Grid Resource Integration Portal

USER GUIDE

Contents

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1 Overview

The Grid Resource Integration Portal was established to provide public access to key datasets, including (a) hosting capacity, (b) forecast loads, (c) forecast distributed energy resources (DERs), and (d) planned distribution system projects. Over the last few years, the data portal has changed to better support users.

The data portal provides data via (1) a map interface, (2) downloadable datasets, and (3) an Application Programming Interface (API). This User Guide will explain how to access data through each method, the various datasets and their meanings, and additional resources.

User Documentation for the Grid Resource Integration Portal consists of:

1. Quick Start Guide
2. User Guide
3. Change Log
4. Data Dictionary (coming soon)
5. Tutorials and walk-throughs (coming soon)

2 Access Methods

The Grid Resource Integration Portal provides access to the key data through (1) a map interface, (2) downloadable, tabular data, and (3) an API.

2.1 Map interface

The Grid Resource Integration Portal is built on an ESRI ArcGIS Hub platform, which supports major browsers including Google Chrome, Mozilla Firefox, Microsoft Edge, and Safari. The map interface provides common map functions and additional search, filter, and query functions. More details about functionality are available in the Functionality/Features section. The data portal does not require authentication.

Name	Link
Grid Resource Integration Portal	grip.pge.com

2.2 Downloads

There are multiple kinds of downloads available through the Grid Resource Integration Portal. In addition to downloadable data, the Grid Resource Integration Portal provides access to downloadable reports and a variety of user documentation.

2.2.1 User Documentation

Downloadable user documentation is available through the following links.

Display name	Description
Getting Started	1 page introduction to the data portal with key links.
Data Dictionary	Descriptions for all available datasets and attributes.
User Documentation	File contains all available user documentation, including the data dictionary and change log.
Change Log	Data Portal change log

2.2.2 Reports

Some public reports are also available for download, including the annual GNA and DDOR reports.

Display name	File name	Description
Reports		Contains annual DIDF report.

2.2.3 Downloadable Data

All data that is published through the Grid Resource Integration Portal is also available for download in various formats.

Display name(s)	Description
GRIP FGDB	Contains all data that is available on the map. (file geodatabase)
GRIP Shape	Contains all data that is available on the map. (shape file)
Report	DIDF data as published in appendices with the DIDF reports. (excel format)
Varies	Data in these files is the detailed ICA results: criteria results for all 576 ICA scenarios. File names are circuit/feeder IDs. Each circuit/feeder file contains the detailed ICA results for every line section on the feeder. (.zip files, containing .csv format files)

Additionally, it is possible to 'export' and download data in a variety of formats through the map interface (see section X). Current available formats include: csv, JSON, GeoJSON, Item (refers to an ArcGIS Online Item).

2.3 Application Programming Interface (API)

The data is exposed through an ESRI ArcGIS Feature Service (REST endpoint). Further documentation is available at Build powerful apps with ArcGIS services | Esri Developer REST APIs documentation. The API does not require authentication.

API Description	URL
REST Endpoint	https://services9.arcgis.com/q5DTBtlqgaEcBe1j/arcgis/rest/services/DRPComplianceFeatureSVC/FeatureServer
Feature Service as an ArcGIS Online Portal item	https://geomartawrrqa.maps.arcgis.com/home/item.html?id=b5ba3ff7fbb14d33933a1d5aaf089192
Feature Service as an ArcGIS Online Web Map	https://geomartawrrqa.maps.arcgis.com/home/item.html?id=72bf45addf32477abb5ed49104960c14

3 Data

On the map the data is organized into three major categories: system data, ICA data and DIDF data. The Data Dictionary (coming soon) has more information about each attribute. The Grid Resource Integration Portal shares multiple datasets that each have different purposes. As such, there are multiple kinds of IDs that are used in different datasets.

3.1 Identification Information

There are multiple types of IDs used in the Grid Resource Integration Portal.

3.1.1 PG&E Hierarchy and IDs

PG&E utilizes a Regional Service Model, with five Distribution Planning Regions (DPR). Each DPR has multiple Divisions. DPRs usually contain more than one substation. A substation is a physical facility that is built of many components. In the context of the Grid Resource Integration Portal, the only reported component is the transformer banks, and each substation has one or more transformer banks, sometimes shortened to 'banks.' Each transformer bank can serve one or more circuits/feeders (used interchangeably in these datasets). Each feeder is a circuit that consists of many components, with multiple overhead or underground line sections. Line Sections are the most granular unit published on the Grid Resource Integration Portal.

Level	Description	IDs and example(s)
Distribution Planning Region	Bay Area, Central Valley, North Coast, North Valley and Sierra, South Bay and Central Coast	**Names:** South Bay and Central Coast **ID:** (n/a)
Division	Within each region, there are multiple Divisions	**Names:** Central Coast **ID:** (n/a)
Substation	Within each Division, there are multiple substations	**Name:** Viejo **ID:** 18285 (5 numeric digits)
Transformer Bank	Each substation contains one or more transformer banks.	**Name:** Viejo Bank 1 **ID:** 1828501 (7 numeric digits = 5-digit substation ID+ 2-digit bank number)
Feeder/ Circuit	Each transformer bank within a substation will support one or more feeders/circuits.	**Name:** Viejo 2202 (substation name + 4-digit feeder number) **ID:** 182852202 (9 numeric digits = 5-digit substation ID + 4-digit feeder number)
Line Section	There are many line sections in each feeder/circuit. ICA results are reported for all 3-phase, primary system line sections	**Name:** n/a **ID*:** 5097476 **Global ID*:** {BA3F3EC4-5BE8-4C6F-8834-827BA0E84CEF}

*In 2025 we will transition to publishing only Global IDs, since this is a unique identifier that is already used as a primary key across different datasets. We are developing a transition plan and expect to implement it in 2025. In the meantime, both Line Section ID and Global ID will be published on the Grid Resource Integration Portal. They are different numbers that refer to the same line section.

Transmission data does not follow the same hierarchy as the distribution system. In the Grid Resource Integration Portal, the published transmission system data consists of transmission lines.

Display name	Description	IDs and Example(s)
Transmission Line	Transmission Lines are referred to by name, which usually consists of the names of the two substations that are connected by the line.	**Names:** Viejo-Monterey **ID:** (n/a)

3.1.2 GNA and DDOR IDs

The GNA and DDOR reports have specific IDs that are used only in the context of those datasets.

Display name	Description	IDs and Example(s)
GNA ID	Used as a unique identifier in the DIDF datasets. Consists of GNA, the facility ID (either feeder ID or bank ID) and the type of grid service being reported (eg capacity, voltage, etc)	**ID:** GNA_1828501_Capacity
DDOR ID	Used to identify and report on different projects/solutions identified during the DIDF process.	**ID:** DDOR12083

3.2 System Data

System data includes identifying information about electric distribution system components, some information about nominal ratings, customers and existing DERs. Additionally, High Fire Threat Districts are included in this group.

Layer	Description
Substations, Distribution	This layer consists of substations that are part of the electric distribution system.
Transmission Lines (kV)	This layer consists of transmission lines, view based on voltage.
Distribution Lines (kV)	This layer consists of distribution lines, viewed based on voltage.
Distributed Generation	These layers consist of distribution lines, and allow users to view lines based on the amount of distributed generation on each feeder.
High Fire Threat District	These layers are the High Fire Threat District (HFTD) data that was created by Cal Fire and the CPUC. Source: CPUC High Fire Threat District (HFTD) (arcgis.com)

3.3 ICA Data

3.3.1 Map:

Layer	Description
ICA Results	These layers display ICA results for each line section. There are 5 view options: Load Capacity, Solar Capacity (with and without OpFlex) and Uniform Generation capacity (with and without OpFlex). *Load Capacity (kW)*: Amount of load that can be installed at that location without any thermal or voltage violations at the time the integration capacity analysis was performed. *Solar Capacity without OpFlex (kW)*: Amount of PV generation that can be installed at that location without any thermal, voltage, or distribution protection (not considering operational flexibility) violations at the time the integration capacity analysis was performed. *Generation Capacity without OpFlex (kW)*: Amount of generation (fixed output or uniform) that can be installed at that location without any thermal, voltage, or distribution protection (not considering operational flexibility) violations at the time the integration capacity analysis was performed. This attribute is also referred to as ICA-SG (Integration Capacity Analysis – Static Grid). *Solar Capacity (kW)*: Amount of PV generation that can be installed at that location without any thermal, voltage, distribution protection, or operational flexibility violations at the time the integration capacity analysis was performed. *Generation Capacity (kW)*: Amount of generation (fixed output or uniform) that can be installed at that location without any thermal, voltage, distribution protection, or operational flexibility violations at the time the integration capacity analysis was performed. This attribute is also referred to as ICA-OF (Integration Capacity Analysis – with Operational Flexibility).
ICA Not Available	This layer consists of line sections that do not have ICA data.
Expected Load Capacity	This layer indicates the results of the simple 'expected load capacity' analysis. This is an interim dataset until Load ICA Refinements have been implemented.
Buffer Zone, Networked Secondary System	This layer consists of a polygon surrounding the networked secondary system. It indicates the area in which streamlined interconnection might not be possible due to complex distribution system circuits.

Operational Flexibility (OpFlex) refers to reverse-flow *limitations* that enable more flexibility in grid operations. So reverse flow is allowed within the power flow analysis models used for "ICA without OpFlex".

3.3.2 Downloads:

Detailed ICA results are available for download from the Grid Resource Integration Portal. Downloads can be accessed via the download widget in the map interface. Each Division has a names zip file that contains csv files for all the feeders in the Division. Each csv file, named with the Feeder ID, contains detailed ICA results for every line section on the feeder. These ICA results consist of 576 hourly results for the 4 ICA criteria violation types: Thermal, Voltage, Protection, and Safety.

Column	Description
Line Section ID	ID of line section where the integration capacity analysis is conducted.
Load or Generation	Indicates the ICA values are for generation or load resources.
Month-Hour	Specifies the month and hour of load conditions that was used in calculating the ICA values.
Loading Scenario	Indicates which input loading condition was used to calculate the ICA values, either 10th percentile or 90th percentile loading conditions.
IC Thermal	Amount of generation that can be installed without causing thermal violations at the time the integration capacity analysis was performed.
IC Voltage	Amount of generation that can be installed without causing voltage violations at the time the integration capacity analysis was performed.
IC Protection	Amount of generation that can be installed without causing protection violations at the time the integration capacity analysis was performed.
IC Safety	Amount of generation that can be installed without causing reverse power flow at SCADA devices at the time the integration capacity analysis was performed.
Hourly ICA OF	The minimum ICA result for that loading hour, with operational flexibility constraints: calculated as the minimum of the 90th or 10th percentile ICA results for all reported results for that loading hour (IC thermal, IC voltage, IC protection and IC safety).
Hourly ICA SG	The minimum ICA result for that loading hour, without operational flexibility constraints: calculated as the minimum of the 90th or 10th percentile ICA results for IC thermal, IC voltage, and IC protection (ICA SG does not consider the IC Safety values, which are based on reverse power flow constraints).
Monthly ICA SG	The minimum ICA result for that month, without operational flexibility constraints: calculated as the minimum of the 90th and 10th percentile ICA results for IC thermal, IC voltage, and IC protection (ICA SG does not consider the IC Safety values, which are based on reverse power flow constraints).
Hourly Load	The minimum ICA result used for calculating Load hosting capacity for that hour: calculated as the minimum of the 90th and 10th percentile IC results for IC thermal and IC voltage.

3.4 DIDF Data

Common Data Attributes:

GNA Facility Type: The type of facility – substation, bank, bank group, feeder, or line section.

Distribution Service Required: The distribution service for which the grid need can mapped to, if one exists – Capacity, Voltage, Reliability, Resiliency.

Primary Driver: The primary driver of the grid need, if one exists.

Anticipated Need Date: The date for which the grid need is estimated to first occur, if there is one.

Facility Rating: The normal operating rating of the asset for each year (MW).

Deficiency: Deficiency related to capacity need or other violated criteria for each year and for the peak (max) year. For Capacity needs, the Deficiency is based on Facility Rating and calculated as the MW overload over the threshold of 100.5% of the Facility Rating. For Reliability and Resiliency needs, the Deficiency is based on the Primary Driver. For Voltage needs, the Deficiency is based on Rule 2 Voltage Limits (over- and under-voltage) exceeding normal operating conditions.

Layer	Description
Substation Projects, Transmission System	This layer consists of substation projects as required by an annual DIDF Refinements Ruling.
Line Projects, Transmission System	This layer consists of line projects as required by an annual DIDF Refinements Ruling.
DIDF, Line Section Grid Needs (% Overload)	This layer shows the forecasted line section voltage and capacity needs over a 3-year planning horizon.
DIDF, Feeder Grid Needs (% Overload)	This layer shows the Demand Forecast data peak loads for feeders over a 5-year planning horizon. This is compared against the normal operating equipment ratings to determine the feeder capacity needs.
DIDF, Load Forecast on Circuits (% Loaded)	This layer shows the Demand Forecast data peak loads for feeders over a 5-year planning horizon.
DIDF, Known Load	This layer shows the dataset on the known loads, otherwise addressed as load adjustments. *Unique Identifier*: Unique identifiers have historically been customized IDs for each load adjustment -- the 2024 DDOR Report utilizes Project Management (PM) Numbers in lieu of the historic customized IDs. PM Numbers are multi-

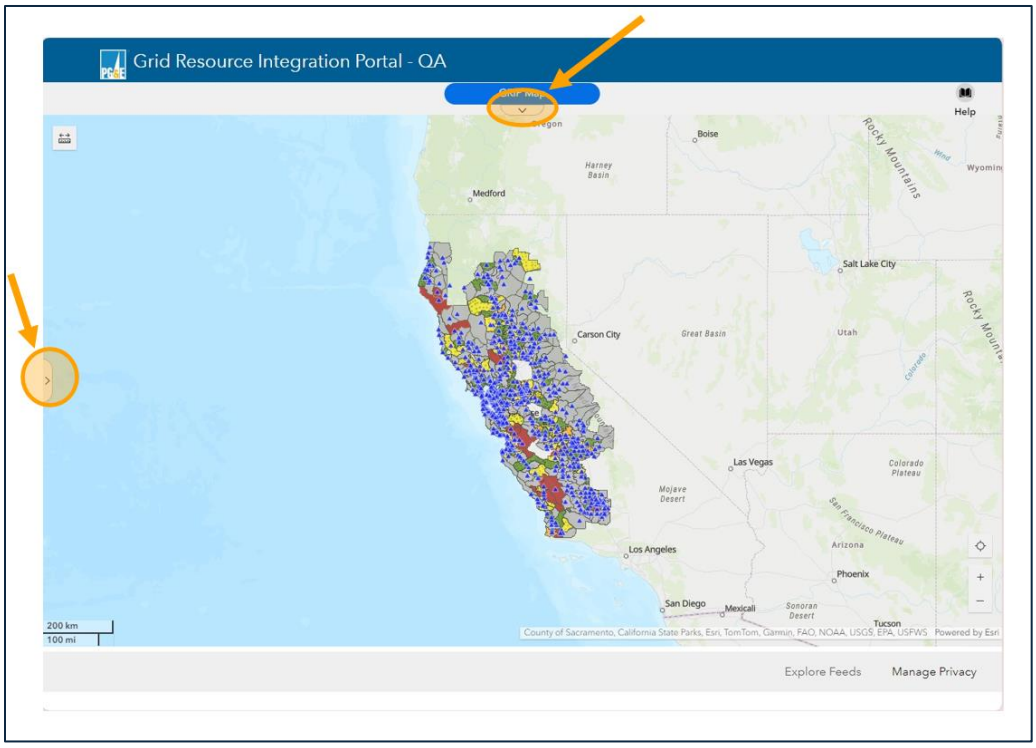
	use project identifiers which represents customer application that map to one or multiple known load(s). *Type*: Residential, Commercial, Industrial, Agriculture, and Transportation. *Category*: This includes further categories of each type i.e., Home Construction, and Other for the Residential type; Education, Healthcare, Business, and Other for the Commercial type; Plants, Facilities, Cultivation, and Other for the Industrial type; LD EV, and MD/HD EVs for the Transportation type; Agriculture for the Agriculture type; Retail and Wholesale for the Energy Storage type. *IEPR Status*: PG&E does not use this field, and is therefore marked as N/A.
DIDF, DER Feeder Forecast (MW)	This layer shows the DER growth forecast applied for each feeder and broken out by DER type. The DER growth amount shown is the expected DER contribution at the time the feeder is at peak demand (coincident peak). These forecast values do not include existing DER capacity but do show incremental DER growth. *Solar (MW)*: The largest coincidental load decrease for the year, in MW, from photovoltaics. Negative values translate into a load decrease. *Energy Efficiency (MW)*: The largest coincidental load reduction for the year, in MW, from adopting Energy Efficiency. Negative values translate into load reduction. *Fuel Substitution (MW)*: The largest coincidental load increase for the year, in MW, from Fuel Substitution loads. Positive values translate into a load increase. *Energy Storage Non-Res Discharge (MW)*: The largest coincidental load decrease for the year, in MW, from Non-Residential Energy Storage Discharge DERs. Negative values translate into a load decrease. *Energy Storage Res Discharge (MW)*: The largest coincidental load decrease for the year, in MW, from Residential Energy Storage Discharge DERs. Negative values translate into a load decrease. *EV Fleet (MW)*: The largest coincidental load increase for the year, in MW, from Electric Vehicles Fleet charging loads. Positive values translate into a load increase. *EV Public L2 (MW)*: The largest coincidental load increase for the year, in MW, from Public Electric Vehicles Level 2 charging loads. Positive values translate into a load increase.

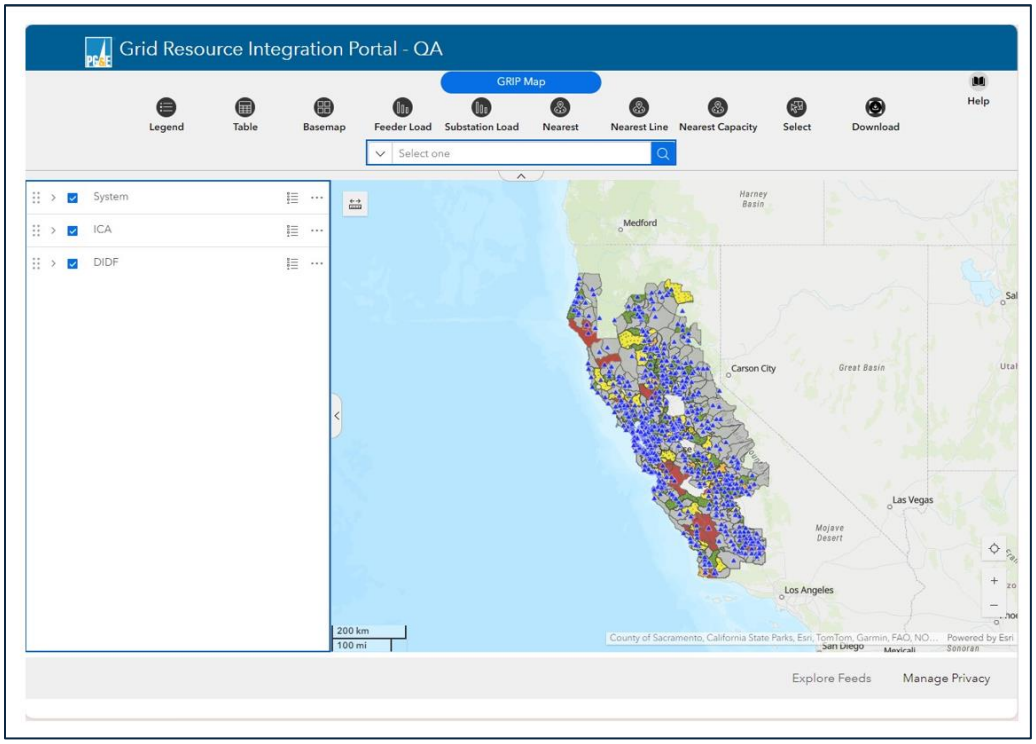
	EV Res L1 (MW): The largest coincidental load increase for the year, in MW, from Residential Electric Vehicles Level 1 charging loads. Positive values translate into a load increase. *EV Res L2 (MW)*: The largest coincidental load increase for the year, in MW, from Residential Electric Vehicles Level 2 charging loads. Positive values translate into a load increase. *EV DC Fast Charge (MW)*: the largest coincidental load increase for the year, in MW, from Urban Electric Vehicles DC Fast Charging (DCFC) loads. Positive values translate into a load increase. *EV Workplace L2 (MW)*: The largest coincidental load increase for the year, in MW, from Workplace Electric Vehicles Level 2 charging loads. Positive values translate into a load increase.
DIDF, Load Forecast at Substation (% Loaded)	This layer shows the Demand Forecast data peak loads for substation banks over a 5-year planning horizon.
DIDF, Grid Needs at Substations (% Overload)	This layer shows the Demand Forecast data peak loads for substation banks over a 5-year planning horizon. This is compared against the normal operating equipment ratings to determine the bank capacity needs.
DIDF, Planned Investments	Planned Investments include all proposed distribution planning solutions that are currently funded within the current planning horizon (i.e. five years).

4 Functionality/Features

Basic map functions are supported, including zoom, pan, select, search, measure, etc. Additionally, numerous widgets support a variety of filtering and querying functions.

To allow for a larger viewing area, the map has ‘pull out’ bars that hide/reveal the widgets on the top and the contents on the left side of the map. Users must click the arrows to expose the Widget bar and the list of Map Layers.


Grid Resource Integration Portal - QA
GRIP Map
Help
Boise
Medford
Harney Basin
Rocky Mountains
Salt Lake City
Carson City
Great Basin
Utah
Las Vegas
Colorado Plateau
Mojave Desert
San Francisco Plateau
Arizona
Phoenix
Los Angeles
San Diego
Mexicali
Sonoran Desert
Tucson
200 km
100 mi
County of Sacramento, California State Parks, Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USFWS
Powered by Esri
Explore Feeds
Manage Privacy


Grid Resource Integration Portal - QA
GRIP Map
Help
Legend
Table
Basemap
Feeder Load
Substation Load
Nearest
Nearest Line
Nearest Capacity
Select
Download
Select one
System
ICA
DIDF
Medford
Harney Basin
Carson City
Great Basin
Las Vegas
Mojave Desert
Los Angeles
200 km
100 mi
Explore Feeds
Manage Privacy

The Grid Resource Integration Portal uses only standard functions and widgets to improve usability. Information about the various functions is available at Widgets—ArcGIS Experience Builder | Documentation, or at the links provided for each widget.

- Basemap Gallery widget—Add a panel for changing a map's basemap. The widget can synchronize with your organization's basemap settings, or you can choose which basemaps to include.
- Legend widget—Display labels and symbols for layers in a map.
- Near Me widget—Find and summarize data about features within a certain distance of a defined location.
- Map Layers widget—Display a list of map layers and their symbols.
- Chart widget—Visualize quantitative attributes from an operational layer to reveal potential patterns or trends.
- Filter widget—Limit the visibility of features in a layer to only those that meet the expression criteria.
- Search widget—Place anywhere on the map or page and allow users to find features, records, or locations based on specific layers and locators. You can define how and where to display search results in the app.
- Select widget—Select features using attribute selection, interactive map selection, and spatial selection.
- Table widget—Display interactive attribute tables for feature layers with the option to include multiple sheets accessed through tabs or a list.

5 FAQs

5.1 Data Questions

What is operational flexibility?

Operational flexibility limits reverse power flow on certain types of equipment, including reclosers and circuit breakers. When OpFlex is included in the ICA study, reverse flow is prevented, which may result in a lower integration capacity. When OpFlex is not included in the ICA study, reverse flow is allowed, which may result in a higher integration capacity.

What's the difference between the ICA values on the map and in the downloadable ICA file?

For each line section, ICA outputs 1152 values: 12 months * 24 hours * 2 load curves (high and low) * 2 installation types (load and generation) and 4 ICA categories: thermal, voltage, protection, and safety.

Map Values: The data is further distilled for display on the map. For Generation IC and Generic PV IC, the minimum value out of thermal, voltage, protection, and safety is used. For Generation IC w/o OpFlex and Generic PV IC w/o OpFlex, the minimum value of thermal, voltage, and protection is used. A typical PV profile is used to create the PV values. For Load IC, the minimum value out of thermal and voltage is used. This is summarized in the table below. To get the ICA map layer (rows), take the minimum of the ICA download values (columns) marked with an X.

	IC Thermal	IC Voltage	IC Protection	IC Safety	PV Profile
Color by Generation IC	X	X	X	X	
Color by Generic PV IC	X	X	X	X	X
Color by Generation IC w/out OpFlex	X	X	X		
Color by Generic PV IC w/out OpFlex	X	X	X		X
Color by Load IC	X	X			

What does it mean when a location has less capacity than a proposed DER project?

As explained in the question above, the ICA value used for the map display is the minimum of the ICA results for that line section. Red on the map (i.e. an ICA output of zero) does not necessarily mean that there isn't integration capacity at that location – it means an engineer needs to review.

For example, a line section shows an ICA output of zero on the map. In looking at the downloadable ICA data, voltage is found to be the limiting factor. In going through the installation process, the engineer updates equipment settings to eliminate the voltage issue and allow for installation.

Why is the safety column in the downloadable ICA data sometimes redacted?

PG&E uses the 15-100-15 rule to protect customer load information and will redact load data if it contains fewer than 15 non-residential customers, fewer than 100 residential customers, or a single customer makes up more than 15% of the load. As defined today, IC Safety is equivalent to load data and will be redacted if it fails the 15-100-15 rule.

5.2 Map Questions

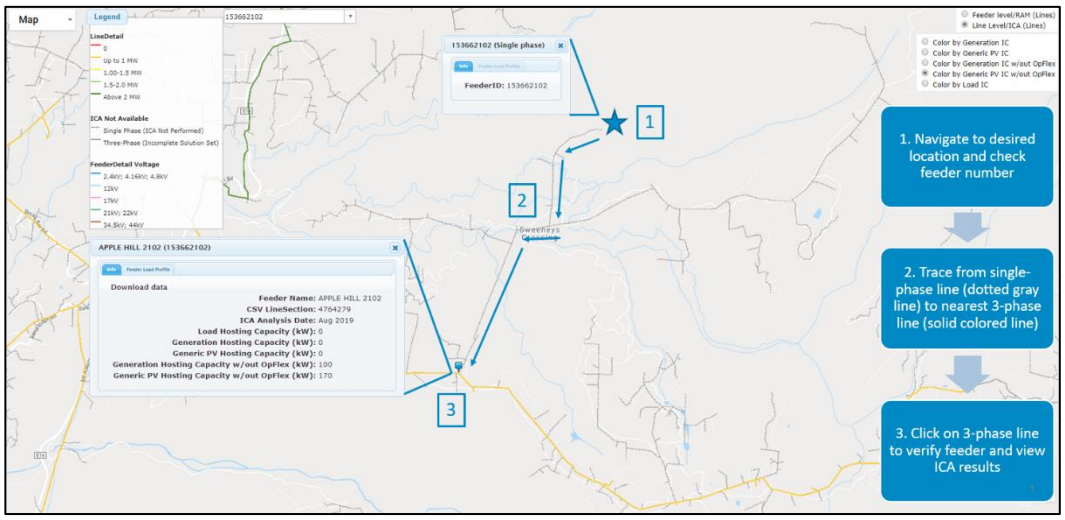
Where are the single-phase lines?

ICA values are not calculated for single-phase lines; however, single-phase lines are mapped on both the feeder level view and the line level view. On the feeder level view, single-phase and three-

phase lines are not differentiated. On the line level view, single-phase lines are shown as dotted gray lines.

How can I tell where a single-phase line connects to a three-phase line?

A single-phase line can be traced to the nearest three-phase line. The pop-up box for the single-phase line lists the associated Feeder ID, which can be matched with the Feeder ID in the three-phase line's pop-up box. See graphic below for visual instructions.



Why do I not see ICA values on the networked secondary system?

ICA values are not calculated for the secondary network system; however, these lines are mapped on both the feeder level view and the line level view. On the feeder level view, they are not differentiated. On the line level view, they are shown as solid purple lines.

What is the Networked Secondary Buffer?

The Networked Secondary Buffer zone (indicated by a pale purple area) indicates the location of a ¼ mile buffer zone around the secondary network system. The buffer is for interconnection safety purposes and is defined as a ¼ mile distance (as the crow flies), from any line in the secondary networked system. This buffer is used in the notification only website tool, as discussed in D.21-06-002.

Why are some feeder and substation load profiles redacted?

PG&E uses the 15-100-15 rule to protect customer load information: if a feeder has fewer than 15 non-residential customers, fewer than 100 residential customers, or a single customer makes up more than 15% of the load, the load data must be redacted.

6 Glossary

576 year – A standard year consists of 8,760 hours. A 576 year is meant to represent both seasonal and daily/diurnal variations without requiring as much data or computing power. The 576 hours consist of high and low scenarios for 24 hours per day per month 2x(24 hours x12 months) = 2x(288 hours) = 576 hours. In ICA, high and low scenarios are based on the 10th and 90th percentile loading conditions.

API – Application Programming Interface

Bank - see Transformer Bank

CAISO – California Independent System Operator

CEC – California Energy Commission

CPUC – California Public Utilities Commission

DDOR – Distribution Deferral Opportunity Report – published annually as part of the annual DIDF filing

DER – Distributed Energy Resources

DG – Distributed Generation

DIDF – Distribution Investment Deferral Framework

DRP – Distribution Planning Region – A geographic area which generally operates at the same voltage level with strong electric distribution ties within the area

Feeder – tends to describe a medium voltage distribution system circuit. "Circuit" is a more general electric term, but both can be used.

Global ID – a unique identifier for line sections that can be used as a primary key within PG&E systems

GNA – Grid Needs Assessment – published annually as part of the annual DIDF filing

HFTD – High Fire Threat District. Data was created by the CPUC and Cal Fire.

ICA – Integration Capacity Analysis, often known as Hosting Capacity in other regions. How much power (load or gen) could be accommodated without requiring significant upgrades. Calculated with iterative power flow analyses, reported for three phase, primary distribution system line sections.

ICA-OF – Integration Capacity Analysis - with Operational Flexibility, used in Rule 21

ICA-SG – Integration Capacity Analysis – Static Grid, used in Rule 21

IEPR – Integrated Energy Policy Report, published by the CEC

IOU – Investor Owned Utility. California's IOUs are Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E)

kV – kilovolt, a standard unit of measure for voltage

kW – kilowatt, a standard unit of measure for power

MW – Megawatt, a standard unit of measure for power

OpFlex - Operational Flexibility: OpFlex limits reverse power flow on certain types of equipment, including reclosers and circuit breakers. When OpFlex is included in the ICA study, reverse flow is prevented, which may result in a lower integration capacity. When OpFlex is not included in the ICA study, reverse flow is allowed, which may result in a higher integration capacity.

PV – Photovoltaic, often used as shorthand for solar photovoltaics, a type of renewable energy.

Substation – A substation is a high-voltage electric system facility. It is used to switch generators, equipment, and circuits or lines in and out of a system. It also is used to change AC voltages from one level to another, and/or change alternating current to direct current or direct current to alternating current. Some substations are small with little more than a transformer and associated switches. Others are very large with several transformers and dozens of switches and other equipment. (Illustrated Glossary - Substations, eTools, OSHA.gov, accessed October 20, 2024 at eTool : Electric Power Generation, Transmission, and Distribution - Illustrated Glossary - Substations | Occupational Safety and Health Administration)

TPR – Transmission Project Review

Transformer bank – One or more three-phase transformers, or a bank of three or more single-phase transformers, interconnected to operate as a single unit, to supply three phase load.

7 Additional Resources

There are numerous types of support available. First, the Grid Resource Integration Portal User Documentation includes a User Guide with FAQs and a Glossary. A Data Dictionary and Tutorials for common and/or complex uses are coming soon.

As the Grid Resource Integration Portal uses standardized functionality, users can also refer to support documentation published by ESRI at ArcGIS Experience Builder Resources | Tutorials, Documentation, Videos & More and Widgets—ArcGIS Experience Builder | Documentation.

If the available documentation is not sufficient, users can send questions via email to GRIP.data@pge.com.

8 Document Change Log

Date	Version	Description
10/25/24	2.0	Document created