each metric multiplied by the weighting percentages defined by user
- Products of decile/weighting calculation are summed to equal final score (out of 100)
- Final scores of tracts compared against each other to generate rankings