



**CALIFORNIA  
ENERGY COMMISSION**



California Energy Commission

# **EVSE Deployment and Grid Evaluation (EDGE) Tool User Guide**

**August 2023**



# Overview

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The EVSE Deployment and Grid Evaluation (EDGE) Tool is a web map application created by California Energy Commission (CEC) staff. It is designed to help users identify locations in California that could potentially best host electric vehicle (EV) charging infrastructure based on projected demand and available distribution circuit data. Developed as part of the CEC's [Assembly Bill 2127 charging infrastructure assessment](#), EDGE harnesses data from the assessment's EV population and travel modeling to highlight areas where new charging load is expected to grow over time, and contextualizes that information with respect to available grid capacity as shown in publicly-available distribution circuit maps. Combining these two types of information gives users a view of regions where the expected growth in EV charging load could exceed grid capacity limitations.

Project developers and others who are interested in deploying EV charging infrastructure can use this information to identify "low-hanging fruit," areas that could host significant charging without the likelihood of grid equipment requiring significant upgrades. Conversely, utility planners can use the tool to identify their own low-hanging fruit, in the form of possible least-regrets grid upgrade projects. Regions where projected load exceeds the hosting capacity could inform proactive utility planning conversations, and potentially help address grid constraints before project developers submit charging infrastructure project applications to their local utilities.

Please note that EDGE does not replace any utility process and is not incorporated into any formal planning effort at this time. It is only designed as an informational tool to give users insight into the electric grid capacity conditions in regions where they may desire to build EV charging infrastructure. Any project developer interested in siting EV chargers should work with their local utility to begin the process as early as possible.

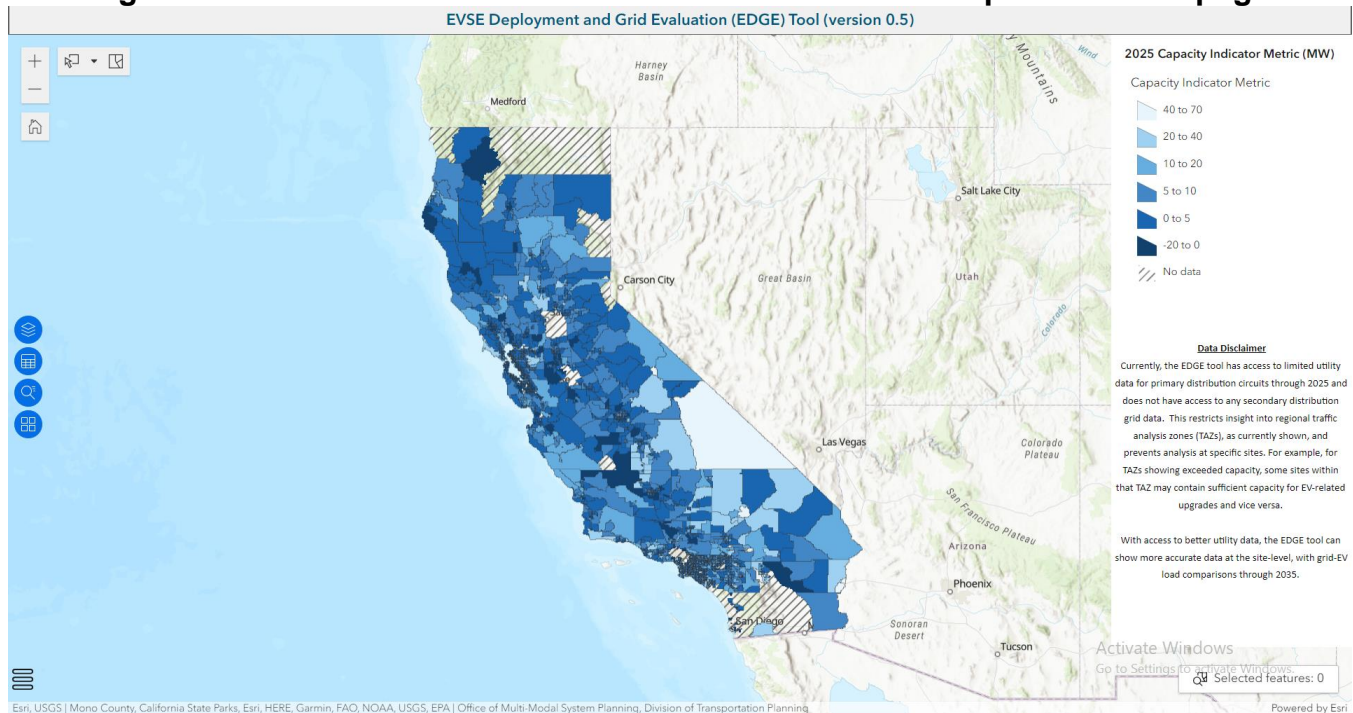
The core data that EDGE uses for its visualization come from two sources. Regional grid capacity information is sourced from the investor-owned utilities' Grid Needs Assessment (GNA) portals. Currently, these data go out to 2025. Projected EV charging load data come from two CEC-funded EV charging infrastructure projection modeling projects used in the Assembly Bill 2127 assessment: the Electric Vehicle Infrastructure Projections (EVI-Pro) model for light-duty EVs and the Medium-and Heavy-Duty Load, Operation, and Deployment (HEVI-LOAD) model for on-road medium- and heavy-duty EVs. Given the long-range scope of the charging infrastructure assessment, the earliest detailed projection scenario available is for 2030. All of the data is aggregated to the traffic analysis zone (TAZ) level.

A detailed description of the functionality and data layers found within the EDGE tool is provided below.


# Navigating the Tool


When first loading the website, a splash screen with linked terms and conditions will appear. After reviewing the terms and conditions, click the check box to agree and then click OK to proceed. The default view layer displayed on the map is Capacity Indicator Metric (CIM), measured in megawatts (MW) for the year 2025. Each map function is described in more detail below.


**Figure 1: Default view of the EDGE Tool when a user first opens the web page**





## Map Functions


 **Zoom buttons** – Zooms in and out on the map window. Zooming can also be done with a scroll wheel or touchpad.


 **Home button** – Resets the map to the default position and zoom level.


 **Select by button** – Gives the user multiple choices by which to select features on the map. The selection tool choices are, Rectangles, Lasso, Circle, Line, and Point. Each selection tool behaves in a slightly different way. The user can also specify the mode by which they want to select data. Selection mode choices are **Partially or completely within**, and **Completely contained by**.


 **Clear selection button** – Resets the map and table by clearing all map features previously selected by the user.

 **Layers button** – Shows the viewable layers for the map. Each layer can be toggled on or off. The legend for the currently visible layer(s) can also be viewed. Note the intended use of EDGE is to have only one layer at a time selected. (Future updates may optimize the interface for this purpose.)

 **Table button** – Pulls up a table of all the data currently visible on the map screen. Different layers can be selected from the top of the table. The table can also be collapsed when not in use by clicking on the X button in the top right corner.




 **Search button** – Brings up a text box where a user can enter an address and zoom to it on the map.

 **Basemap button** – Changes the currently visible “basemap,” which is a reference map image on which data from layers are overlaid to visualize geographic information. The basemap choice does not affect tool functionality.

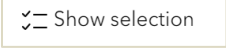
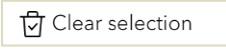
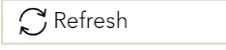

 **Menu button** – Located on the bottom left of the screen. Opens the main menu which contains several different options:

- **User guide** – Opens a link to this document.
- **View EDGE Map Data** – Opens a link to the CEC ArcGis Online webpage where a user will be able to view all the metadata associated with the EDGE tool and its analysis.
- **CEC AB 2127 Assessment** – Opens a link to the main landing page for the CEC’s Assembly Bill 2127 Assessment. There, a user can find materials for all analysis, workshops, and proceedings related to AB 2127 and other related efforts.






## Table Functions

There are two buttons in the upper right corner of the table that appears when a user clicks on the  **Table button**. The first is the  **Options button** and the second is the  **Actions button**. Clicking on either of these buttons lists multiple choices for a user to make.

### **Options button**

-  **Show selection** The **Show selection** option filters the features in the table to show only those that have been selected either from the table or from the map. Clicking again will show all features.
-  **Clear selection** The **Clear selection** option resets the map and table by clearing the map and table features previously selected by the user.
-  **Refresh** The **Refresh** option updates all data in the table and the map with the most up-to-date version of the data that is available.
-  **Show/hide columns** The **Show/hide columns** option allows a user to toggle which columns they would like to view in the table.

## **Actions button**

-  Zoom to The **Zoom to** action displays a zoomed-in view of the currently selected feature(s).
-  Pan to The **Pan to** action displays the currently selected feature(s) in the center of the map view.
-  Show on map The **Show on map** action highlights the currently selected feature(s) on the map so the user can easily distinguish them from other, unselected features.
-  Export all > The **Export all** action allows a user to export and download all data from the EDGE tool in the following formats: JSON, CSV, and GeoJSON.
-  Export selected > The **Export selected** action allows a user to export and download only the currently selected feature(s) in the following formats: JSON, CSV, and GeoJSON.

# Feature Layers

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Three layers of information can be viewed in the EDGE tool. Each set of data is separated by County and TAZ. The default layer is the 2025 Capacity Indicator Metric, and the other two layers mentioned below are selectable from the table using the top tabs.

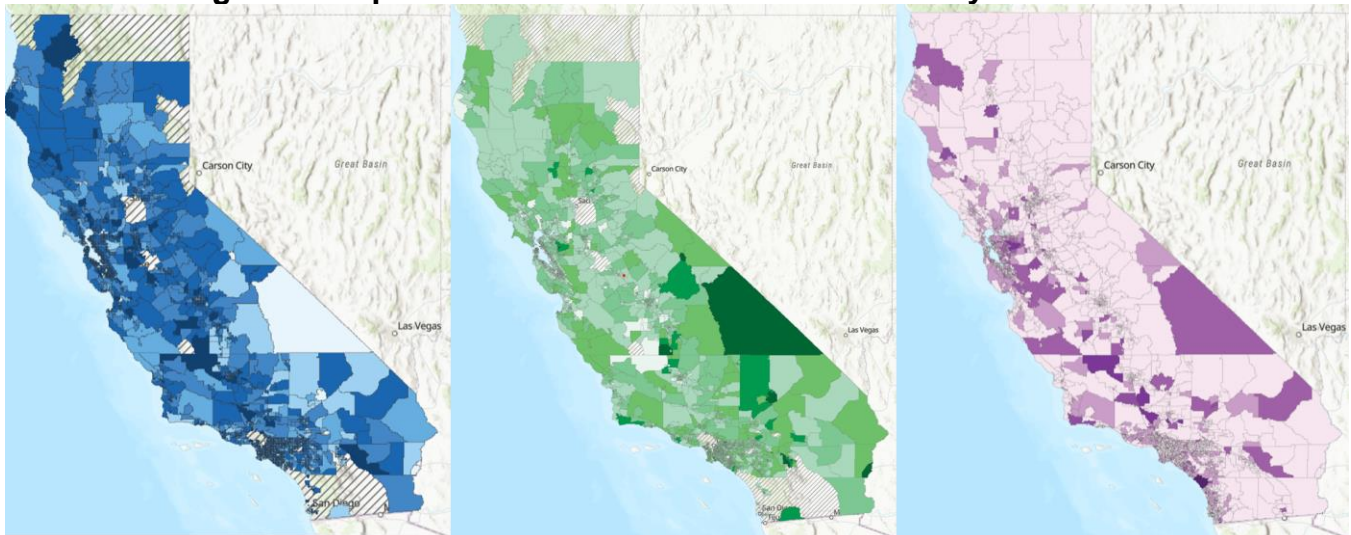
**2025 Capacity Indicator Metric (MW)** – a TAZ-level comparison of the combined light-duty and medium- and heavy-duty modeled EV charging peak load from the year 2025 against the aggregate capacity of existing circuits projected for the year 2025, from the three large IOUs’ GNA portal data. The result is a direct subtraction of EV peak load from the aggregate circuit capacity sourced from the CEC’s infrastructure projection models. Positive Capacity Indicator Metric values denote TAZs with more than enough capacity to host the load projected there, while negative values mean that the modeled EV charging load could potentially exceed the existing capacity in those regions.

**Aggregated Circuit Capacity (MW)** – the total capacity of all primary circuits that exist within a TAZ and have publicly available data. For each circuit within the IOU GNA data, EDGE calculates the total hosting capacity by subtracting the Facility Loading values from the Facility Rating values annually through 2025.


**2025 Total Peak EV Load (MW)** – the expected total peak load incurred by EV charging in a TAZ. EDGE shows hourly data for the combined load profile of light-duty and medium- and heavy-duty on road EV charging. Data is sourced from the CEC’s EVI-Pro and HEVI-LOAD models as part of the Assembly Bill 2127 assessment. Note that the EV load information shown is for the year 2025.

Figure 2 below shows each of these layers in order from left to right.

**Figure 2: Maps of each of the three available data layers in EDGE**



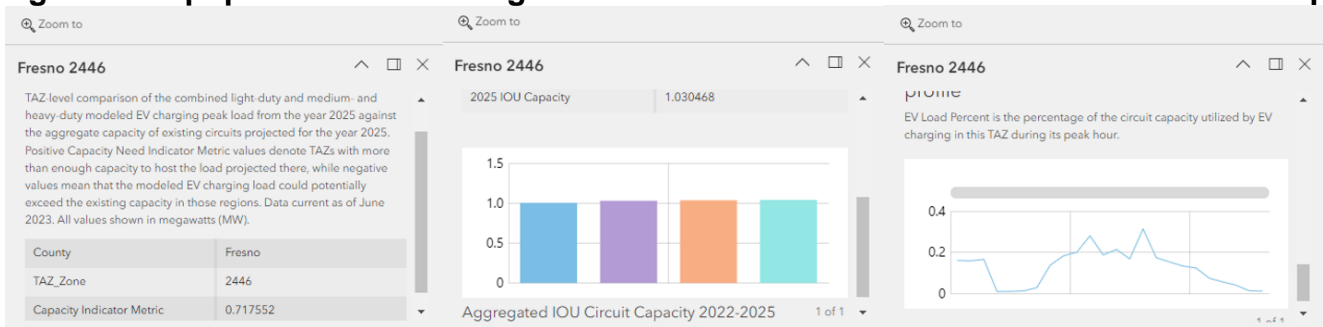
# Functionality

In EDGE, a user can select features either from the table that is displayed by clicking the  **Table button** on the left-hand side of the window or directly from the map. The user can scroll in the table to see all available data in the layer that is selected on the table.

When selecting a single feature on the map, a window will pop up showing all available data for that feature in the actively visible layer. Each layer displays different data in the pop-up box that appears when selecting a single feature. Figure 3 shows these different views. The CIM pop-up box shows a single CIM value for the selected TAZ. The Aggregated Circuit Capacity pop-up box shows IOU circuit capacity for the years 2022 through 2025 as well as a chart comparing these values. The 2025 EV Peak Load pop-up box shows hourly load profile data, the peak EV load value, the peak hour, a percentage of the EV load as compared to the IOU circuit capacity for the selected TAZ, and an EV charging load profile chart at the bottom. All load values in EDGE are shown in megawatts (MW). Using the tools available on the screen, a user can compare the different data to evaluate projected circuit capacity in 2025, projected EV charging peak load for 2025, and the Capacity Indicator Metric showing areas where EV load exceeds available grid capacity for the year 2025.

In the future, EDGE may be updated to be available to users on mobile platforms such as tablets or smartphones.

**Figure 3: Popup windows showing various data views for a selected feature on the map**




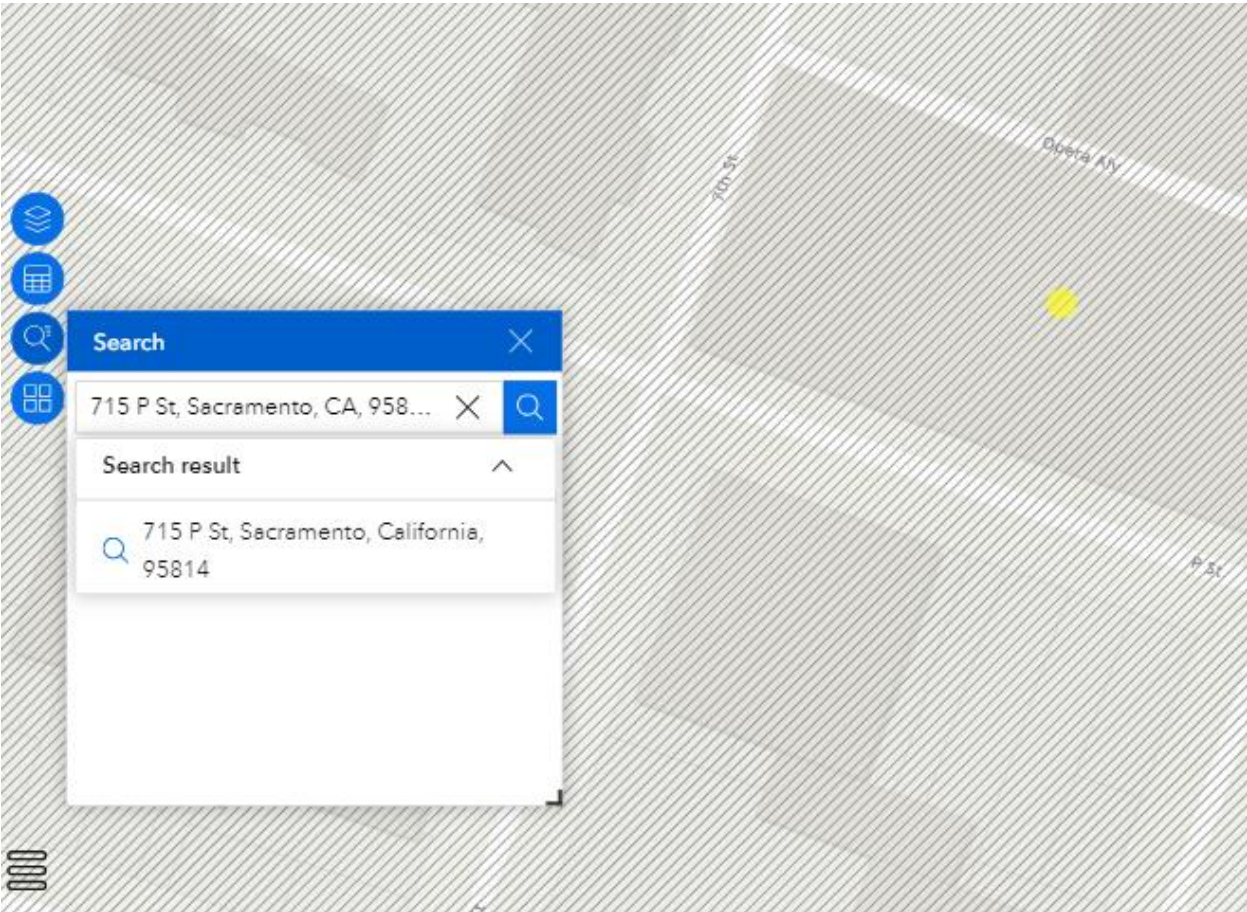
If a user is interested in evaluating the available data at a particular address, then they can click on the  **Search button** on the left-hand side of the screen where a search box will appear. When entering information into the text box, the results will filter and be displayed in real-time, allowing a user to select an option without completely specifying the full address. A user can also type in the name of a location (such as "California Energy Commission") and achieve similar results. Figure 4 below shows an example of this functionality.

Figure 4: Locating a specific address on the EDGE map using the Search function





# Disclaimers and Caveats to Consider When Using EDGE

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## Geographic Coverage

The EDGE tool does not cover the entire state of California. There are TAZs throughout the state for which the CEC does not have utility data. EDGE currently only contains circuit capacity data for Pacific Gas & Electric, Southern California Edison, and San Diego Gas & Electric service territories. Therefore, when calculating the Capacity Indicator Metric, EDGE shows no information associated with TAZs outside of these areas, such as in other investor-owned utility and publicly owned utility territories.

## Peak Load and Circuit Capacity Calculations

The Capacity Indicator Metric was calculated using modeled EV charging peak load values for 2025 and circuit capacity values from 2025. These circuit capacity data are the latest available. As a result, the exact values shown may be different than actual grid conditions. The 2025 circuit capacity calculation methodology involves determining what percentage of a given GNA circuit exists within a TAZ boundary and multiplying the overall capacity on that circuit by that percentage. Then, EDGE aggregates all those piecewise percentage values to the TAZ level which results in an overall circuit capacity for the entire TAZ.

EV peak load is sourced from the CEC's infrastructure projection models EVI-Pro and HEVI-LOAD. Hourly medium- and heavy-duty EV load values for 2025 are directly output from the HEVI-LOAD model while light-duty EV load values for the same year are extrapolated and scaled down from EVI-Pro results for the year 2030.

## Geospatial Resolution

EDGE uses the TAZ as its primary unit of resolution to best align with the CEC's electric vehicle infrastructure projection models EVI-Pro and HEVI-LOAD. Previous assessments using these models produced results at the county level, so presenting this information at the TAZ level is an improvement in granularity. However, aggregating the information to this level could result in a loss of fidelity in terms of the impact to specific circuits. Since circuit capacity is aggregated and summed within each TAZ, EDGE does not specify which circuit the expected EV load will affect. Therefore, once information is obtained from EDGE, it is recommended to work with the local utility when deploying charging infrastructure.

## Utility Data Discrepancies

The utility GNA data only show information at the primary circuit level and, as a result, do not give insight into the conditions at specific sites. Additionally, the furthest collective forecast year for all three IOU GNA datasets is 2025, which is the year used in the Capacity Indicator Metric calculation in EDGE. In this forecast, the GNA data do consider some expected load growth and equipment deficiencies over time, but do not capture every near-term project. Due to confidentiality and privacy concerns, some data have been redacted in the GNA datasets, as well. These circuits are not considered in EDGE's capacity calculations.