



# Technical Requirements for Telemetry and Control

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## Summary

This utility procedure describes the communication, telemetry, and control schemes the approved aggregator must follow to participate in the Flex Connect Program. This document is for EV load applications.

## Target Audience

The target audience is the solution provider to the customers who have applied for load service and are limited by a capacity constraint.

## Safety

This utility procedure describes administrative tasks that do not expose personnel to any significant hazards.

## Overview

In cases where the PG&E distribution grid cannot accommodate a customer's requested load capacity, because the requested capacity is not available year-round and the required upgrades are scheduled for the future, the Flex Connect Program enables customers to energize and utilize the available capacity immediately by dynamically managing capacity limits based on grid availability. This serves as a bridge solution until infrastructure projects are completed. The backend platform that enables this feature is called the Distributed Energy Resource Management System (DERMS).

PG&E issues a Load Limit Letter (LLL) for EV service applications to indicate whether there is a capacity constraint, how much guaranteed capacity is currently available, and what upgrades will be needed and by when to serve the full load. The guaranteed capacity defined in the LLL becomes the **planning limit(s)** (interchangeable with "static limit" or "firm limit"), while DERMS provides a **dynamic schedule** based on real-time grid conditions.

The communication protocol between DERMS and the site is IEEE 2030.5. PG&E's DERMS will send the hourly capacity dynamic schedule to the site's energy management system, which are based on the forecasted loading of the constrained PG&E equipment (e.g. substation transformer).

## Telemetry Requirements

Projects participating in the Flex Connect program must provide telemetry from on-site Point of Common Coupling (PCC) metering. The primary purpose of collecting telemetry data is for PG&E to ensure that the charge rate remains within dynamic capacity limits and proper fail-safe



limits are adhered to during abnormal grid conditions or in the event of communications loss or power loss. The measurements will be compared against either the planning limit(s) defined in the load limit letter, or the dynamic schedule set by the DERMS platform. The PCC meter shall measure the same aggregate load as the revenue meter installed by PG&E at the site, including both flexible load and non-flexible loads, such as lighting, HVAC, and security etc.

### Collect Telemetry Data

If the load limit applies to a site that only has distributed energy resources (DER) such as EV chargers or batteries, as flexible loads, the telemetry data should aggregate all DERs. If the load limit applies to a site that also includes firm load that's not part of flex connected, the PCC meter should include it as well. The PCC meter is recommended to be located next to the PG&E meter.

### Transmit Telemetry Data

PG&E's DERMS platform requires the use of the IEEE 2030.5 communication protocol to transmit telemetry data. Aggregated meter data should be sent to an IEEE CSIP-certified aggregator client or gateway client. The telemetry data will then be translated into the IEEE 2030.5 communication protocol and transmitted to the DERMS server. The approved aggregator must pass PG&E's interoperability testing for telemetry to verify proper implementation. For the gateway client, which requires a hardware gateway on-site, detailed specifications must meet the requirements stated in the [Distribution Interconnection Handbook COT requirements](#), Section 4 (COT Specifications) and Section 5 (Cybersecurity Requirements).

### Required Telemetry Data Points

PG&E's DERMS platform uses a Metering Mirror Server, which acts as a proxy or representation of the actual metering device. It requires sending telemetry data to the Metering Mirror Server via a POST request, using a MirrorUsagePoint (MUP), a data object defined in the IEEE 2030.5 standard. Table 1 below is the Directly Monitored Telemetry Points Required for Interoperability Testing.

### Control Scheme Requirements

California Rule 21 requires that, by default, Distributed Energy Resources within Investor Owned Utilities (IOU) must utilize the IEEE™ 2030.5-2018 networking standard in the manner described in the Common Smart Inverter Profile (CSIP). Products certified by SunSpec to the 2030.5 standard for wide area communication can be installed on sites connected to California Investor-Owned Utilities and have the confidence in their compatibility with local area communication protocols. Flex Connect Program adapts the Common Smart Inverter Profile (CSIP) of the IEEE 2030.5 communication protocol for bi-directional communication with participating sites. The approved vendors must obtain CSIP certification to meet the basic technical requirements.

The SunSpec Alliance is a global alliance of distributed energy industry participants, together pursuing information standards to enable “plug & play” system interoperability, grid



interconnection, and secure data communications for Distributed Energy Resource (DER) and Electric Vehicle (EV) technologies.

Below are the resources and costs categories:

- SunSpec main contacts
  - Membership: [membership@sunspec.org](mailto:membership@sunspec.org)
  - Certification: [certification@sunspec.org](mailto:certification@sunspec.org)
  - PKI provider: [Damon.Kachur@secureg.io](mailto:Damon.Kachur@secureg.io)
- [CSIP Implementation Guide v2.0](#)
- [Product Certification Registry - SunSpec Alliance](#)
- [Authorized Test Software Provider Program - SunSpec Alliance](#)
- Cost Categories
  - Membership fee
  - Approved Lab Testing cost
  - Device Certificate or PKI service
  - Testing Toolkit (optional)
  - Training workshop (optional)

In addition to the CSIP certification, the interoperability testing plan specifies the requirements for integrating with the DERMS platform to meet Flex Connect requirements. Flex Connect requires two control modes from IEEE 2030.5-2023 and a fallback mechanism to handle communication loss and power loss scenarios.

<b>Core Interoperability Function</b>	<b>Description</b>	<b>Implementation Options</b>
Default control and control events should be stored in these control modes.  1. opModMaxLimWAbsorb (Newly added in IEEE 2030.5-2023)- Load 2. opModMaxLimWInject (Newly added in IEEE 2030.5-2023)- Generation	DERMS capacity limits will be communicated via the control mode(s). 2030.5 Gateway clients must be able to receive the controls schedule in the required format	IEEE 2030.5-2023



<p>PKI Certs</p> <ul style="list-style-type: none"> <li>➤ Sunspec approved or qualified PKI provider to provide MICA to issue device certificate or directly issue device certificate</li> </ul>	<p>Provide authentication, trust, and secure communication between Distributed Energy Resources (DERs), aggregators, utilities, and servers.</p>	<p>IEEE 2030.5-2018 &amp; 2023</p>
<p>Control schedule communication methods. CSIP certification offers two options:</p> <ul style="list-style-type: none"> <li>➤ Polling from the client to the DERMS headend service every 15mins</li> <li>➤ Subscription to the Notification when control schedule changes, along with polling from DERMS (Recommended)</li> </ul>	<p>Check and receive dynamic schedule from DERMS server</p>	<p>IEEE 2030.5-2018 &amp; 2023</p>
<ul style="list-style-type: none"> <li>➤ From the client to post the telemetry every 30 seconds for MMR</li> </ul>	<p>Provide site level telemetry for monitoring purpose.</p>	<p>PG&amp;E Interoperability</p>
<ul style="list-style-type: none"> <li>➤ Support for canceling events. <ul style="list-style-type: none"> <li>○ Server will change the current Status to 2 in the DERControl to cancel an event.</li> <li>○ If the DERControl is no longer returned from a GetControls response, the client must consider the DERControl to be canceled.</li> </ul> </li> <li>➤ PG&amp;E's 2030.5 server will receive Response that event is received after a control schedule has been received by the local device. The local device is either the site controller or the aggregator client which receives the dynamic schedule from DERMS directly.</li> </ul>	<p>Support for canceling events</p>	<p>IEEE 2030.5-2018</p>



<p>➤ Site Nameplate and Setting Information-Daily Registration</p> <ul style="list-style-type: none"><li>○ DERCapability – The following will be sent as combination of all controllable energy devices at the site (including controllable loads).<ul style="list-style-type: none"><li>▪ rtgMaxChargeRateW</li><li>▪ rtgMaxDischargeRateW</li><li>▪ modesSupported</li><li>▪ rtgMaxWh</li></ul></li><li>○ DERSettings – The following will be sent as combination of all controllable energy devices at the site (including controllable loads).<ul style="list-style-type: none"><li>▪ setMaxChargeRateW</li><li>▪ setMaxDischargeRateW</li></ul></li></ul>	<p>Provide Device Nameplate and Setting Information (This is a subset of what CSIP requires)</p>	<p>IEEE 2030.5-2018 &amp; 2023</p>
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<p>Failsafe for Communication Loss and Power Loss</p> <ol style="list-style-type: none"><li>1. If communications between the client and DERMS is lost* for 900 consecutive seconds, the application will implement a loss of communications mode. It will opt-out of (and not observe) the remainder of any active event and manage the DER according to the planning limit(s) which is defined in PG&amp;E's load limit letter as static load limits. It will continue to Opt-Out of scheduled events at or prior to start time until communications have been restored.<ol style="list-style-type: none"><li>1. Alternative option: In the event of a communication loss, instead of implementing the planning limit(s), the customer could consider an approach that prevents chargers from drawing power from the grid until communication is restored and capacity limits from DERMS are enforced.</li></ol></li><li>2. Upon the restoration of communications, the 2030.5 client shall commence to re-register with the head end service and shall poll for the latest schedules, superseding previous ones if necessary, and resume following them after the last opted-out event. In the absence of an active schedule, the client shall manage the DER according to the planning limit(s).</li></ol>	<p>Detect communication loss and switch to the planning limit(s) which either draws the minimum power or stays below the static capacity specified in the load limit letter.</p>	<p>PG&amp;E Interoperability</p>
<p>Power Loss</p> <ol style="list-style-type: none"><li>1. When the Grid restore power, start with the default planning control schedule until they receive the new schedule from DERMS</li></ol>	<p>When power is restored, follow two steps to resume operation, starting with the default planning control schedule.</p>	<p>PG&amp;E Interoperability</p>



### **Failsafe Scenarios:**

Under emergency conditions the PG&E DERMS system may cancel an existing dynamic schedule or modify an existing dynamic schedule. The client must cancel the existing dynamic schedule and update the load limit to the planning limit(s) in 30 seconds.

If there is a communication loss (15 mins of continuous communication loss – or from the moment all signals went stale (not fresh) on the device) between the DERMS server and the client or between the client and Local Site Communication Device, the Communication Device will revert to the planning limit(s).

Similarly, if there is power loss onsite, the site must revert to the planning limit(s) first then to the first dynamic schedule received from DERMS.

### **Normal Day Operation:**

The client will receive the day-ahead dynamic schedule and planning limit(s) from the PG&E DERMS server. The day-ahead dynamic schedule is communicated by the server on or before 8 AM for the next day's 24-hour schedule starting at 12:00 AM Midnight. Please note that PG&E may send day-ahead schedules for more than 24 hours (e.g 3 days). The client will make the schedule available on IEEE 2030.5 for the Gateway on a separate IEEE 2030.5 Server Channel.

The Schedule will have the following information:

- Start Time
- Duration
- Max Watt Absorb Limit
- Event Status with current status set to 0 (scheduled)

### **Emergency Operation:**

PG&E Server will change the current Status to 2 in the DERControl to cancel an event. The client will then revert to the planning limit(s). The client will first cancel the existing dynamic schedule and then update the load limit to the default value in 30 seconds.