Resolution E-5230 Workshop #2

February 21, 2023

09:00 a.m. – 04:00 p.m.

Topic F: Implementing More Than 12 LGP Values Per Year

Background on Topic F

“In adopting a modified version of the Large IOUs’ counter proposal, the Decision modified the proposal such that the 'frequency of changes is expanded to monthly limits to align with the Integration Capacity Analysis.' The Decision, however, did not specify that the monthly profile was limited to only one value.

The Decision addressed the frequency of change and did not restrict the number of values within a month to be only one. **The adopted 288-hour format includes 24 values per each of the 12 months of the year. Essentially this amounts to customers submitting the same value 24 times a month, on a monthly basis for a year when one value would suffice.**

The Large IOUs are therefore directed to discuss the 288-hour format and how it may allow for more than one value per month. Given that the Working Group Two Report was filed October 31, 2018, four years from the current date, we expect there is now more information and experience available to the Large IOUs to allow this.

The Large IOUs shall discuss their learnings and best practices in the workshops and propose how implementation of more than one value per month may be accomplished to better take advantage of the available capacity on a circuit to accomplish the goals of Issue 9."

- Resolution 5230

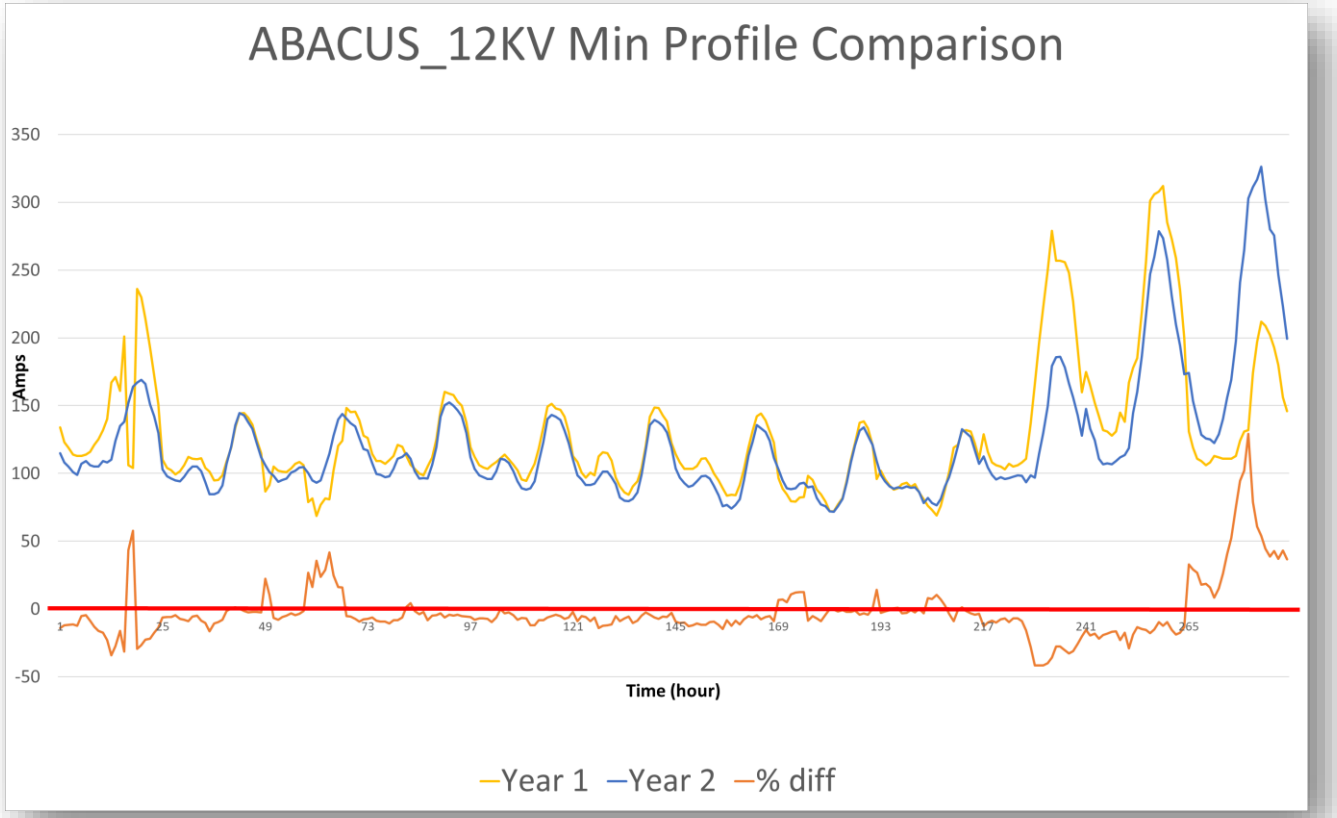
Data Analysis performed in Response to Request made at 1/19/23 SIWG Meeting

Responding to Questions in 1/19/23 SIWG Meeting

- IOUs agree with CalAdvocates' 1/19/2023 SIWG presentation that accommodating more than a single LGP value each month would, in concept, allow increased LGP exports.
  - This would logically be beneficial to the LGP customer.
  - However, the presentation did not include an assessment of the operational risks, and whether, and the extent to which, ratepayers would benefit.
- IOUs understand potential advantages of allowing DERs to operate at a more granular level (e.g., more than a single value each month). However, it is prudent to start with one value each month.

Data Analysis: SCE Minimum Net Load Profile Comparison

SCE's ABACUS 12 kV Net Load Profile Year 1 vs. Year 2

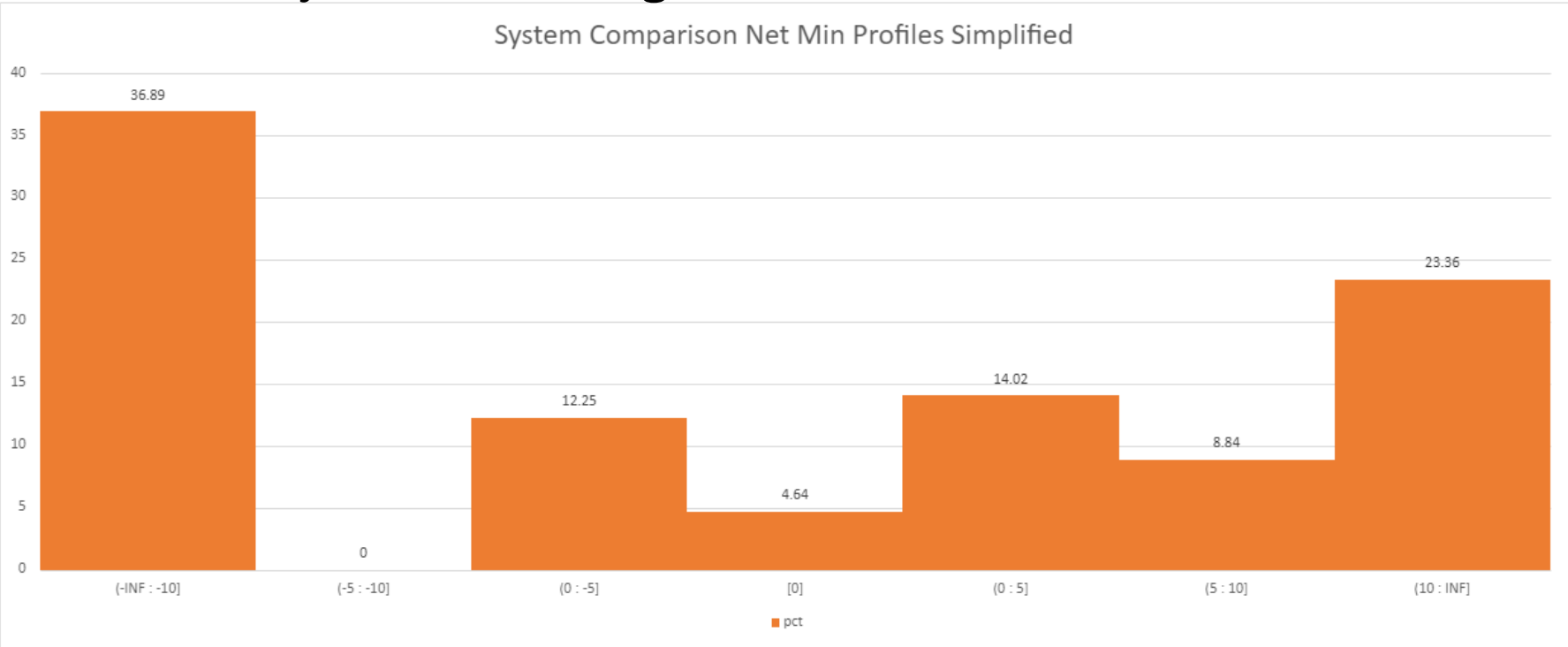


- Utilizing a randomly selected circuit, Year 1 minimum net load profile (yellow) was extracted and overlayed with Year 2 minimum net load profile (blue) for the same circuit.
  - Note: These profiles are inputs to ICA
- The orange curve shows the % difference between the load profiles for Year 1 and Year 2.
  - Where the orange curve is below the red line (zero line) the load in year 2 was less than the load in year 1 for that month and hour (load decreased that hour)
  - Where the orange curve is above the red line (zero line) the load in year 2 was greater than the load in year 1 for that month and hour (load increased that hour)
- **Data-Based Conclusion:** Load variability from year to year is exemplified in the graph (left); this can potentially lead to higher risks if an LGP project's profile is more granular (i.e., maximizing hosting capacity) which in turn can lead to more chances of overshooting available margins.

Year 1: September 2020 to August 2021
Year 2: September 2021 to August 2022

Data Analysis: SCE Systemwide % of Circuit Nodes Experiencing 10% Decrease In Load

System Wide Histogram – With 10% Load Decrease



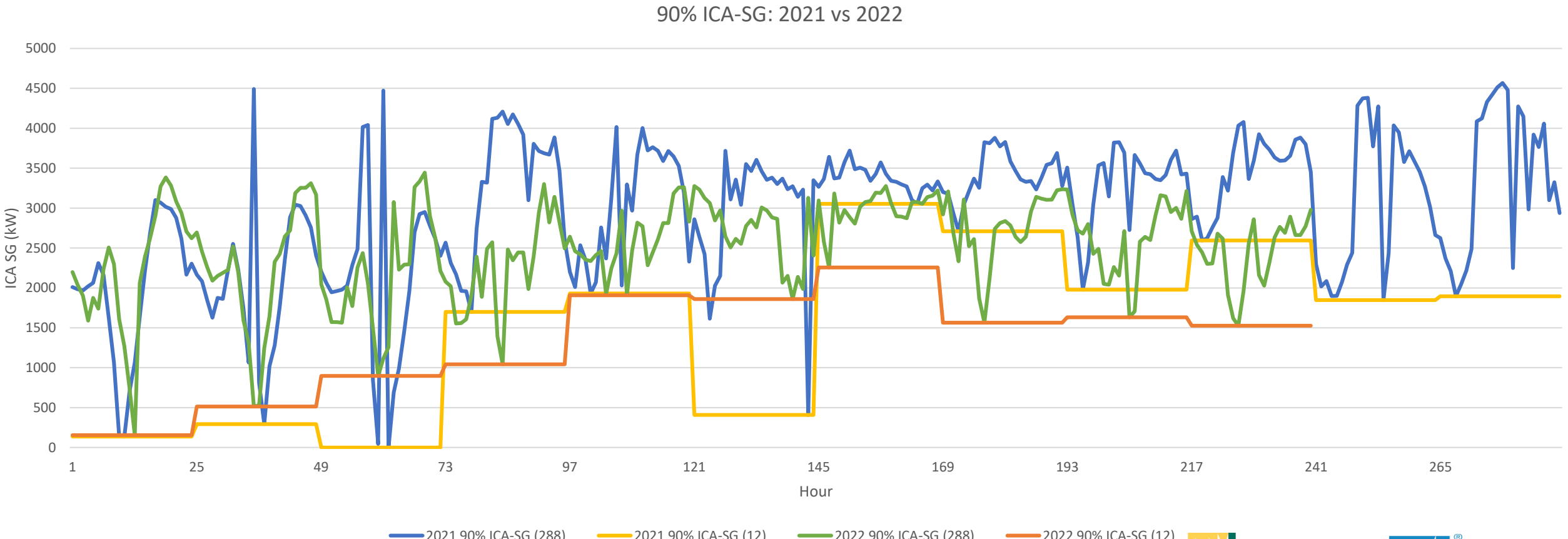
Graph Interpretation:

The histogram represents SCE's system level net load profile data analysis. The data represents the difference between Year 1 minimum net load profiles and Year 2 minimum net load profiles across SCE's territory where Year 2's load decreased by 10% as compared to Year 1 (for each hour and not reflective of peak loading). The histogram groups the data into 7 bins using cumulative percentage (pct). This shows that ~37% of the circuit nodes analyzed experienced a decrease of load by 10% or more for each hour.

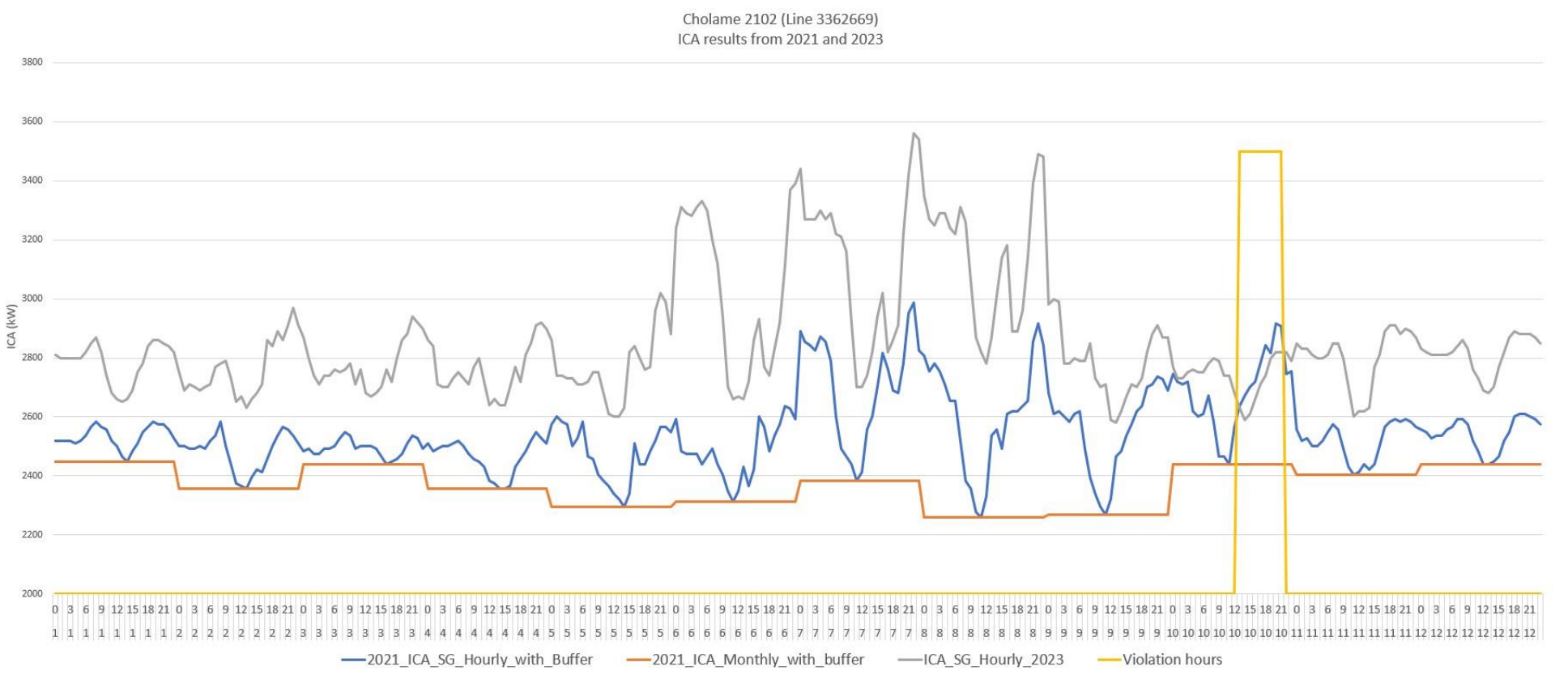
- ~37% of SCE's distribution circuits experienced a decrease in load of 10% or more (for each hour-not reflective of peak loading)
- These results indicate a correlation of the risk with adopting a more granular 288-hour (unique value) and the possibility of running into safety and reliability issues in real time.

Data Analysis: SCE 2021 ICA-SG Vs. 2022 ICA-SG

- This analysis examines a single node on a single circuit and compares the 90% ICA-SG results for two time periods: 2022 (Jan-Oct) to 2021 (Jan-Oct)
- 288 value profile (green and blue) vs. 12 value profile (yellow and orange) illustrate that ICA-SG can decrease from year to year
- 288 profile: ICA-SG was less in year 2 than in year 1: 173/240 hours (72%). The range of differences was **16.9 kW to 3,979.5 kW**
- 12 profile: ICA-SG was less in year 2 than in year 1: 144/240 hours or 6/10 months (60%). The range of differences was **22.4 kW to 1,144.7 kW**
- A project interconnecting to this node may have caused unexpected criteria violations since ICA-SG was lower at times in 2022 than it was in 2021.



Data Analysis: PG&E ICA Profile Comparison



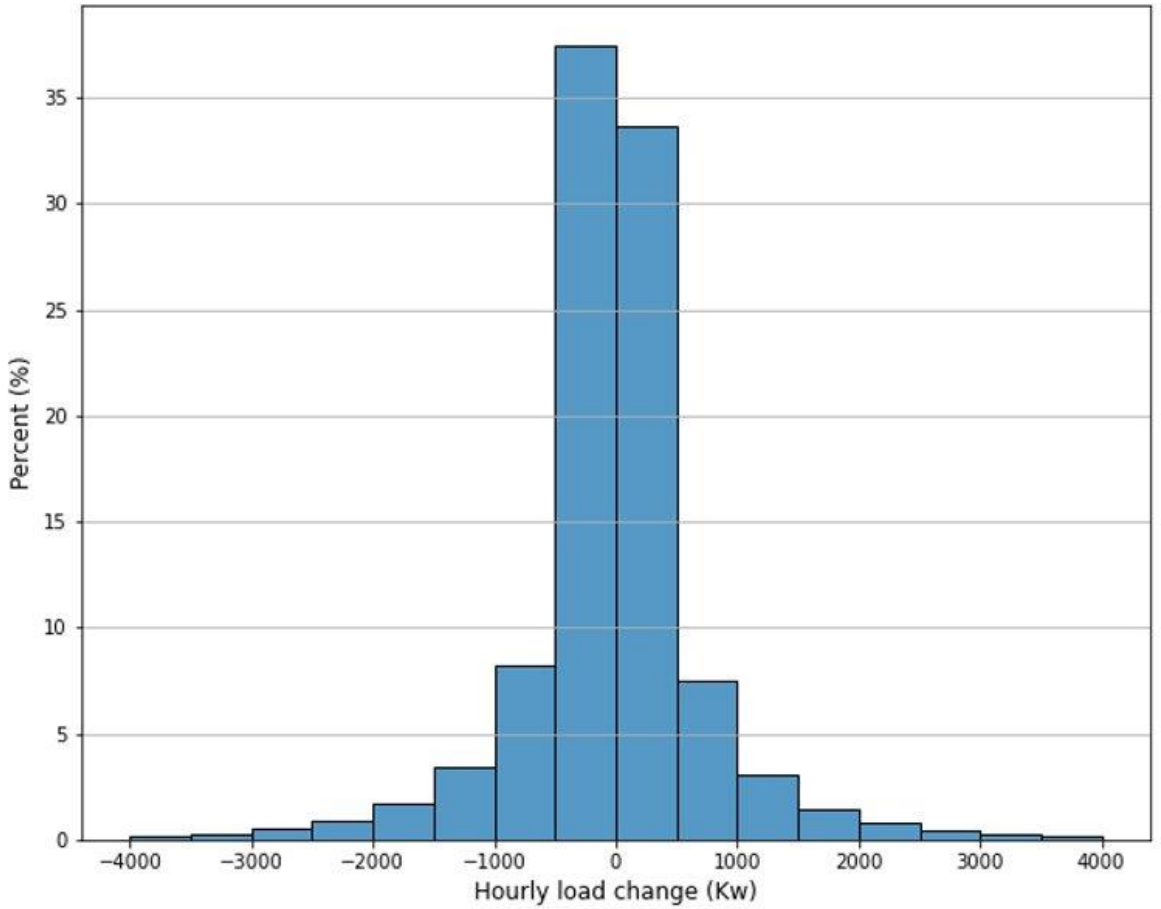
- Utilizing a randomly selected circuit, Year 1 (2021) 288 ICA-SG (blue) & Monthly profile (orange) with a 10% buffer was compared with Year 2 (2022) 288 ICA-SG profile (grey) for the same circuit.
- <u>Data-Based Conclusion:</u> As can be seen using a 288 profile (rather than a monthly profile) creates a possibility where year 2 hosting capacity falls below year 1 hosting capacity. This drop in hosting capacity in year 2 could result in grid impacts that were NOT considered during the previous interconnection. It is prudent for the IOU's to go through a cycle of interconnecting LGP projects using only 12 different values prior to moving to a 288 profile.

Data Analysis: PG&E System Wide Load Changes

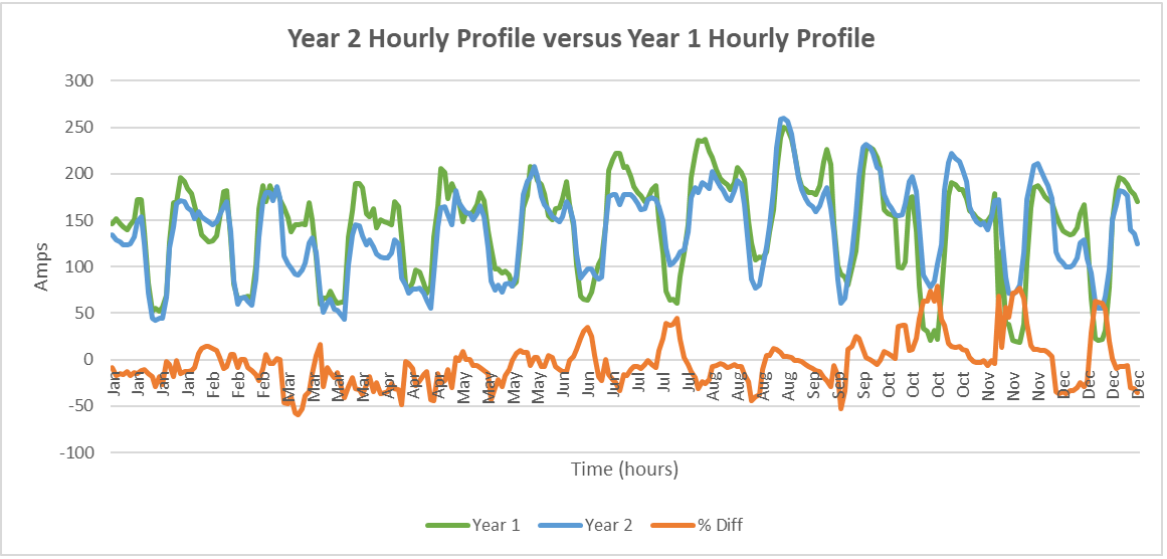
Feeder level load information is collected for all ~3100 PG&E circuits for 8760 hours in the following intervals:

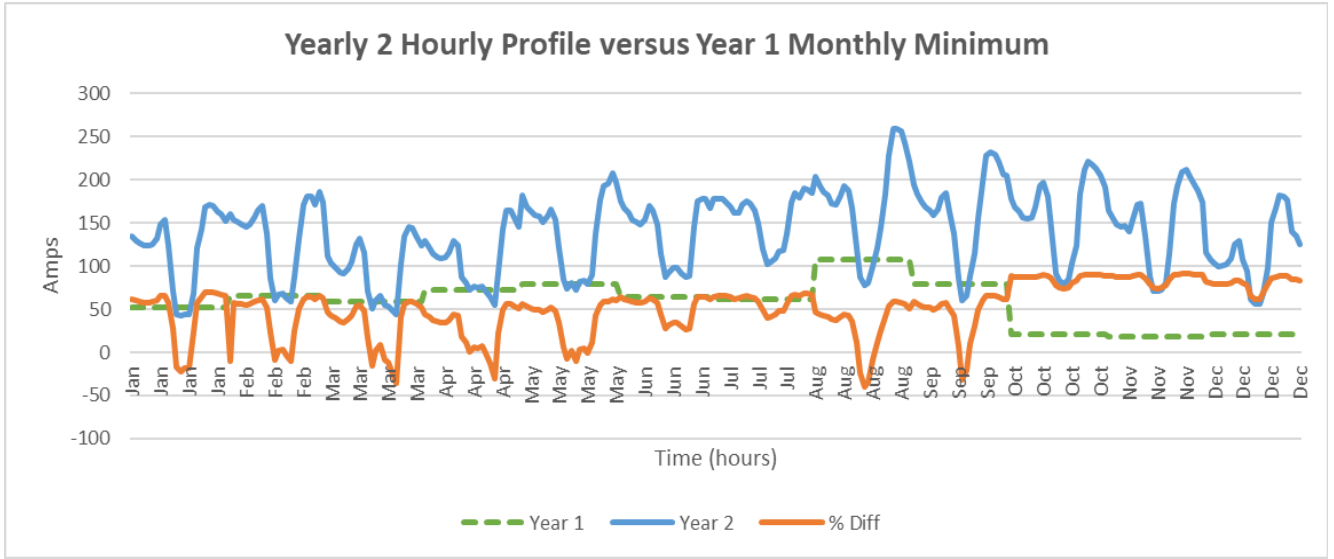
- From 10/01/2020 to 09/30/2021 & From 10/01/2021 to 09/30/2022

Hourly Load Change = Second Year Load – First Year Load



Data Analysis: SDG&E Minimum Net Load Profile Comparison[1]





- Pulling circuit load profiles across 2 years for one circuit:
  - For the left graph, Year 1 net load profile (Green) was extracted and overlayed with Year 2 net load profile (Blue) for the same circuit. The orange curve represents that 63% of the times, Year 2 loading was lower than Year 1.
  - For the right graph, Year 1 monthly minimum net load profile (Dashed Green) was calculated and overlayed with Year 2 net load profiles (Blue) for the given circuit. The orange curve represents that 9% of the times, Year 2 loading was lower than Year 1.
- **Data-Based Conclusion:** as shown in the comparison, its less likely and less often for a monthly loading profile to fall below the previous year loading of the circuit, which is what the hosting capacity is calculated based on.

Year 1= Jan 2021 to Dec 2021
Year 2= Jan 2022 to Dec 2022

[1] For the shown analysis, SCADA data was pulled to aggregate as hourly load profiles. SDG&E did not have time to clean/scrub the data to perform its typical QA/QC with data inputs into its ICA process.

Topic E: Implementation of Limited Generation Profiles Using Current Smart Inverter Functions

Background

D-20-09-035 OP 15, 51

- Requires the use of Limited Generation Profile (LGP) for exporting generators
- Different options of implementing the LGP are being considered
  - Use of a PCS with integrated scheduling capabilities
    - Standards are currently being develop (ETA for completion Q2, 2023). Not currently available
  - Use of CSIP Certified Gateway and Server [using Function 3(P_{Limit}) and Function 8(Scheduling)
    - Industry discussion determine possibilities of using this method. The discussion in subsequent slides summarizes the discussion
  - Options for compliance may be
    - Directly as generation output control
    - At the PCC for net export

Resolution E-5320

- Given the record for Issue 9, the Large IOUs are obligated to explore how to implement the LGP-option before standards are approved and establish a mechanism for validating proposed profiles.
- The Large IOUs shall determine which functional elements are already present in commercially available inverters, and which are not, to establish LGP functionality prior to the approval of standards. More specificity on how functions 3 and 8 will interact at this time

From Workshop 1 (February 1, 2023)

- The IOUs were directed to engaged industry subject matter experts to further explore elements already available to establish LGP functionality prior to the development of PCS standards

From SIWG (February 16, 2023)

- IOUs presented their industry discussion finding to the SIWG held on February 16, 2023
- IOUs presented slides within topics E and stakeholder provided the following concepts:
  - Potential utilization of aggregators – IOUs responded that currently, the interconnection agreements do not account for specifications which would allow an aggregator to take the responsibility for meeting interconnection agreements
  - The concept of utilizing profile for residential systems for which IOUs responded that LGP is derived from the ICA-SG profile which is only for three phase systems and thus not applicable to single phase residential services
  - There were comments regarding utilization of Individual certified devices without certifying the operation of the group devices. IOUs responded that this a concern to the IOUs and the reason as to why additional investigation is needed prior to utilization of these type of systems
  - Ownership and control of LGP data discussed for which IOUs discussed that 288 LGP would be approved via the interconnection process using a template which is currently under discussion. Once approved, the customer is responsible for ownership, control, and application of the LGP
  - There were no comments on IOUs industry discussion takeaway comments as shown in the following slide

IOU Note: **The slides below depict IOU's best understating on current equipment capabilities. Additional requirements may be necessary based on further investigation/understanding**

Thanks: **IOUs thank industry members for their valuable input. *Special* thanks to Prasanth Gopalakrishnan, Brian Lydic, and John Berdner**

Summary of possible options to accomplish LGP with currently available products

Takeaway from discussion with various industry members

Operational Option #	LGP Method Type	Output Measurement Point	288 LGP Storage	8760 LGP Storage	288LGP to 8760LGP Translation/Creation	Applicable Standards	Industry Discussion Takeaway
1	**Method A:** Server stores 288 LGP and sends Gateway the 288 LGP automatically (or manually) on a yearly basis	Inverter Terminals	Server (Source) Gateway (From Source)	Gateway	Gateway	1) CSIP for Gateway 2) UL1741+SA or UL1741SB, 3th Edition for inverters	Technology application may be possible but there are areas needing further investigation and additional validation testing may be necessary
1	**Method B:** Server stores 8760 LGP and sends Gateway the 8760 LGP automatically (or manually) on a yearly basis	Inverter Terminals	Server	Server (Source) Gateway (From Source)	Server	1) CSIP for Gateway 2) UL1741+SA or UL1741SB, 3th Edition for inverters	Technology application may be possible but there are areas needing further investigation and additional validation testing may be necessary
1	**Method C:** Server stores 8760 LGP and sends Gateway the Plimit each hour of the 8760 LGP. Repeats each year unless a new 8760 LGP is uploaded	Inverter Terminals	Server	Server	Server	1) CSIP for Gateway 2) UL1741+SA or UL1741SB, 3th Edition for inverters	Technology application may be possible but there are areas needing further investigation and additional validation testing may be necessary
2	**Method D:** Server stores 288 LGP and sends Gateway the 288 LGP automatically (or manually) on a yearly basis	PCC	Server (Source) Gateway (From Source)	Gateway	Gateway	1) CSIP for Gateway 2) UL1741+SA or UL1741SB, 3th Edition for inverters 3)UL PCS CRD for UL PCS Device	Technology application may be possible but industry is not actively pursuing making products available. Further testing may be necessary
2	**Method E:** Server stores 8760 LGP and sends Gateway the Plimit each hour of the 8760. Repeats each year unless a new 8760 LGP is uploaded	PCC	Server	Server	Server	1) CSIP for Gateway 2) UL1741+SA or UL1741SB, 3th Edition for inverters	Technology application may be possible but industry is not actively pursuing making products available. Further testing may be necessary
2	**Method F:** Server stores 8760 LGP and sends Gateway the 8760 LGP automatically (or manually) on a yearly basis	PCC	Server	Server (Source) Gateway (From Source)	Server	1) CSIP for Gateway 2) UL1741+SA or UL1741SB, 3th Edition for inverters 3)UL PCS CRD for UL PCS Device	Technology application may be possible but industry is not actively pursuing making products available. Further testing may be necessary
3	**Method G:** Use of UL PCS with integrated schedule	PCC	PCS	PCS	N/A	2) UL1741+SA or UL1741SB, 3th Edition for inverters 3)UL PCS CRD for UL PCS Device	Standards being developed- Anticipated by Q2-2023

Option 1 – Method A: Limit Output at Inverter Terminals

Equipment Requirements

CSIP Certified Server
- Capacity to store the yearly 288 LGP

CSIP Certified Gateway
- Capability to translate the 288 LGP to 8760 LGP(Create 8760 LGP)
- Capacity to store the yearly 8760 LGP

UL1741SA or SB Inverters
- Receives and executes Plimit

Operational Requirements

CSIP Certified Server
- Sends 288 LGP to Gateway via IEEE 2030.5 protocol
  - Repeat each year automatically or
  - A human forces the update each year

CSIP Certified Gateway
- Receives the 288 LGP from Server via IEEE 2030.5 protocol
- Translate the 288 LGP to 8760 LGP
- Each hour of the 8760 LGP, Gateway sends the inverters a new Plimit command as % of inverter rating (Inverter need Plimit command as % of inverter nameplate rating)
- For multiple inverter systems, Gateway perform the required calculations as to send each inverter a Plimit without exceed the LGP at each hour (must share the LGP among all inverters)

Example: 1 MW aggregate Inverter Nameplate Rating (two inverters)

10am Commands
- Command to inverter 1 = 90% of inverter 1 Nameplate (.45MW)
- Command to inverter 2 = 90% of inverter 2 nameplate (0.45MW)

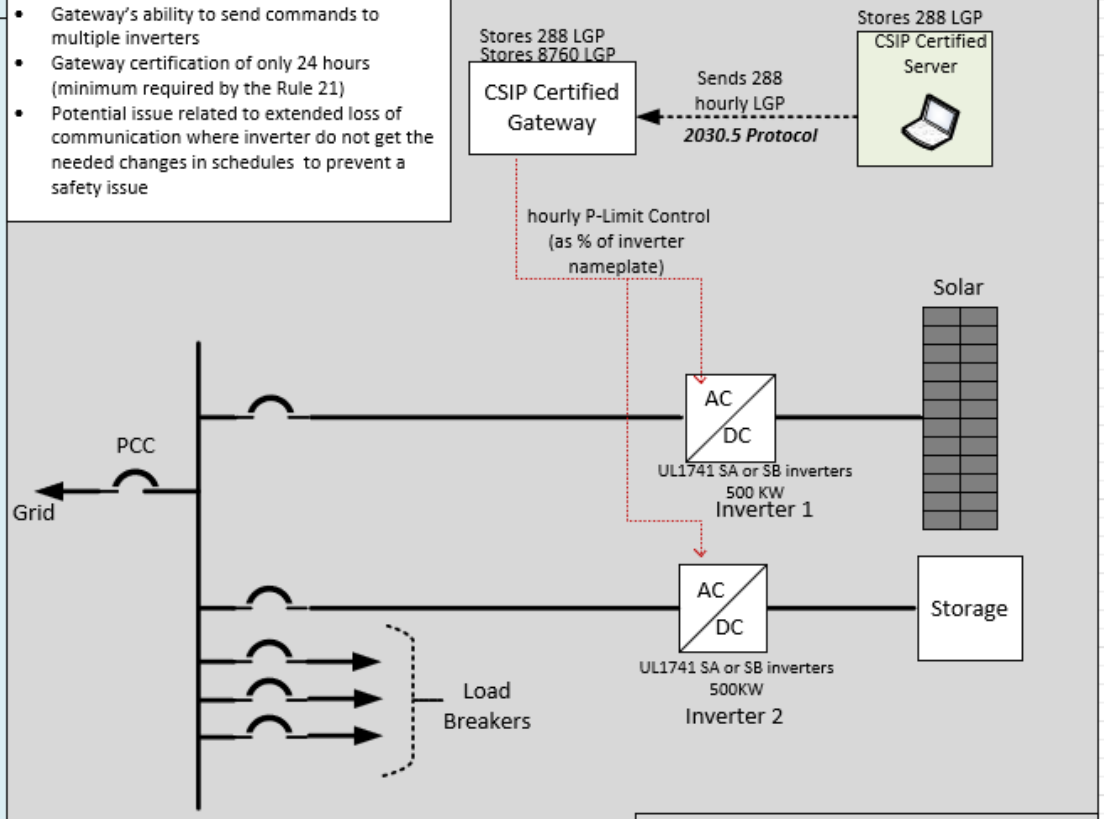
UL1741SA or SB Inverter
- Receives a new Plimit command as % of its nameplate rating
- Enter operation based to Plimit per IEEE1547-2018 standard
- Stays on that Plimt until new Plimit is received

Option 1: Limit Output at Inverter Terminals (not PCC)
Method A: Use of Server to Store 288 LGP

Applicable Standards:
- CSIP for Gateway
- UL1741+SA or UL1741SB, 3th Edition for inverters

Take away from Industry Discussion: Technology application may be possible but there are areas needing further investigation and additional validation testing

Areas requiring further investigation
- Gateway conversion of 288 LGP to 8760 LGP
- Gateway's ability to send commands to multiple inverters
- Gateway certification of only 24 hours (minimum required by the Rule 21)
- Potential issue related to extended loss of communication where inverter do not get the needed changes in schedules to prevent a safety issue



Concept for Discussion ONLY
Support Discussion for Workshop 1 Re: E-5230

Option 1 – Method B: Limit Output at Inverter Terminals

Equipment Requirements

CIP Certified Server
- Capability to translate the 288 LGP to 8760 LGP (Create 8760 LGP)
- Capacity to store the yearly 8760 LGP

CSIP Certified Gateway
- Capacity to store the yearly 8760 LGP

UL1741SA or SB Inverters
- Receives and executes Plimit

Operational Requirements

CSIP Certified Server
- Translates 288 LGP to 8760 LGP(Create 8760 LGP)
- Sends 8760 LGP to Gateway via IEEE 2030.5 protocol
  - Repeat each year automatically **or**
  - A human forces the update each year

CSIP Certified Gateway
- Receives the 8760 LGP from Server via IEEE 2030.5 protocol
- Each hour of the 8760 LGP, Gateway sends the inverters a new Plimit command as % of inverter rating (Inverter need Plimit command as % of inverter nameplate rating)
- For multiple inverter systems, Gateway perform the required calculations as to send each inverter a Plimit without exceed the LGP at each hour (must share the LGP among all inverters)

Example: 1 MW aggregate Inverter Nameplate Rating (two inverters)

10am commands
- Command to inverter 1 = 90% of inverter 1 Nameplate (.45MW)
- Command to inverter 2 = 90% of inverter 2 nameplate (0.45MW)

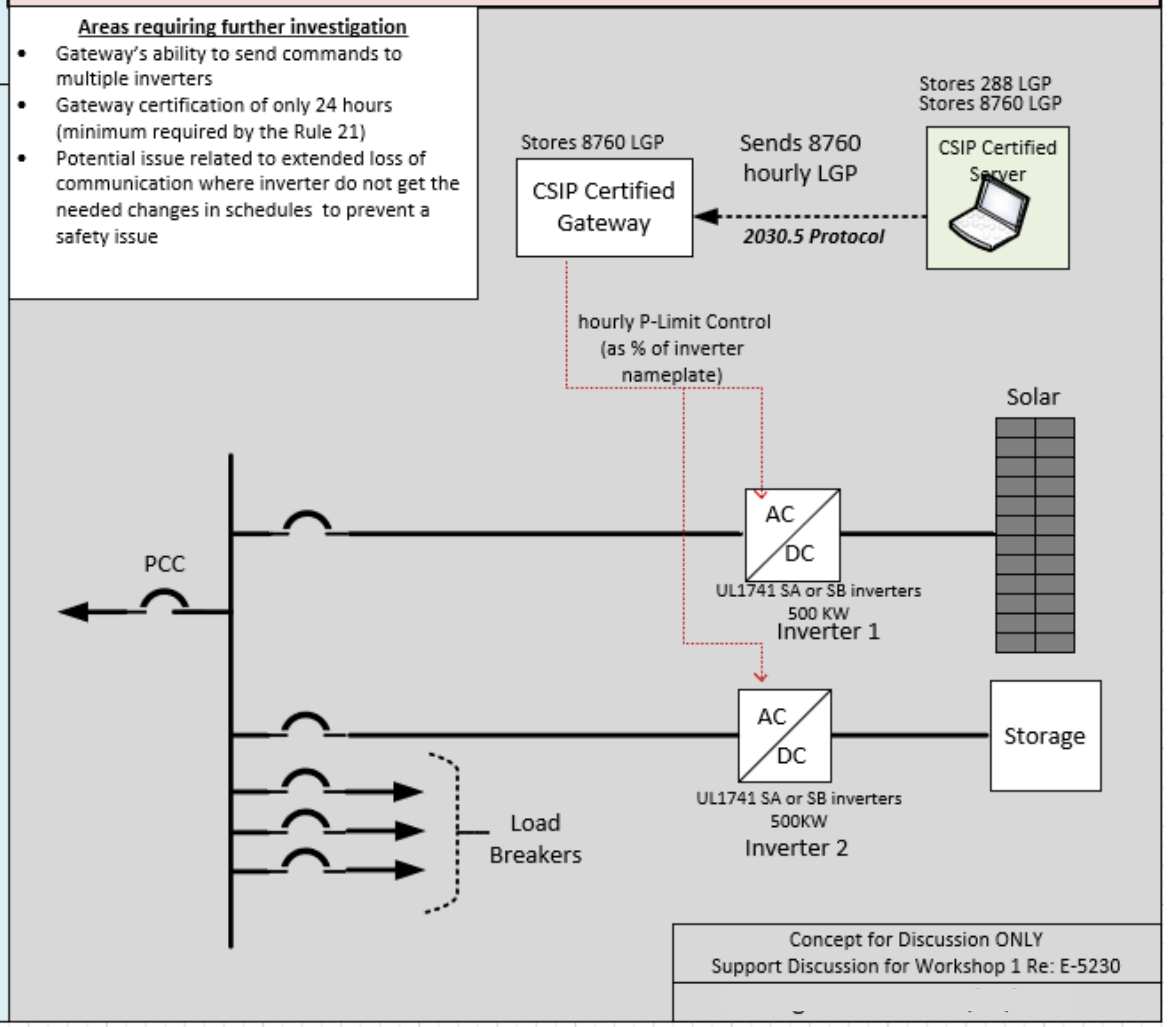
UL1741SA or SB Inverter
- Receives a new Plimit as % of its nameplate rating
- Enter operation based on new Plimit per IEEE1547-2018 standard
- Stays on that Plimt until new Plimit is received

Option 1: Limit Output at Inverter Terminals (not PCC)
Method B: Use of Server to Store 8760 LGP

Applicable Standards:
- CSIP for Gateway
- UL1741+SA or UL1741SB, 3th Edition for Inverters

Take away from Industry Discussion: : Technology application may be possible but there are areas needing further investigation and additional validation testing

Areas requiring further investigation
- Gateway's ability to send commands to multiple inverters
- Gateway certification of only 24 hours (minimum required by the Rule 21)
- Potential issue related to extended loss of communication where inverter do not get the needed changes in schedules to prevent a safety issue



Option 1 – Method C: Limit Output at Inverter Terminals

Equipment Requirements

CSIP Certified Server

- Capability to translate the 288 LGP to 8760 LGP(Create 8760 LGP)
- Capacity to store the yearly 8760 LGP
- Capable of sending a Plimit each hour
- Capable of cycling the 8760 on a yearly basis

CSIP Certified Gateway

- Capacity to receive and send limit without delay

UL1741SA or SB Inverters

- Receives and executes Plimit

Operational Requirements

CSIP Certified Server

- Translates 288 LGP to 8760 LGP(Create 8760 LGP)
- Sends one value each hour to Gateway via IEEE 2030.5 protocol
  - Recycle 8760 each year unless new 288 LGP is upload to the Server

CSIP Certified Gateway

- Receives the hour Plimit from Server via IEEE 2030.5 protocol
- Gateway relays to the the inverters the new Plimit command as % of inverter rating (Inverter need Plimit command as % of inverter nameplate rating)
- For multiple inverter systems, Gateway perform the required calculations as to send each inverter a Plimit without exceed the LGP at each hour (must share the LGP among all inverters)

Example: 1 MW aggregate Inverter Nameplate Rating (two inverters)

10am commands

- Command to inverter 1 = 90% of inverter 1 Nameplate (.45MW)
- Command to inverter 2 = 90% of inverter 2 nameplate (0.45MW)

UL1741SA or SB Inverter

- Receives a new Plimit as % of its nameplate rating
- Enter operation based on new Plimit per IEEE1547-2018 standard
- Stays on that Plimt until new Plimit is received

Option 1: Limit Output at Inverter Terminals (not PCC)

Method C: Use of Server to Store 8760 LGP- Sends the gateway each hour the limit for that hour, repeats the 8760 cycle on a yearly basis (unless updated)

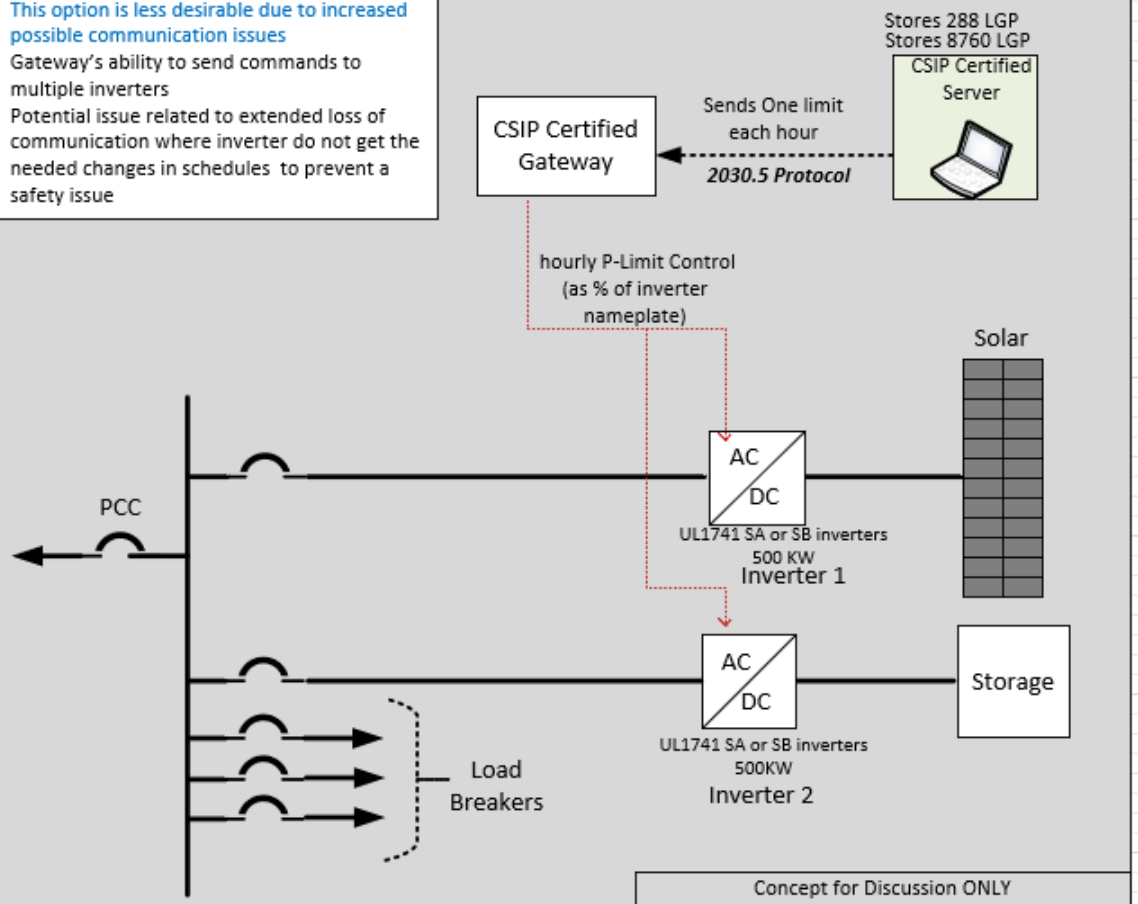
Applicable Standards:

- CSIP for Gateway
- UL1741+SA or UL1741SB, 3th Edition for Inverters

Take away from Industry Discussion: : Technology application may be possible but there are areas needing further investigation and additional validation testing

Areas requiring further investigation

- This option is less desirable due to increased possible communication issues
- Gateway's ability to send commands to multiple inverters
- Potential issue related to extended loss of communication where inverter do not get the needed changes in schedules to prevent a safety issue



Option 2 – Method D: Limit Output at PCC

Equipment Requirements

CSIP Certified Server
- Capacity to store the yearly 288 LGP

CSIP Certified Gateway
- Capability to translate the 288 LGP to 8760 LGP(create 8760 LGP)
- Capacity to store the yearly 8760 LGP

UL PCS Control Device
- Capable of receiving a hourly Plimit
- Capable of measuring export at PCC
- Capable of sending Plimit commands to inverters as to not exceed hourly limit at PCC (may need share with multiple inverters)

UL1741SA or SB Inverters
- Receives and executes Plimit

Operational Requirements

CSIP Certified Server
- Sends 288 LGP to Gateway via IEEE 2030.5 protocol
  - Repeat each year automatically **or**
  - A human forces the update each year

CSIP Certified Gateway
- Receives the 288 LGP from Server via IEEE 2030.5 protocol and translates to 8760 LGP
- Each hour of the 8760 LGP , sends the PCS a new export limit

Example:
10am limit = 0.9MW
11am Limit = .85 MW
12pm Limit = 1MW

UL PCS Device
- Receives hourly limit from Gateway
- Sends new Plimit commands to inverters based on measurement at PCC
- Measures Power(P) at PCC
  - If P>hourly limit, send inverters a reduced Plimit until P≤ hourly limit.
  - If P≤ hourly limit – no action required but may send new Plimit to increase inverter output
- For Multiple inverters, PCS must send Plimit as to not exceed Plimit at PCC
- PCS must not allow inverters to return to full output unless intended

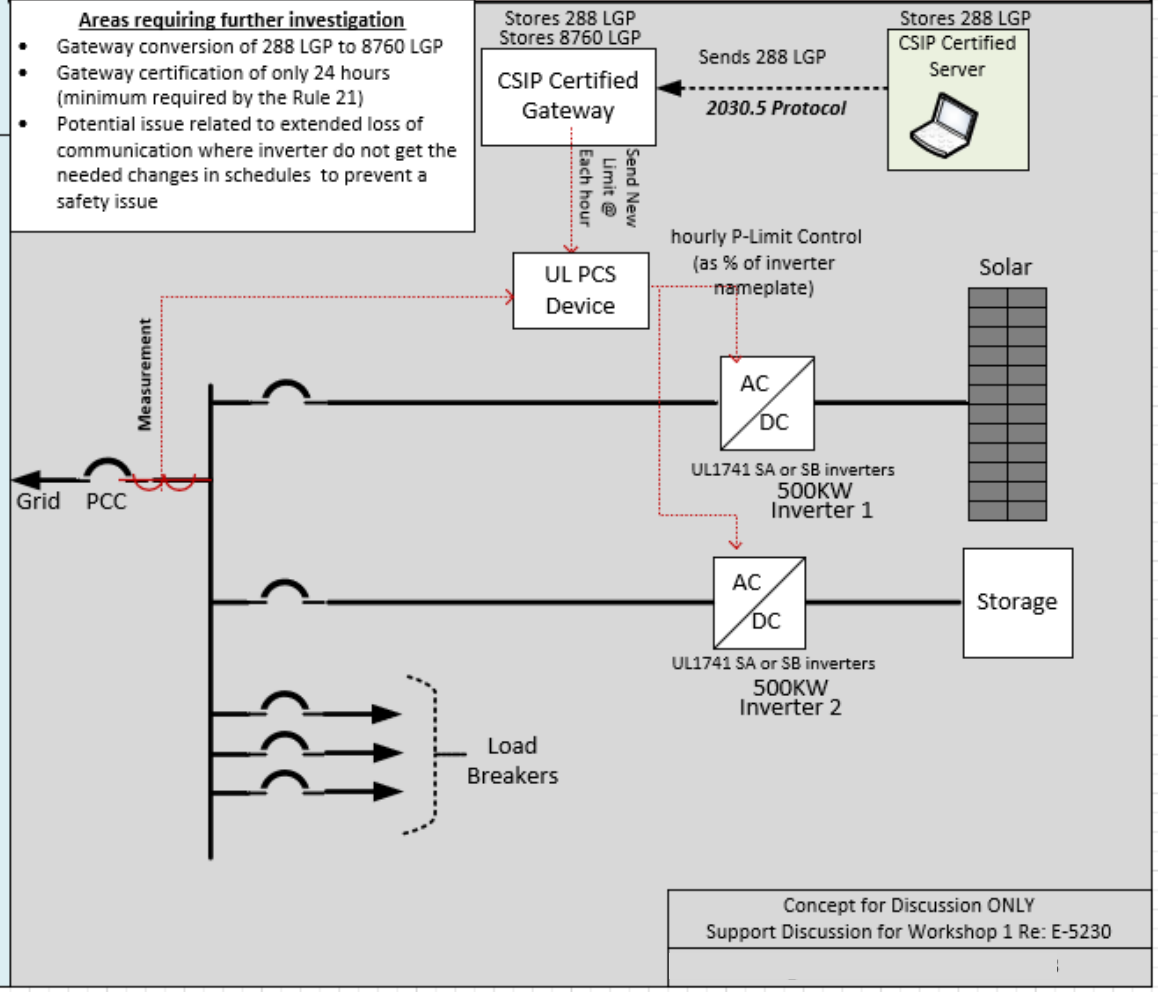
UL1741SA or SB Inverter
- Receives a new Plimit
- Enter operation based on new Plimit per IEEE1547-2018 standard
- Stays on that Plimt until new Plimit is received

Option 2: Control generation output based on PCC export limit
Method D: Use of Server to Store 288 LGP

Applicable Standards:
- CSIP for Gateway
- UL1741+SA or UL1741SB, 3th Edition for Inverters
- UL PCS CRD for UL PCS Device

Take away from Industry Discussion: Technology application may be possible but industry is not actively pursuing making products available

Areas requiring further investigation
- Gateway conversion of 288 LGP to 8760 LGP
- Gateway certification of only 24 hours (minimum required by the Rule 21)
- Potential issue related to extended loss of communication where inverter do not get the needed changes in schedules to prevent a safety issue



Option 2 – Method E: Limit Output at PCC

Equipment Requirements

CSIP Certified Server
- Capacity to store the yearly 288 LGP
- Capability to translate the 288 LGP to 8760 LGP(create 8760 LGP)
- Capacity to store the yearly 8760 LGP

CSIP Certified Gateway
- Capacity to receive and send limit without delay

UL PCS Control Device
- Capable of receiving a hourly Plimit
- Capable of measuring export at PCC
- Capable of sending Plimit commands to inverters as to not exceed hourly limit at PCC (may need share with multiple inverters)

UL1741SA or SB Inverters
- Receives and executes Plimit

Operational Requirements

CSIP Certified Server
- Sends 288 LGP to Gateway via IEEE 2030.5 protocol
  - Repeat each year automatically or
  - A human forces the update each year

CSIP Certified Gateway
- Receives the 288 LGP from Server via IEEE 2030.5 protocol and translates to 8760 LGP
- Each hour of the 8760 LGP , sends the PCS a new export limit

Example:
10am limit = 0.9MW
11am Limit = .85 MW
12pm Limit = 1MW

UL PCS Device
- Receives hourly limit from Gateway
- Sends new Plimit commands to inverters based on measurement at PCC
- Measures Power(P) at PCC
  - If P>hourly limit, send inverters a reduced Plimit until P≤ hourly limit.
  - If P≤ hourly limit – no action required but may send new Plimit to increase inverter output
- For Multiple inverters, PCS must send Plimit as to not exceed Plimit at PCC
- PCS must not allow inverters to return to full output unless intended

UL1741SA or SB Inverter
- Receives a new Plimit
- Enter operation based on new Plimit per IEEE1547-2018 standard
- Stays on that Plimt until new Plimit is received

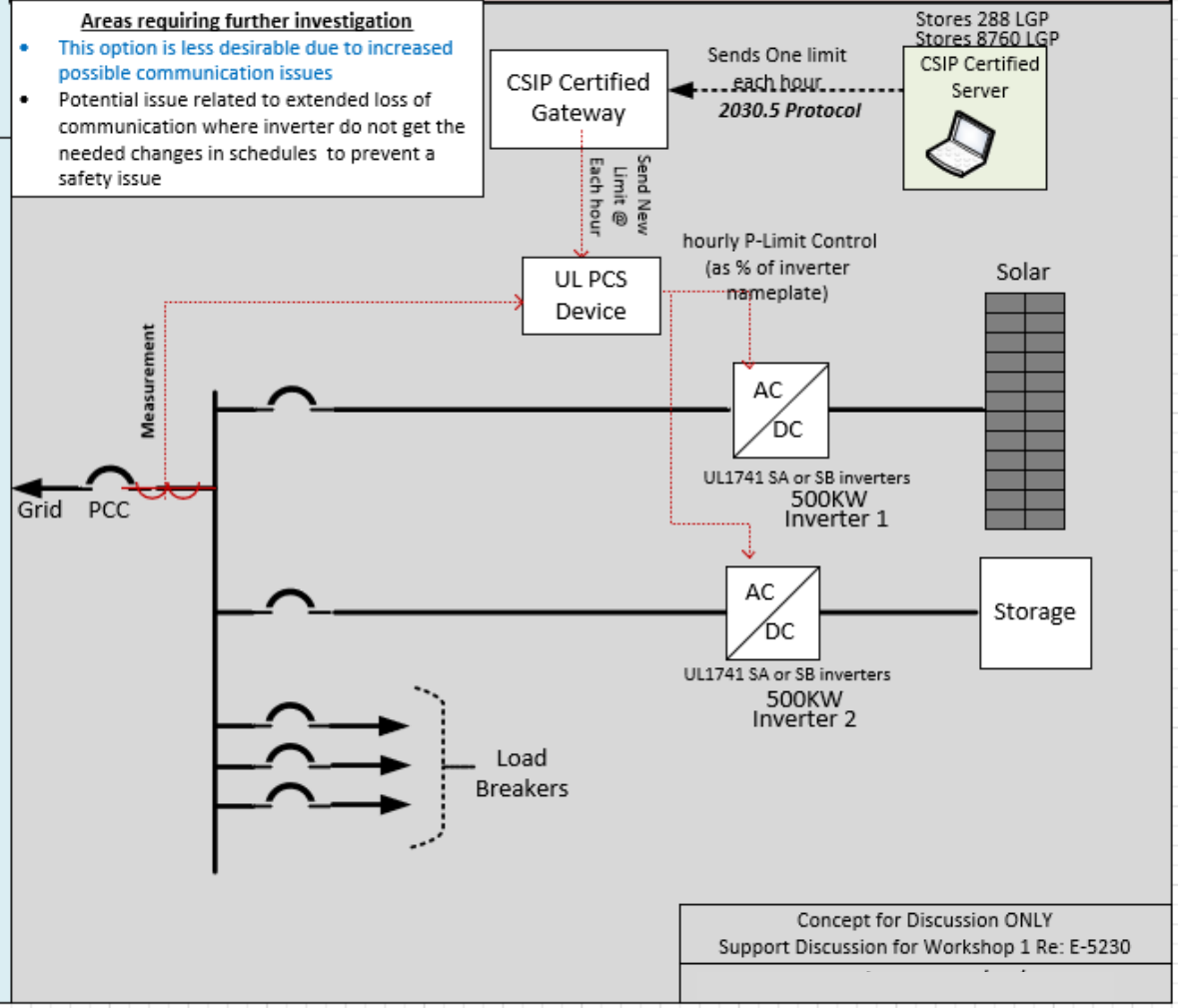
Option 2: Control generation output based on PCC export limit

Method E: Use of Server to Store 8760 LGP- Sends the gateway each hour the limit for that hour, repeats the 8760 cycle on a yearly basis (unless updated)

Applicable Standards:
- CSIP for Gateway
- UL1741+SA or UL1741SB, 3th Edition for Inverters
- UL PCS CRD for UL PCS Device

Take away from Industry Discussion: Technology application may be possible but industry is not actively pursuing making products available

Areas requiring further investigation
- This option is less desirable due to increased possible communication issues
- Potential issue related to extended loss of communication where inverter do not get the needed changes in schedules to prevent a safety issue



Option 2 – Method F: Limit Output at PCC

Equipment Requirements

CSIP Certified Server
- Capability to translate the 288 LGP to 8760 LGP(create 8760 LGP)
- Capacity to store the yearly 8760 LGP

CSIP Certified Gateway
- Capacity to store the yearly 8760 LGP

UL PCS Control Device
- Capable of receiving a hourly export limit
- Capable of measuring export at PCC
- Capable of sending Plimit commands to inverters as to not exceed hourly limit at PCC(May need to share with multiple inverters)

UL1741SA or SB Inverters
- Receives and executes Plimit

Operational Requirements

CSIP Certified Server
- Sends 8760 LGP to Gateway via IEEE 2030.5 protocol
  - Repeat each year automatically or
  - A human forces the update each year

CSIP Certified Gateway
- Receives the 8760 LGP from Server via IEEE 2030.5 protocol (stores 8760 LGP)
- Each hour of the 8760, sends the PCS a new export limit
  Example:
  - 10am limit = 0.9MW
  - 11am Limit = .85 MW
  - 12pm Limit = 1MW

UL PCS Device
- Receives hourly limit from Gateway
- Sends new Plimit commands to inverters based on measurement at PCC
- Measures Power(P) at PCC
  - If P>hourly limit, send inverters a reduced Plimit until P≤ hourly limit.
  - If P≤ hourly limit – no action required but may send new Plimit to increase inverter output
- For Multiple inverters, PCS must send Plimit as to not exceed Plimit at PCC
- PCS must not allow inverters to return to full output unless intended

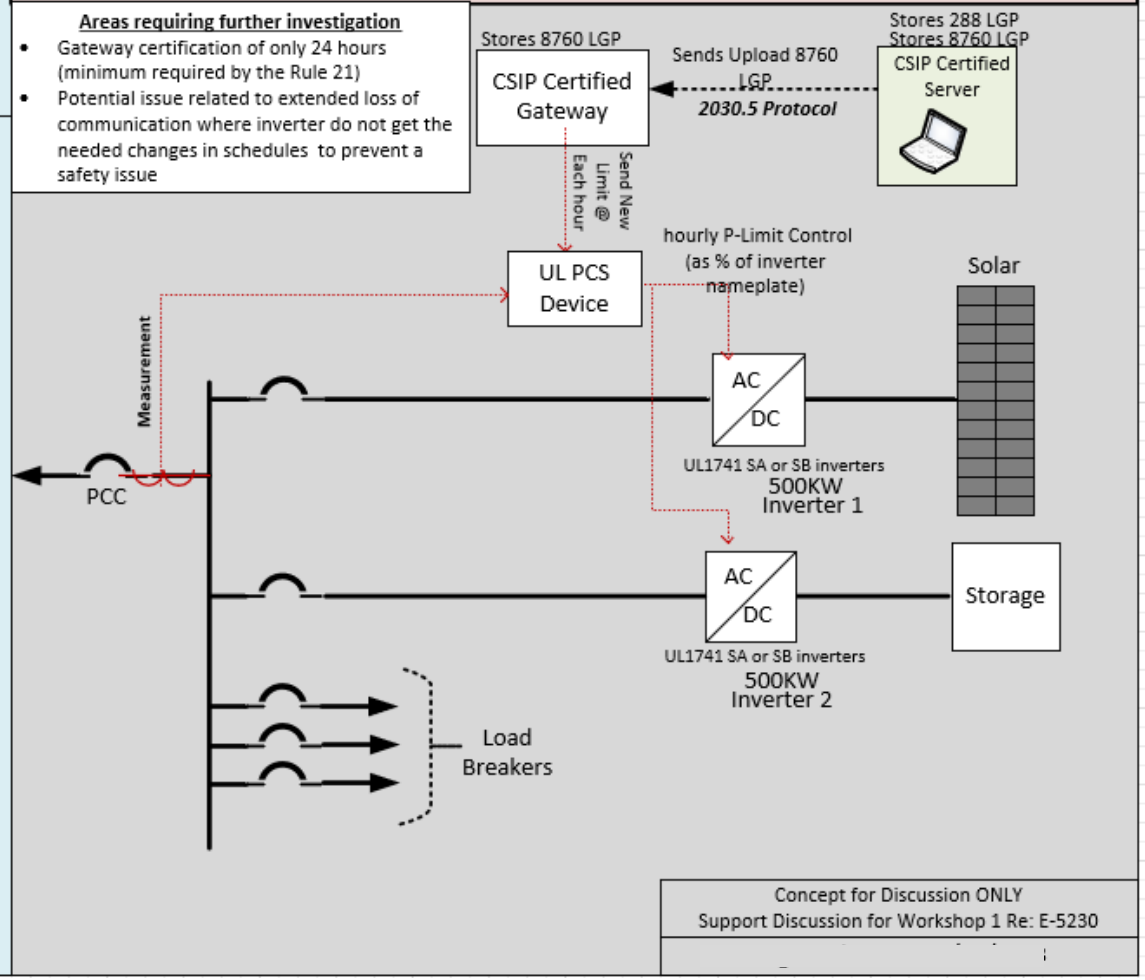
UL1741SA or SB Inverter
- Receives a new Plimit
- Enter operation based on new Plimit per IEEE1547-2018 standard
- Stays on that Plimt until new Plimit is received

Option 2: Control generation output based on PCC export limit
Method F: Use of Server to Store 8760 LGP

Applicable Standards:
- CSIP for Gateway
- UL1741+SA or UL1741SB, 3th Edition for Inverters
- UL PCS CRD

Take away from Industry Discussion: Technology application may be possible but industry is not actively pursuing making products available

Areas requiring further investigation
- Gateway certification of only 24 hours (minimum required by the Rule 21)
- Potential issue related to extended loss of communication where inverter do not get the needed changes in schedules to prevent a safety issue



Option 3 – Method G: Limit Output at PCC (With PCS)

Equipment Requirements

UL PCS Control Device
- Capable of storing 8760 LGP
- Capable of measuring export at PCC
- Capable of sending Plimit commands to inverters as to not exceed hourly limit at PCC(May need to share with multiple inverters)

UL1741SA or SB Inverters
- Receives and executes Plimit

Operational Requirements

UL PCS Device
- Each hour of the 8760 LGP, sends the Inverters sends a new export limit
  Example:
  - 10am limit = 0.9MW
  - 11am Limit = .85 MW
  - 12pm Limit = 1MW
- UL PCS Measures Power(P) at PCC
  - If P>hourly limit, send inverters a reduced Plimit until P≤ hourly limit.
  - If P≤ hourly limit – no action required but may send new Plimit to increase inverter output
- For Multiple inverters, PCS must send Plimit as to not exceed Plimit at PCC

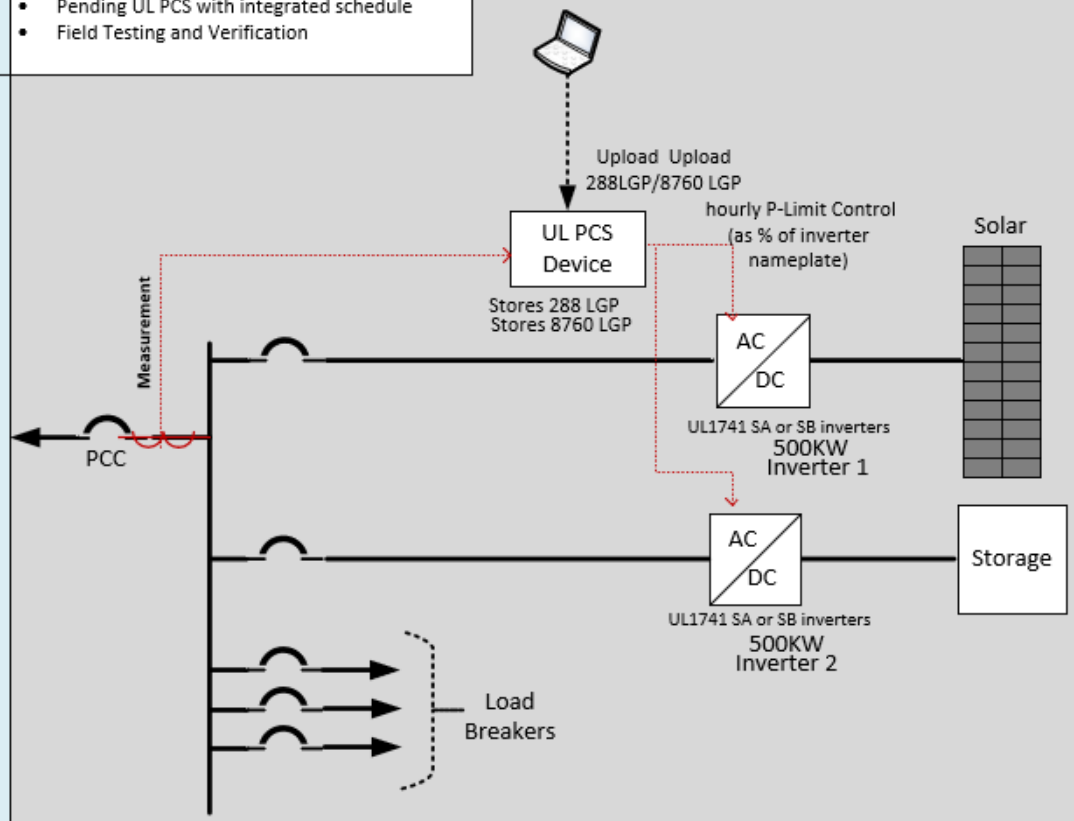
UL1741SA or SB Inverter
- Receives a new Plimit
- Enter operation based on new Plimit per IEEE1547-2018 standard
- Stays on that Plimt until new Plimit is received

Option 3: Control generation output based on PCC export limit
Method G: Use PCC with integrated schedule

Applicable Standards:
- UL1741+SA or UL1741SB, 3th Edition for Inverters
- UL PCS CRD (With Integrated Scheduling)

Take away from Industry Discussion: Standards are being developed and may be available by Q2, 2023

Areas requiring further investigation
- Pending UL PCS with integrated schedule
- Field Testing and Verification



Concept for Discussion ONLY
Support Discussion for Workshop 1 Re: E-5230

Implementation of LGP

- Rule 21 needs to be updated to reflect the technical, operational, and contractual requirements of LGP
  - The topics are being discussed in the various workshops:
    - Workshop 1 – February 1, 2023
    - Workshop 2 – February 21, 2023
    - Workshop 3 – March 14, 2023
    - Other workshops as may be necessary
  - IOUs will submit an updated AL for implementing LGP (based on all the workshop discussions)
  - PUC will approve AL and Rule 21 updated
- Implementation of LGP 9 months after the approval of the AL

CPUC Energy Division
April 19, 2021
Page 8

	OP 15	OP 51	IREC Proposal
Timing for updates to Rule 21 once certification standards are approved	Update within 60 days	Update within 90 days	Update within 60 days
Implementation timeline once certification standards are approved	No timeline provided	9 months	9 months

OP 15 requires IOUs to modify Rule 21 to use Limited Generation Profiles within "60 days of adoption of a certification scheme for the Limited Generation Profile," but OP 51 requires the IOUs file a Tier 2 Advice Letter addressing the same Rule 21 modifications within 90 days of the same.[16] To reconcile these different dates for the same requirement, the Energy Division should instruct the IOUs to file a Tier 2 Advice Letter modifying Rule 21 to allow the use of Limited Generation Profiles within 60 days of adoption of a certification scheme for the Limited Generation Profile. No modification to D.20-09-035 would be necessary if the IOUs fully comply with the requirement within 60 days.

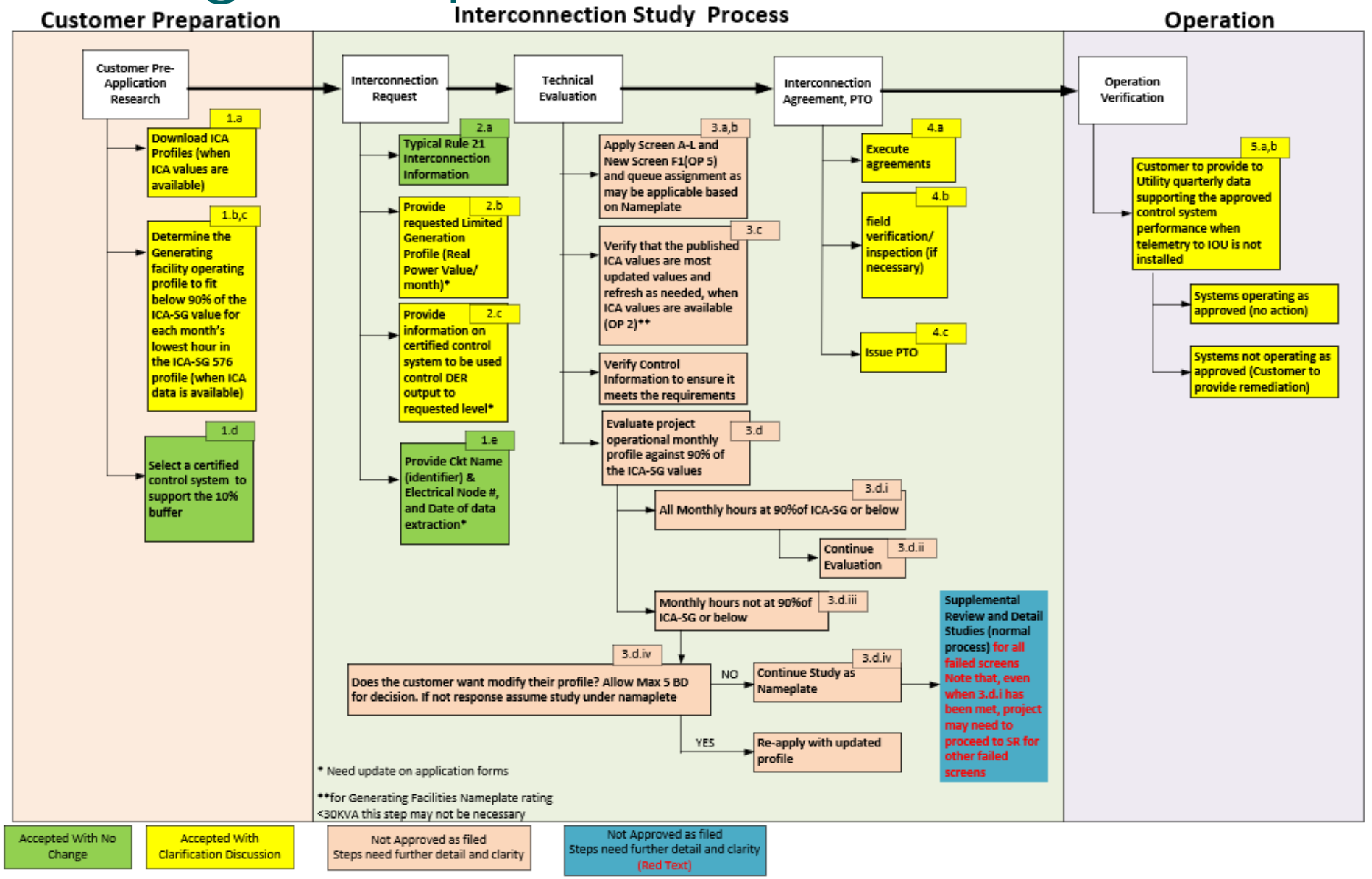
Topic B.2: Use of Gross Nameplate Rating

Background on Topic B.2

"We direct the Large IOUs to discuss tariff language modifications during the workshops and to provide more information on which aspects of Screen P will be studied using the LGP value and which will not, if this is the case. In the November 10, 2022 SIWG meeting, the Large IOUs also state that Screens F, G, and H will be evaluated on nameplate rating. The Large IOUs note that 'Screens A-E are also not included in ICA calculation. The evaluation is not based on nameplate rating but will depend on aspects of each screen.' As it is still in unclear how screens D, I, J, and K will be studied, discussions regarding these screens should continue within the workshop discussions. We find a mere statement 'Given that ICASG values do not account for screens D, J, and K, then it is appropriate to evaluate screen D using gross nameplate rating' without proper justification and details unconvincing. Accordingly, the Large IOUs are directed to fully justify their arguments. The discussions should refer to how the Decision adopts Proposal A-B 3 and how the Working Group Three Report states the screens should be applied, which we discuss below. Below we also address SDG&E's response regarding upward revisions in allowable generation."

- Resolution 5230

Proposed Changes to Implement LGP



Screening Process Discussion

"The Large IOUs note that “Screens A-E are also not included in ICA calculation. The evaluation is not based on nameplate rating but will depend on aspects of each screen"

- **Screen A:** Determines if project is located on a "Networked Secondary.“ ICA values not calculated for secondary systems (networked or not).
- **Screen B:** Screen is related to certification of equipment (inverters, PCS) which is not related to ICA calculations.
- **Screen C**: While ICA has PQ/Voltage fluctuations, that is mainly for primary systems. Screen C includes voltage drop and flicker on the service transformer and secondary service; service transformers and secondary service are not included in ICA.
- **Screen D:** This screen is related to service transformer/secondary overloads which are not accounted for in ICA given that ICA only calculates the values at the primary system.
- **Screen E:** This screen is related to circuit phase balancing for single-phase generators. Single phase circuit balancing is not calculated in ICA.

Addressing Rule 21 Screens D, I, J and K as they relate to LGP

"As it is still in unclear how screens D, I, J, and K will be studied, discussions regarding these screens should continue within the workshop discussions"

- **Screen D:** IOU's will use the maximum potential export based on the LGP when analyzing Screen D.
- **Screen I:** Screen I asks whether the project will export power across the PCC. Currently there are 11 screen I options. Pending further discussion, a 12th may be need to be added to address LGP projects.
- **Screen J:** Rule 21 already uses Gross Nameplate Rating. The working group only recommended that "11 KVA" be changed to "30 KVA." No changes were recommended or discussed regarding changing Gross Nameplate Rating.
- **Screen K:** Same argument as for Screen J.

Screening Process Discussion

"In the November 10, 2022 SIWG meeting, the Large IOUs also state that Screens F, G, and H will be evaluated on nameplate rating"

The following screens are evaluated on Nameplate and not included in ICA calculations

- **Screen F:** ICA does not calculate Short Circuit Contribution Ratio (SCCR) to determine if SCCR is ≤ 10%.
- **Screen F.1:** ICA uses facility gross nameplate to determine whether short circuit contribution is within allowable limits.
- **Screen G:** ICA does not calculate impact of increased short circuit on protection and devices and equipment.
- **Screen H**: ICA does not account for line configuration loading per table G-1 of Rule 21.

Screening Process Discussion

"We direct the Large IOUs to discuss tariff language modifications during the workshops and to provide more information on which aspects of Screen P will be studied using the LGP value and which will not, if this is the case"

Analysis of Screen P under supplemental review will be triggered by failure of Screens [A-H] . As indicated on slide 10, Screens F, F.1, G, and H use nameplate, therefore, Screen P would be evaluated using nameplate.

Exact tariff language for the screens impacted by LGP needs to be developed.

Topic C: Overview of Proposals: Including technical requirements, "Monthly" scheduling (See Topic 5), Nameplate capacity (Topic 2); Should include alignment of language (Section D of Res) and incorporate all topics in Resolution

Overarching Framework Discussion For Section C

@ pg. 24/57
"The Large IOUs shall also differentiate between "export power" and "output power" and make clear that the LGP option is intended to manage the amount of export power to the electric grid and not output power that may be consumed on-site."

- IOUs confirm that the LGP option is intended to manage the amount of export power to the electric grid at the Point of Common Coupling (PCC)
- IOUs also make available the option of applying LGP at the output of the inverters (additional discussion as part of Topic E)

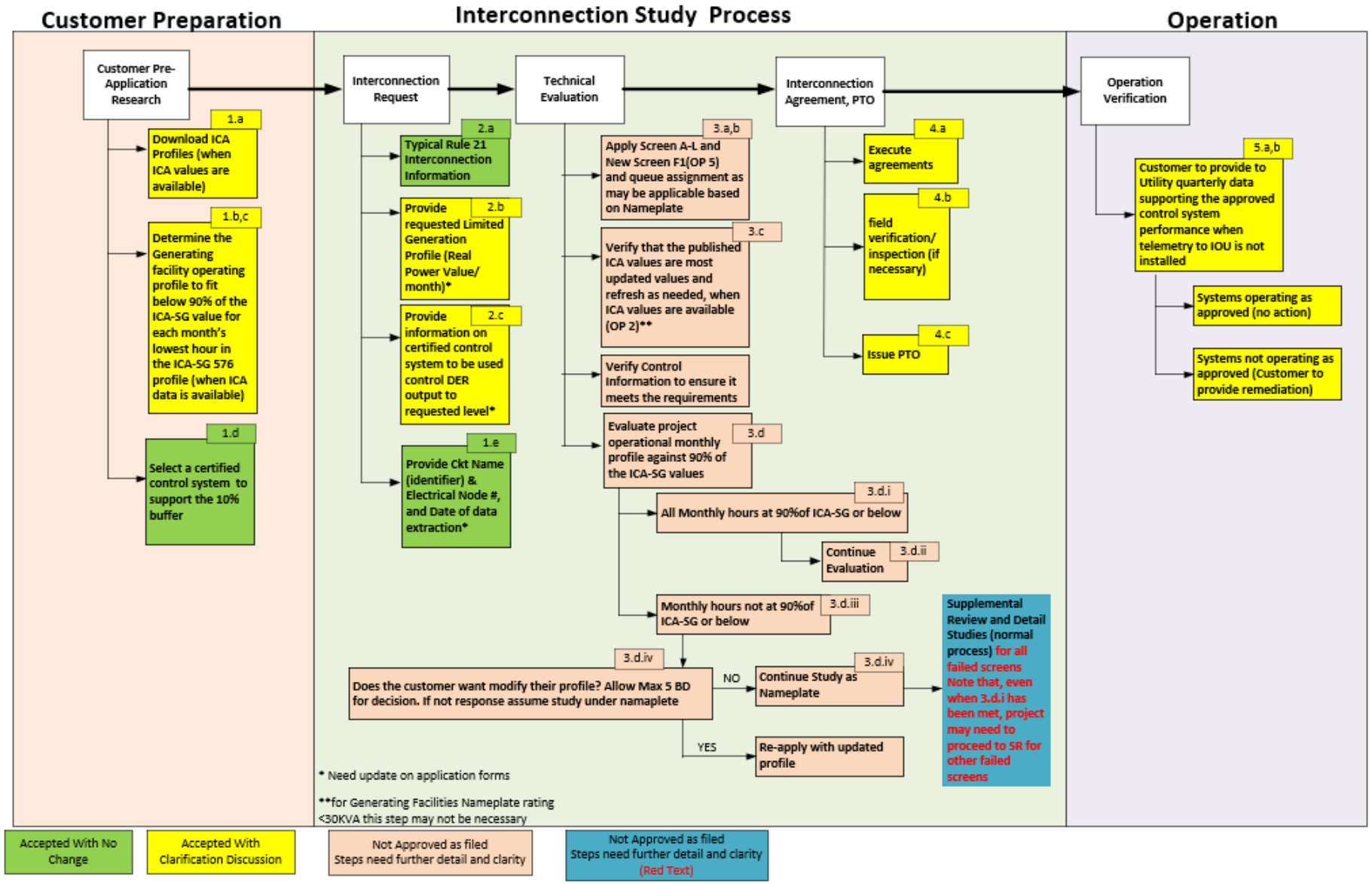
@ 24/57
"In consideration of the significant time that has passed since the filing of the ALs, the Large IOUs **shall discuss any updates to the proposals that their subsequent experiences indicate may be warranted."**

- While significant time has passed since filing of the AL, joint IOUs have not yet utilized any version of LGP and thus IOU experience is limited to the use of UL Certified PCS for a single value
- IOUs are currently working with industry to gain more knowledge on the technology capable and necessary to support LGP

"The Large IOUs are **directed to go over the proposal to address any questions stakeholders may have and determine whether each step is appropriate and complete**"

- The framework as outlined in Appendix A (Depicted by Figure 1) remains appropriate with the clarification to be provided via this workshop for several elements of the proposals
- IOUs will review in detail each of the steps in the framework. The review and discussion will include:
  - Any direction for clarification or discussion as specified directly in the Resolution
  - Steps for which the Resolution did not require specific requirements for clarification or discussion

Original Overarching Framework Discussion For Section C Background



- Decision D.20-09-035 OP 15 required that IOUs to discuss with SIWG the implementation of LGP per IOUs counter outlined Rulemaking 17-07-007 Working Group Two Final Report
- IOUs presented and discussed the implementation framework on the January 21, 2021, and February 18, 2021 SIWG meetings
- Figure 1 is the outcome of the February 18 SIWG meeting and source for IOUs Tier 3 ALs modified to reflect direction from Resolution E5230
- In the subsequent slides, IOUs will further discuss steps which:
  - Have been accepted with no changes
  - Have been identified in the Resolution as needing additional clarification or discussion

Figure 1 – Original LGP implementation Framework updated to reflect direction from Resolution E-5230

Detailed Discussion of Section C (LGP Framework)

Phase 1. Customer Preparation Phase:

1.a

Download ICA Profiles (when ICA values are available)

The discussion below clarifies what is meant by the term 'three-phase electrical nodes,' applicability of a three-phase electrical node and the meaning of "monthly"

Step	Resolution Question	IOU Response
1.a	1)The Large IOUs refer to "three-phase electrical node." For transparency, and for those not familiar with the ICA, the Large IOUs shall clarify the use of three-phase electrical nodes and any planned changes to the ICA that may expand the ICA to single phase nodes.	• Consistent with D.17-09-026, the IOUs currently perform ICA and publish ICA results where the distribution system is composed of three phase conductors. There are no planned changes to expand ICA to single-phase nodes. In the IOUs ICA maps, line segments inherit the ICA results of the associated three-phase electrical node. • Customers would identify the ICA line segment near their proposed site and review the ICA results for that line segment • Three phase electrical nodes are electrical points in the grid used for connecting three phase electrical services (for load or generation). These would be commercial, industrial, and large generating facilities (typically >50KVA). Residential services are mostly connected at single phase nodes
1.b	2)the Large IOUs shall clarify the term "monthly" and specify the schedule upon which a LGP profile must be updated.	The IOUs clarified the use of the term "monthly" in LGP Workshop 1, which is defined as a profile containing 24 values per month (where all hourly values for a given month are the same) for each of the 12 months, totaling 288 data points. See slide titled "Required Format for LGP." See Joint Advice 4941-E, for explanation of how the IOUs propose to address LGP profile updates.

Detailed Discussion of Section C (LGP Framework)

Phase 1. Customer Preparation Phase:

1.b,c

Determine the Generating facility operating profile to fit below 90% of the ICA-SG value for each month's lowest hour in the ICA-SG 576 profile (when ICA data is available)

- Download the ICA hourly profile
- Examine and conform the downloaded data to inform the minimum LGP monthly values
- Ensure each hour of the LGP is at or below 90% of the ICA-SG Value for that hour
- Provide IOU the proposed LGP using agreed on template via IOU interconnection process

1.d

Select a certified control system to support the 10% buffer

- Customer to select a certified control system to support the LGP
- IOUs are currently investigating with Industry members the availability of technology to support LGP.
  - UL PCS with scheduling functionality is not yet available, standards are currently being developed and potentially ready for use by Q2, 2023
  - A combination of CSIP certified gateway and server may be available but requires further investigation

Customers shall capture the name of the Distribution Feeder (circuit) name, the three-phase electrical node identifier (PG&E: CSV Line Section) (SCE and SDG&E: Node ID), and the date of when the data extraction took place. This information will be needed when the customer submits the Interconnection Request.

Detailed Discussion of Section C (LGP Framework) - Continue

Phase 2. Interconnection Request Phase:

2.a **Typical Rule 21 Interconnection Information**

2.b **Provide requested Limited Generation Profile (Real Power Value/ month)***

2.c **Provide information on certified control system to be used control DER output to requested level***

Discussion below covers interconnection tools, common LGP format, and alternative method for applicable IOUs

Step	Resolution Question	IOU Response
2.b	1a) The Large IOUs use the terminology "Limited Generation Values." We ask the Large IOUs, for consistency and clarity, to use the term "Limited Generation Profile values" or other agreed upon term.	The IOUs agree to make the terminology change to "Limited Generation Profile values"
2.b	1b) The Large IOUs shall clarify if a common scheduling format may be used to supply this information, and if not, the reasons for it	The IOUs agree to use the common scheduling format proposed by the IOUs. An initial proposal for a common scheduling format was presented by the IOUs at LGP Workshop 1 (see slide titled "Required Format for LGP.") Specific terminology may vary across IOUs.
	1b cont.)Additionally, the Large IOUs shall clarify what is meant by "alternative method."	• By alternative method, SCE clarifies that if SCE's interconnection portals are not capable of accepting (.CSV) files at the time of LGP implementation and thus SCE may need to rely on customers emailing the (.CSV) files to SCE as part of the interconnection request. SCE would inform its stakeholders once the interconnection portals have been upgraded to accept the files. • PGE is currently updating the interconnection portal to allow LGP application submittal. These updates are intended to allow interconnection customers to upload their LGP in an IOU's acceptable format. If these updates allowing file uploads are not completed when LGP projects begin, PGE will accept an emailed LGP file. • SDG&E currently plans to accept CSV file uploaded via its interconnection portal.

Detailed Discussion of Section C (LGP Framework) - Continue

Phase 2. Interconnection Request Phase:

Provide information on certified control system to be used control DER output to requested level* 2.c

Discussion below covers clarification of selection of equipment for LGP applications
IOUs are currently investigating with Industry members the availability of technology to support LGP.

- UL PCS with scheduling functionality is not yet available, standards are currently being developed and potentially ready for use by Q2, 2023
- A combination of CSIP certified gateway and server may be available but requires further investigation

Step	Resolution Question	IOU Response
2.c.i	2a) More clarity is needed with regards to the statement provided by SCE and SDG&E that "additional requirements for control information will be determined and provided." SCE and SDG&E should clarify whether this information is part of the technical specifications discussed in Issue 5. Should PG&E also adopt this or similar language, PG&E shall meet these requirements. …. The Large IOUs shall provide this information via revisions to Rule 21 within the ALs which are required to be filed 60 days following the publication of a certification scheme, per OP 15 of D.20-09-035.	• SCE and SDG&E align with PG&E's methodology of listing certified UL PCS that customers can select during the application process. Alternatively, joint IOUs can leverage CEC listing when available. • Based on experience interconnecting customers using UL-certified PCS devices, SCE and SDG&E view that there is no need to add additional technical requirements beyond listing of UL-certified Power Control Systems. • The IOUs believe these are not part of the technical requirements requested by IREC. As discussed in Issue 5, IREC requested that IOUs publish technical requirements. IREC should discuss what additional technical requirements may be needed beyond listing of UL certified Power Control Systems. • Certification for UL PCS has not yet been published.
2.c.i	2b) SDG&E defines "PCS" as "Power Control Settings." SDG&E shall align this language to reflect "Power Control Systems."	SDG&E confirms it will define "PCS" as "Power Control Systems"
2.c.i	2c)It is unclear if these requirements are part of the technical requirements the Large IOUs have committed to publishing as discussed in Issue 5. The Large IOUs shall clarify the difference.	See response to 2.a.

Detailed Discussion of Section C (LGP Framework) - Continue

Phase 3. Technical Evaluation Phase:

3.a,b

Apply Screen A-L and New Screen F1(OP 5) and queue assignment as may be applicable based on Nameplate

Discussion below provides clarification on which screens are based on nameplate (3.a), queuing methods, and impacts to subsequent projects.

Step	Resolution Question	IOU Response
3.a	1.a) the Large IOUs propose to apply all the Initial Review Screens (A-L) based on the Nameplate capacity. This shall be clarified and updated as applicable; the Large IOUs shall abide by the requirements set forth in this Resolution.	Utilities agree some screens would be based on nameplate and others would be based on export. The topic will be covered in SIWG topic B.2.
3.b	2.a) More clarity shall be provided with regards to what this implies for the interconnection queue and specific details on how it would function. This step shall be updated based on results of workshop discussions as directed in Resolving Issue 2. The Large IOUs shall also discuss if exceptions need to be made for certain studies.	• The interconnection queue as published will only contain the nameplate for LGP projects. • Projects that request interconnection after an LGP project will be evaluated using updated ICA values that include the LGP project. As indicated above, power flow impacts (such as voltage and thermal) will be based on the LGP while other aspects (such SCD) will be based on Nameplate • Per D.20-06-017, no projects would be allowed to move ahead of other projects in the queue, however, in some cases where need to obtain updated LGP profile (per Section 3.d.iii in Appendix A), the timing of subsequent projects may be affected
3.b	2.b) SCE and SDG&E state that the nameplate capacity will be used as a baseline for subsequent impact studies, monthly ICA updates and other studies. This step shall be updated based on results of workshop discussion as directed in Resolving Issue 2. The Large IOUs shall also discuss if exceptions need to be made for certain studies.	The IOUs will update this step as needed based on discussions related to Resolving Issue 2 (Use of Gross Nameplate Rating)

Detailed Discussion of Section C (LGP Framework) - Continue

Phase 3. Technical Evaluation Phase:

3.c

Verify that the published ICA values are most updated values and refresh as needed, when ICA values are available (OP 2)**

Discussion below provides clarification as how ICA values are to be used and the need to refresh outdated ICA values

@ 26/57

The Large IOUs shall discuss the associated timing to conduct the Technical Evaluation to avoid conflict with the updates to the ICA values. We remind the Large IOUs that per OP 4 of D.20-09-035:

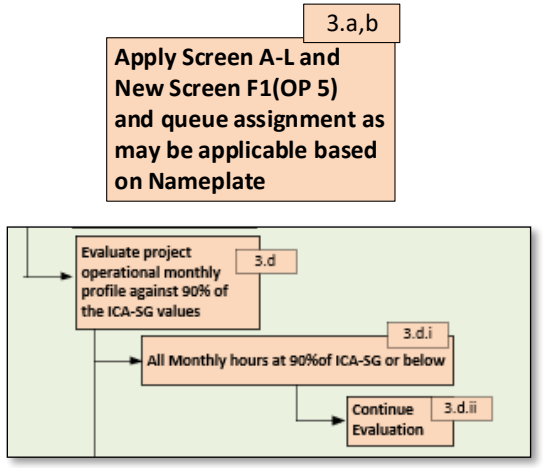
- Given that ICA values are updated on a monthly basis, Technical evaluation will be based on the most updated ICA values
  - In some cases, the published ICA values are outdated due a grid chance (new generation, new load, new circuit configuration, etc.)
- The timing of the Fast Track initial review would be per established requirements (15 business days from application deemed complete) – Changes to this timing for LGP projects which do not meet the 90% of the LGP for each hour will be discussed in subsequent slides

[The Large IOUs] shall track when the Integration Capacity Analysis outdated values lead to Interconnection Requests failing the Initial Review.... [and] shall also track the costs associated with the updates necessitated by the outdated values and provide the data in ... [a] reporting document ....

- Per OP 2, IOUs will utilize updated ICA values when the ICA values are not up to date.
- IOUs will comply with Decision requirements related to outdated values, associated cost tracking for updating the outdated ICA values, and reporting requirements

Detailed Discussion of Section C (LGP Framework) - Continue

Phase 3. Technical Evaluation Phase:

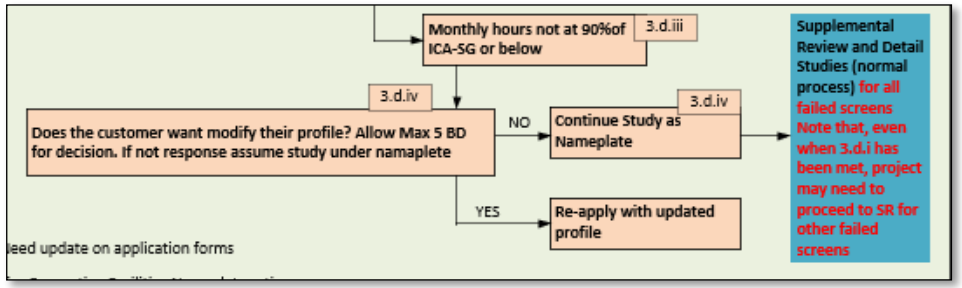


Discussion below provides clarification on the study process for evaluation of Screens A-L, and screen M using LGP values

Step	Resolution Question	IOU Response
3.d.i	3) the Large IOUs state that if the export request for each of the 12 months is at or below the 90% of each month's minimum ICA-SG value then the project can continue with its evaluation. This step shall be updated as needed based on discussions related to Resolving Issue 2.	The IOUs will compare each hour of the customer's proposed LGP profile with 90% of the ICA-SG profile. The IOUs will update this step as needed based on discussions related to Resolving Issue 2 (Use of Gross Nameplate Rating)
3.d.ii	4) the Large IOUs state "If all Initial review screens (A-L) are met including 3.d.i (all requested values are below 90% of each month's ICA values)" then the project will pass the Rule 21 Fast Track screens. This step shall be updated as needed based on discussions per Resolving Issue 2.	• The IOUs will update this step as needed based on discussions related to Resolving Issue 2.(Use of Gross Nameplate Rating)

Detailed Discussion of Section C (LGP Framework) - Continue

Phase 3. Technical Evaluation Phase:

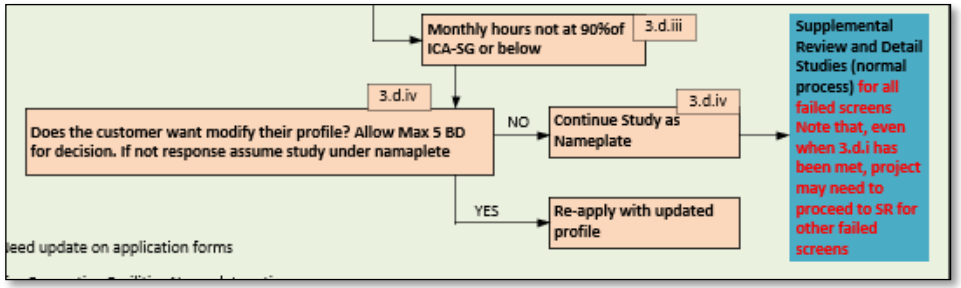


Discussion below provides clarification how customer will be given an opportunity to update the LGP values if one or more does not comply with 90%, the process, and timing of the communication with customer

Step	Resolution Question	IOU Response
3.d.iii	5) "the Large IOUs propose to inform the customer if the export request for one or more of the 12 months of LGP is not at or below the 90% ICA-SG limit. The Large IOUs shall clarify how this will be communicated, within what timeline in the review process it will be communicated, and agree on a format for communicating the appropriate values to be utilized in order to expedite the response from the customer and streamline interconnection process. The Large IOUs shall discuss the significance to the queue position and if the customer will preserve their queue position under these circumstances. The Large IOUs shall also clarify how future grid conditions that warrant a change to the LGP will be communicated to the customer and the time required to change the LGP. This step shall also be updated as needed based on workshop discussions.	• After further research, IOU's identified that section F(2)(b) of the tariff allows modifications that obviate the need for Supplemental Review. To be fair to all other Rule 21 projects (including those currently using ICA), IOU's propose failing Screen M in initial review whenever the LGP does not comply with 90% ICA-SG profile. • IOU's will allow LGP customers to provide an updated LGP as allowed under R21 section F(2)(b). • LGP updates needed based on future grid conditions were discussed in Joint AL: 4941-E, 6816-E, 4138-E

Detailed Discussion of Section C (LGP Framework) - Continue

Phase 3. Technical Evaluation Phase:

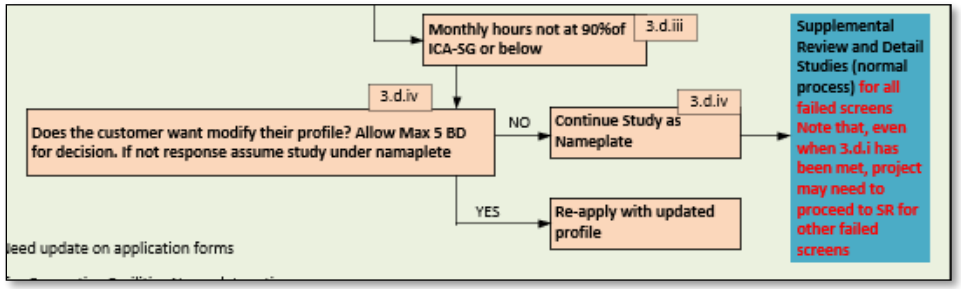


Discussion below provides clarification a how a project is studies if customer does not respond within 5 BD of being notified that a the provided LGP does not comply with the 90% at each hour

Step	Resolution Question	IOU Response
3.d.iii	6) SDG&E shall correct its language to reflect "at or below 90%" instead of only "below 90%."	SDG&E confirms that it will make the change.
3.d.iv	7) the Large IOUs state that if the customer does not respond within 5 business days of the notification to update the LGP so that all values are at or below the 90% ICA-SG profile values the project will be evaluated using full nameplate capacity without monthly limits. We interpret this step to mean that unless a new LGP is proposed by the customer upon notification by the Large IOU to stay within the ICA-SG values, the application will default to a non-LGP option application and the studies will be conducted as a regular interconnection request without LGP and the customer will be responsible for any electric grid updates if they proceed with the application. The Large IOUs shall clarify this in the workshop discussions and include this clarification in the subsequent ALs.	IOUs assert the statement to be correct, will discuss at workshop, and clarify on the upcoming AL
3.d.iv	7 cont.)The Large IOUs shall also clarify any additional changes required for this step based on the outcome of discussions towards Resolving Issue 2, and abide by previous direction regarding material modifications.	• No additional changes required in reference to Issue 2 (applicability of Gross Nameplate Rating for certain Rule 21 screens) • Material modifications allowances per Rule 21 are not proposed to be changed

Detailed Discussion of Section C (LGP Framework) - Continue

Phase 3. Technical Evaluation Phase:

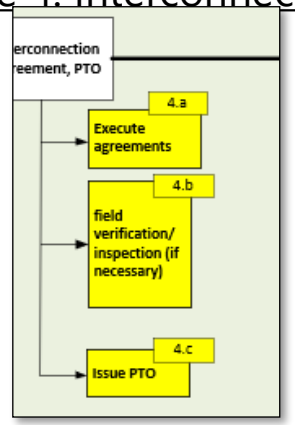


Discussion below provides clarification when customer does not respond within the 5 BDs but still requests LGP interconnection and justification of the 5 BDs

Step	Resolution Question	IOU Response
3.d.iv	7 cont.) Additionally, the Large IOUs shall discuss the timeline for review of the screens, and consequences if the customer does not respond to notice within the time allowed. Among the topics to be discussed: Would the customer lose the queue position if the customer still requested LGP treatment? Does this timeline allow the developer to reasonably be able to contact equipment manufacturers and get clarity on technical questions around inverter capabilities? The Large IOUs shall justify the need for such a short response period, and how it aligns with other similar Rule 21 timeline requirement.	• No changes are proposed to the timeline to review the interconnection screens • One notification will be provided, customer must respond within 5 BDs of being notified • Customer's queue will not be impacted when customer is requested to update their profile and customer responds within 5BDs • If customer does not respond within the 5BD and subsequently still requests LGP, the customer must submit a new interconnection request and its queue will be based on the timing of the new interconnection request. • Allowing more days for customer to respond can cause impact to subsequent projects which may be waiting in the queue to be studied • Developers should be well versed on the capabilities of their system and should not need to contact manufacturer for capabilities of equipment • 5 BD is used for other part of the Rule 21 where customer is required to provide additional information (Example: E.5.b.ii)
3.d.v	8) PG&E shall provide clarity on whether the tools are PG&E tools or the customer's tools, and justify such needs. Should the SCE and SDG&E adopt this statement, this requirement will also apply.	• New tools will have to be developed to efficiently evaluate LGP projects. These tools are necessary to efficiently extract the most updated ICA-SG profile, import the customer provided LGP profile, compare each hour of the profile, and determine if the project meets the criteria at each hour • Additional enhancements to planning tools and ICA process may be needed to enable efficient and automated integration of LGP into the interconnection process. In addition, distribution modeling enhancement would be necessary to reflect the LGP projects. • Once an LGP project connects, a unique output profile must be stored, maintained, and referenced in system planning, interconnection, and ICA studies.

Detailed Discussion of Section C (LGP Framework) - Continue

Phase 4. Interconnection Agreement/PTO Phase:

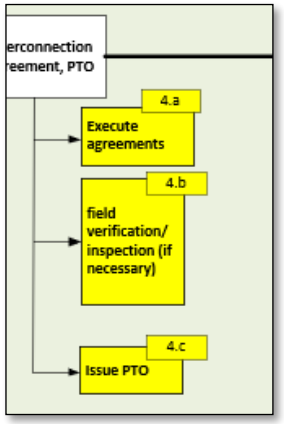


Discussion below provides clarification conditions where a PTO may need to be revoked due to non-compliance to LGP requirements in the Interconnection agreement

Step	Resolution Question	IOU Response
4.a.ii	1a.) The Large IOUs shall provide clarity regarding how this may affect future interconnection applications by the same customer, including whether the customer would be allowed, after termination of the agreement, to interconnect again under the LGP option and, if so; any additional requirements imposed due to not having followed operating specifications before. The Large IOUs shall also provide clarity on the details of the process, and timing to revoke PTO and how disconnection of the non-complying system will occur.	• For conditions which do not immediately causing a safety and/or reliability concern, the customer would be notified by the utility. Customer would be required to make the correction within 15 BDs of notification. If corrections are not made within 15BD from being notified, the PTO will be revoked. IOUs reserve the right to confirm the generator has not reconnected • For conditions which do impose an immediate safety and reliability, IOUs will take immediate action to disconnect the project from the grid until the correction has been made. If corrections are not made within 15BD from being notified (or being disconnected), the PTO will be revoked. IOUs reserve the right to confirm the generator has not reconnected • IOUs are not intending to impose additional requirements for customers who had a revoked PTO. Customer can request interconnection under any PUC approved procedures
4.a.ii	1b) The Large IOUs shall detail the terminology that will be used to "clarify that utility may take actions." Details should include what actions will be taken, the timeline for such action, and relevant Rules (e.g., Rule 2) that are applicable in such a situation.	• The revocation of PTO will be based on executed interconnection agreement specifying an approved LGP. If such LGP is not followed even after being notified, then IOUs have the right under the Interconnection Agreements to Revoke PTO and terminate the agreement. IOUs will update the IA with parameters from response above (a).

Detailed Discussion of Section C (LGP Framework) - Continue

Phase 4. Interconnection Agreement/PTO Phase:



Discussion below provides clarification from PGE &E related to "multiple instances". Also clarifies that 4.a.iii has been addressed

Step	Resolution Question	IOU Response
4.a.ii	1c) PG&E uses the term "if multiple instances." PG&E shall clarify this term, including how the term "multiple" is defined and the timeframe of the recurrence. If SCE and SDG&E also adopt this type of language in aligning the language of the processes, they shall abide by this requirement.	• PG&E clarifies that the LGP Customer would be required to make the correction within 15 BDs of being notified of an issue. If corrections are not made within 15BD from being notified, the PTO will be revoked. IOUs reserve the right to confirm the generator has not reconnected
4.a.iii	2) the Large IOUs require customers to provide quarterly reporting data. The Large IOUs shall update this step based on the outcome of the discussions set forth in this Resolution	• This has been addressed. Where IOUs will use AMI data and telemetry (for projects ≥ 1MW) to verify LGP performance requirements

Detailed Discussion of Section C (LGP Framework) - Continue

Phase 4. Interconnection Agreement/PTO Phase:

4.b

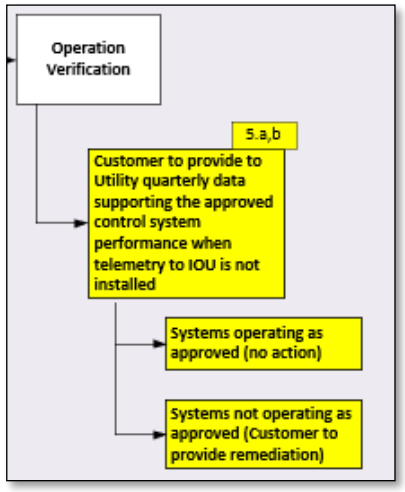
field verification/ inspection (if necessary)

Discussion below provides clarification the requirements for field performance verification, relationship to certification testing and process for developing commissioning test procedures

Step	Resolution Question	IOU Response
4.b	3) The Large IOUs shall clarify the purpose and need for field performance verification and commissioning testing, and the difference between the testing performed by the Large IOUs as opposed to that required by certification to a standard and how it fits into current Rule 21 requirements. This requirement shall be applied to any step where mention of such verification or testing is needed by the Large IOUs. The Large IOUs shall also discuss other possible methods to verify this, including using a remote inspection and using IEEE 2030.5 to verify performance.	• IOUs field performance verification/commissioning tests verify operational performance for ensuring that the installed equipment has been set up to meet the intended need • The IOU field performance verification/commissioning tests defer from certification testing in that these are operational tests for equipment that has been installed in the field as opposed to lab tests used by NTRLs to verify that the equipment being tested meets the requirement of the standard (such as IEEE1547.1-2020/UL1741SB) • While IOUs reserve the right to verify performance on any project prior to issuing PTO, in practice IOUs will only perform field verification on projects which are using new methods or new equipment. Once IOUs become familiar with the methods and equipment, IOUs may not require to be the witness of the operational performance and commissioning tests (which should always be performed with or without IOUs witnessing)
4.c	4) The Large IOUs shall clarify if this step will ensure that during the field performance verification/commissioning testing phase the generating facility complies with the LGP requirements. They should also specify whether this will make the proposed quarterly reporting unnecessary.	• Field performance verification/commissioning tests will ensure that project is set up to comply with LGP requirements. • The issue of quarterly reporting has been addressed. IOUs will use AMI data and telemetry (for projects ≥ 1MW) to verify LGP performance requirements.
4.b.ii	5) PG&E states that it will review, discuss, and agree on the verification procedures. More clarity is needed whether this is solely at PG&E's discretion or if it involves the customer. Should SCE and SDG&E also adapt similar language when aligning the process language, they shall also abide by this requirement.	• Per Rule 21 Section L.5.a, IOUs may require a written Commissioning test procedure to be provided by the Interconnection Customer 10 days in advance of the Commissioning Test. IOUs will coordinate with customer on the development of the commissioning test procedure.

Detailed Discussion of Section C (LGP Framework) - Continue

Phase 5. Operation Performance Phase:



Topic no longer necessary

Step	Resolution Question	IOU Response
5.a.	1) The Large IOUs shall clarify whether they are seeking to impose this as a requirement, or if the Large IOUs are merely reserving the right to implement this step. … If seeking to impose this as a requirement, the Large IOUs shall provide an estimate of the scope of backend system and infrastructure expansion required in the subsequent AL, costs associated with it, and estimate the length of time required for full deployment of these systems to provide to the Commission information on potential scale of such work.	This topic is no longer necessary, IOUs agree to use AMI data in combination with telemetry (for Generating Facilities ≥ 1MW) to verify performance.
5.b	2) the Large IOUs require customers to provide quarterly reporting data. The Large IOUs shall update this step based on the outcome of the discussions set forth in this Resolution	

Questions