

# Summary

## Introduction

### Limited Generation Profile Workshop Resolution E-5211

November 7<sup>th</sup>, 2022

Energy for What's Ahead™



## Resolution Summary

### Resolution E-5211 Issues To Discuss

- **Issue 1:** Compliance with OP 16 of the Decision.
- **Issue 2:** Specifics of Whether and How Reduction to a Customer's Limited Generation Profile Are Determined.
  - Issue 2A: Specifics of Whether Reductions to a Customer's Limited Generation Profile are Determined to be Necessary
  - Issue 2B: Specifics of How Reduction to a Customer's Limited Generation Profile are Determined
- Understanding of the Large IOUs' current business-as-usual practices on curtailment of export power and how they apply to the LGP-option, including circumstances in which export power may be reduced to below the lowest ICA-SG value identified at time of interconnection;
- Process for curtailment of export power for LGP customers and fairness to non-LGP customers who may have paid for grid upgrades;
- Defining Future Grid Conditions and the effect they may have on LGP customers;
- Defining and evaluating the availability of mitigation options, and how mitigation options differ from upgrade measures;
- Criteria to establish a new LGP and process to implement it.
- Curtailment down to zero (Floor Curtailment)



## Reduction of LGP only for safety and reliability, per D.20-09-035

### Safety and Reliability Discussion(1.a.i.1)

1.a.i.1: Discuss how safety and reliability would specifically inform whether and how curtailment should be imposed. Specify safety and reliability concerns: how a LGP profile could compromise safety and reliability of the grid unless there's a reduction of export power

- What are the variables that drive the safety or reliability risk the utility is anticipating (i.e., is it changes in load, performance of other DERs, storms or other emergencies)?

LGP projects can cause safety and reliability issues if grid conditions change from those used when LGP was approved as part of the interconnection process

#### Temporary Reductions:

This is expected to reduce the profiles below the published ICA-SG values and may require curtailment down to zero.

- Emergency Conditions resulting from contingencies due to unforeseen events (e.g., car hits pole)
- Planned maintenance

#### Long Term Reduction Future Grid Conditions:

While the conditions described below are not expected to reduce profile below ICA-SG values, under certain circumstance, they may:

- Unforeseen significant load reductions (e.g., customer closing plant) creating a new future grid condition.
- Customers installing large amounts of non-export projects which causes significant reduction of load creating a new future grid condition.
- Permanent grid modification
- Future expansion of the grid requiring system outages needed to complete large system upgrades could have long lead times (e.g. duct bank re-configuration) and can create a long-term grid condition different from the original grid configuration.



### Reduction of a Customer's Export Power (2.a)

2.a: Criteria for Reduction of Export Power—Clearly outline the criteria that will prompt the IOU to call for a reduction of export power and specific reasons for doing so

#### Criteria/conditions that may cause reduction of LGP

- Voltage in excess of Rule 2 (1.05 pu.)
- Thermal limits exceeding 100% of normal thermal rating
- Voltage flicker exceeding Voltage Flicker limits.



### Mitigation Options (3.a./3b)

3a. Provide definitions for each mitigation option and discuss how mitigation options differ from upgrade measures

3b. Define and evaluate the availability of mitigation options

Define and discuss what low-cost and common mitigations are available to avoid curtailment and under what circumstances they could be applied.

- There is no guarantee of "original LGP" other than minimum ICA-SG.
- Mitigations are temporary efforts (such as switching)
- Upgrades are more lasting efforts (but no such thing as permanent)
- Examples of mitigations (low cost):
  - a) Add load to circuits by switching
  - b) Adjusting voltage regulator equipment
  - c) Temporarily altering circuit configurations
  - d) Enabling or disabling existing capacitor banks
  - e) Adjust Generating Facility operational capabilities if determined to be viable (such Smart Inverters)
    - a) Recognizing that Volt/var and Volt/Watt are enabled at interconnection
- Examples of upgrades (medium to high cost):
  - a) Transformer upgrades at the substation
  - b) Adding capacitors or other equipment at the substation
  - c) Line reconductions (including underground cables)
  - d) Permanently altering circuit configurations,
  - e) Creating new circuits
  - f) Phase balancing of the circuit



### Implementation Process(4.a)

- a. Establish a process to implement a reduction of the LGP once criteria are established
  - i. What is the required documentation and the delivery timeline for an IOU to justify to the customer a reduction of the existing LGP.
  - ii. Specify how the customer will be notified of the change to LGP and how this change will be reflected in the Interconnection Agreement.

- When curtailment are deemed necessary, the IOUs envision utilizing contact information to inform them of a need to change the operating profile.
  - If customer is unable to make those changes, then customer will be required to disconnect from the system until such time that they can make the change.
  - IOUs will require confirmation that the changes have been performed.
- Some examples to consider:
  - IOUs will notify customers in writing as soon as safety and reliability issues result in a need to temporarily adjust LGP (does not include emergency conditions)
  - The temporary LGP changes will not require a new Interconnection Agreement; update to the attachment may be needed
  - It would be customer's responsibility to engage authorized personnel to implement the LGP changes within customer's power control system
  - IOUs reserve the rights to request proof of the updated profile
- Implementation Process will be memorialized in the appropriate interconnection agreement.
- Notifications for planned maintenance and system upgrades will the requirements set for in the interconnection agreements (i.e., notification in advance). All other drivers implementation would be required with subsequent information provided to the customer.



## Reduction of a Customer's Export Power

## Mitigation Options and Remedies to Resume original LGP

## Implementation Process for Reductions to the LGP



# Limited Generation Profile Workshop Resolution E-5211

November 7<sup>th</sup>, 2022

Energy for What's Ahead<sup>®</sup>



# LGP Workshop Agenda

Item	Topic	Sub-topics	Presenter	Start Time	End Time	Duration (min)
1	Introduction	<ul style="list-style-type: none"> <li>Welcome</li> <li>Logistics</li> <li>Agenda</li> <li>Goals</li> </ul>	Energy Division	9:00 AM	9:15 AM	15
2	Reduction of LGP only for safety and reliability, per D.20.09.035	a. Discuss how safety and reliability would specifically inform whether and how curtailment should be imposed	Jorge/Roni (SCE)	9:15 AM	9:35 AM	20
		b. Future Grid Conditions: discuss specifics of what this entails and how this would inform whether and how curtailment should be imposed		9:35 AM	9:55 AM	20
	Q&A	Including: Non-IOU Party proposals	Open to Participants	9:55 AM	10:10 AM	15
3	Reduction of a Customer's Export Power	a. Criteria for Reduction of Export Power – Clearly outline the criteria that will prompt the IOU to call for a reduction of export power and specific reasons for doing so	Alex Mwaura (PG&E)	10:10 AM	10:25 AM	15
		b. Fairness to non-LGP customers who may have paid for grid upgrades		10:25 AM	10:40 AM	15
	Q&A	Including: Non-IOU Party proposals	Open to Participants	10:40 AM	10:55 AM	15
4	Break	---	---	10:55 AM	11:10 AM	15

# LGP Workshop Agenda

Item	Topic	Sub-topics	Presenter	Start Time	End Time	Duration (min)
5	Mitigation Options and Remedies to Resume original LGP	a. Provide definitions for each mitigation option and discuss how mitigation options differ from upgrade measures	Gary Holdsworth (SDG&E)	11:10 AM	11:20 AM	10
		b. Define and evaluate the availability of mitigation options		11:20 AM	11:30 AM	10
		c. Cost of Mitigation Options and Future Grid Conditions Affecting LGP customers		11:30 AM	11:40 AM	10
	Q&A	Including: Non-IOU Party proposals	Open to Participants	11:40 AM	11:55 AM	15
6	Lunch Break	---	---	11:55 AM	1:00 PM	65
7	General Q&A	Including: Non-IOU Party proposals	Open to Participants	1:00 PM	1:15 PM	15
8	Implementation Process for Reduction of the LGP	a. Establish a process to implement a reduction of the LGP once criteria are established	SCE/PG&E/SDG&E	1:15 PM	1:35 PM	20
		b. Scheduling Format		1:35 PM	1:55 PM	20
	Q&A	Including: Non-IOU Party proposals	Open to Participants	1:55 PM	2:15 PM	10
9	Break	---	---	2:15 PM	2:25 PM	10
10	General Q&A	Including: Non-IOU Party proposals	Open to Participants	2:25 PM	2:55 PM	30

# LGP Workshop Agenda

Item	Topic	Sub-topics	Presenter	Start Time	End Time	Duration (min)
11	Wrap-Up and Next Steps	a. Discuss what is required for Workshop #2, including AL language, outstanding topics or clarification needed, non-IOU Party proposals	Energy Division	2:55 PM	3:15 PM	20
12	Last Minute Questions/Comments		Open to Participants	3:15 PM	3:30 PM	15
13	Buffer for Agenda Adjustments	---	---	3::30 PM	4:40 PM	60

# Resolution E-5211 Issues To Discuss

- **Issue 1:** Compliance with OP 16 of the Decision.
- **Issue 2:** Specifics of Whether and How Reduction to a Customer's Limited Generation Profile Are Determined.
  - Issue 2A: Specifics of Whether Reductions to a Customer's Limited Generation Profile are Determined to be Necessary
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- Understanding of the Large IOUs' current business-as-usual practices on curtailment of export power and how they apply to the LGP-option, including circumstances in which export power may be reduced to below the lowest ICA-SG value identified at time of interconnection;
- Process for curtailment of export power for LGP customers and fairness to non-LGP customers who may have paid for grid upgrades;
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# Resolution D20-09-035 Ordering Paragraphs

- 15. The counter proposal from Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company (Utilities) to resolve Issue 9 is adopted with modification. Within 90 days of the issuance of this decision, Utilities shall commence discussions with the Smart Inverter Working Group focused on implementing the proposal. Within six months of issuance of this decision, Utilities shall submit a Tier 3 Advice Letter providing recommendations (as applicable) regarding the standard review, certification requirements, and interconnection processes necessary for implementation of the proposal. Within 60 days of adoption of a certification scheme for the Limited Generation Profile, Utilities shall modify the Rule 21 Interconnection Application Process to ***allow a distributed energy resources customer to include a Limited Generation Profile with their application, require the customer to enable generation profile limiting functionality, and allow Utilities opportunity to alter the profile if safety and reliability concerns warrant it.*** Retroactive alterations to generation profiles shall not reduce generation to below a pre-defined static level, i.e., the lowest Integrated Capacity Analysis – Static Grid typical profile value identified at the time of the Interconnection Application. As part of the proposal, Utilities shall: i) allow customers to utilize a smart inverter’s ability to increase its output on a monthly basis; and ii) use a 10 percent buffer, which shall be revisited. No later than 18 months after the implementation of this proposal, Utilities shall submit a Tier 3 Advice Letter providing data obtained from Proposals 8b and 8c, adopted below, assessing the effectiveness of the use of the Integration Capacity Analysis values within the interconnection process and addressing whether the Commission should continue use of the 10 percent buffer or adjust it, based on the data.
- 16. Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company (Utilities) shall submit a Tier 3 Advice Letter no later than 120 days from the issuance of this decision ***providing the specifics of whether and how reductions to a customer’s Limited Generation Profile are determined.*** The Advice Letter shall include a description of how the Utilities will implement Ordering Paragraph 15. The final resolution of the Advice Letter will be implemented simultaneously with the counter proposal for Issue 9, adopted in Ordering Paragraph 15.

# OP 15 of D. 20-09-035 Implementation (Issue 1)

*“Utilities shall modify the Rule 21 Interconnection Application Process to allow a distributed energy resources customer to include a Limited Generation Profile with their application, require the customer to enable generation profile limiting functionality, and allow the Utilities opportunity to alter the profile if safety and reliability concerns warrant it.”*

- Subsequently, Advice Letters 3678-E (SDG&E), 6141-E (PG&E) & 4455-E (SCE) details how this process will be implemented through the following process flow:
  - Customer Pre-application Research
  - Interconnection Request
  - Technical Review Process
  - Interconnection Agreement and PTO
  - Operational Verification Requirements



## OP16 – Specifics of Whether and How Reduction to a Customer’s Limited Generation Profile Are Determined (Issue 2).

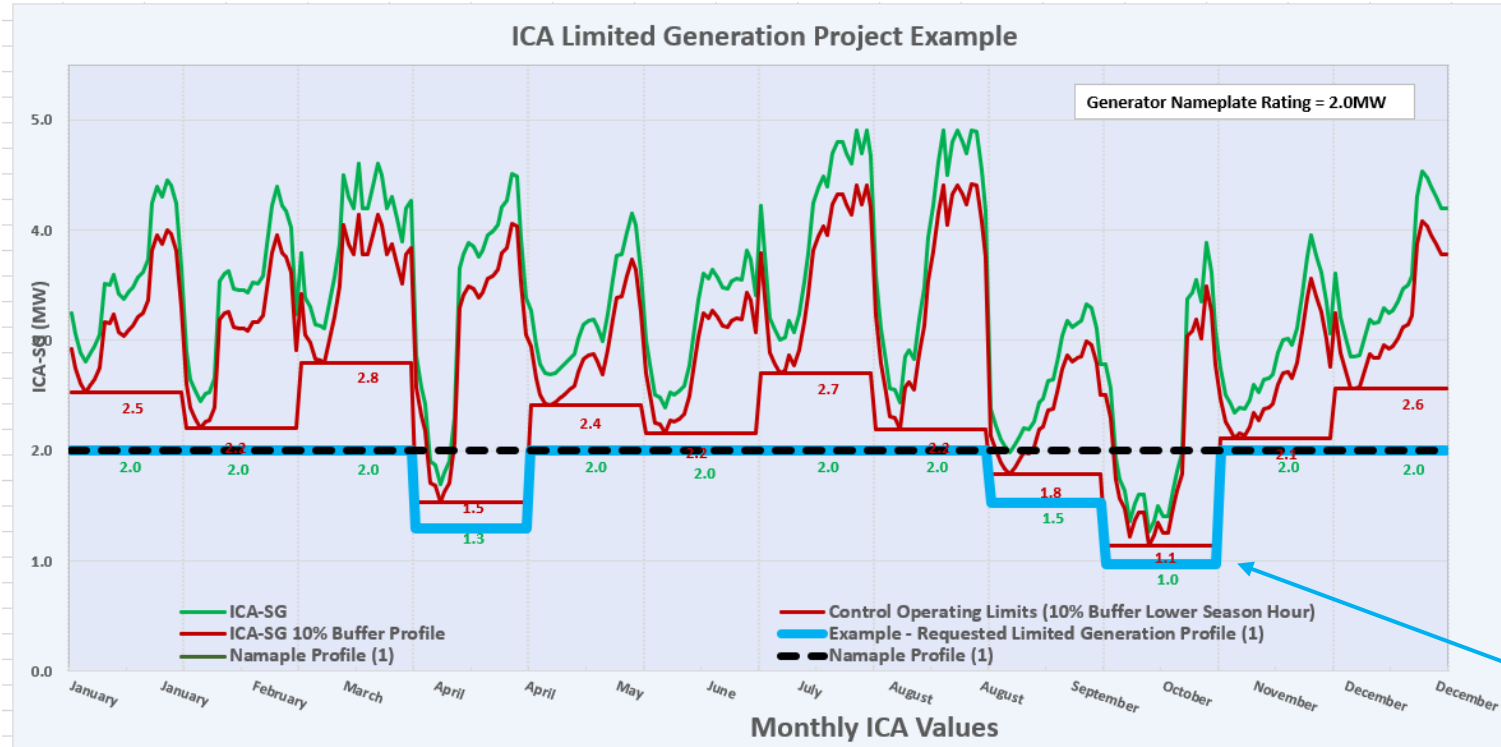
- Subsequently, Advice Letters 3721-E (SDG&E), 6058-E (PG&E) & 4404-E (SCE) details how whether and how reduction to a Customer’s LGP are determined:

The Utilities have identified several initial factors that could contribute to a customer’s Revised Limited Generation Profile. Some of these factors could include:

- The utilities’ need to reduce generation to ensure safe and reliable service without grid updates.
- Future grid conditions resulting in actual hosting capacity being below the published Integration Capacity Analysis-SG.
- A determination by the utility that the system does not operate as approved. For example, there is no buffer or the actual buffer is determined to be less than 10%.

The factors above are subject to change based on the outcome of upcoming preplanned discussions on this topic.

# Minimum ICA-SG Reduction Example



Application Form	
Month	KW
January	2000
February	2000
March	2000
April	1300
May	2000
June	1800
July	2000
August	1900
September	1500
October	1000
November	2000
December	2000

Circuit Name	Enter Circuit Name
Electrical Node Number	Enter Electrical Node
Date of Extraction*	Enter Date
*Date when data from SCE's DRPEP was extracted to determine requested values	

## Working Assumptions

Nameplate(NP) will be higher than minimum ICA value. If NP is lower than minimum ICA-SG value, then no restrictions are necessary.

Output is reduced to months 90% ICA-SG value

Allowed to go full capacity if NP <90% of month ICA-SG value

Value at which a nameplate value would be approved with no operating conditions. This would be recorded as maximum reduction that months(other than the most limited) can be reduced to (Current IOU interpretation of Ruling)

## Minimum ICA-SG

- For example, in July and August (which has 2MW LGP), the ruling allows for reduction down to minimum ICA-SG value for safety and reliability reasons (i.e. 1MW in the blue line)
- There is no ruling to reduce non-LGP values to any lower minimum and therefore would need to upgrade the distribution system in order to maintain agreed upon generation value.

# Safety and Reliability Discussion(1.a.i.1)

1.a.i.1: Discuss how safety and reliability would specifically inform whether and how curtailment should be imposed. Specify safety and reliability concerns: how a LGP profile could compromise safety and reliability of the grid unless there's a reduction of export power

- What are the variables that drive the safety or reliability risk the utility is anticipating (i.e., is it changes in load, performance of other DERs, storms or other emergencies)?

LGP projects can cause safety and reliability issues if grid conditions change from those used when LGP was approved as part of the interconnection process

## Temporary Reductions :

This is expected to reduce the profiles below the published ICA-SG values and may require curtailment down to zero.

- Emergency Conditions resulting from contingencies due to unforeseen events (e.g., car hits pole)
- Planned maintenance

## Long Term Reduction Future Grid Conditions:

While the conditions described below are not expected to reduce profile below ICA-SG values, under certain circumstance, they may.

- Unforeseen significant load reductions (e.g., customer closing plant) creating a new future grid condition.
- Customers installing large amounts of non-export projects which causes significant reduction of load creating a new future grid condition.
- Permanent grid modification
- Future expansion of the grid requiring system outages needed to complete large system upgrades could have long lead times (e.g. duct bank re-configuration) and can create a long-term grid condition different from the original grid configuration.

# Safety and Reliability Discussion(1.a.ii.1)

1.a.ii.1: Discuss how safety and reliability would specifically inform whether and how curtailment should be imposed. Discuss current business-as-usual practices on curtailment of export power.

Identify any circumstances that are already applicable to generating facilities (i.e., business-as-usual, or existing practices) to meet safety and reliability concerns

- How often has this happened per year over the past five years?
- In what types of situations has this happened?
- What have been the sizes of generators that have been curtailed?

## SCE

Transmission /Distribution	Tariff	Cause	2017	2018	2019	2020	2021	2022
Transmission	Rule 21	Unplanned (Automatic initiated)	9	1	3	2	4	3
Transmission	Rule 21	Unplanned (Operator Initiated)	3	0	0	0	0	0
Transmission	Rule 21	Scheduled Work	2	2	4	0	2	0
Transmission	Rule 21	Customer	2	3	3	2	1	4
Transmission	Rule 21	PSPS	0	0	0	0	0	0

For SCE, further investigation is required to provide the details. In general:

- Not expected to occur often (such as less than 2 instances per year)
- Likely occurred under emergency or planned conditions
- The size of these projects are >1MW
- No permanent reductions

## PG&E

Reporting Period : 1/1/17 – 8/1/22			Curtailment Frequency per Year					
Electric Operations Transmission	Tariff/Rule	Circumstance	2017	2018	2019	2020	2021	2022
Transmission	Rule 21	Scheduled Work	0	0	0	5	9	5
Transmission	Rule 21	Customer	0	0	1	0	1	0
Transmission	Rule 21	PSPS	0	0	1	0	0	0

## SDG&E

- SDG&E does not curtail Rule 21 generators at either the transmission or distribution levels.
- SDG&E does disconnect generators under planned and unplanned outage scenarios. Please see SDG&E's annual reliability reports for frequencies of both planned and unplanned outages.

# Safety and Reliability Discussion(1.a.ii.2)

1.a.i.2: Discuss how safety and reliability would specifically inform whether and how curtailment should be imposed. Discuss current business-as-usual practices on curtailment of export power.

## 2. Identify any circumstances that are only applicable under the LGP-option

- a. Identify unique aspects of an LGP customer and detail the cause for why disparate treatment for LGP-option systems may be necessary to meet safety and reliability concerns.
- b. Identify circumstances in which export power must be reduced to below the lowest ICA-SG value identified at time of interconnection to ensure to safety and reliability

## 1.a.2.a

- LGP have 12 different limits as opposed to non-LGP projects which only one 1 limit
- LGP have higher level of possibilities that a safety/reliability may occur because it follows ICA profile on a month-to-month bases
- A system change (such as load reduction) will have a greater impact on LGP project then non-LGP projects

## 1.a.2.b

- Reduction to below lowest ICA-SG values would be required:
  - Emergency or planned conditions (equivalent to non-LGP projects - not expected to be permanent)
  - Unprecedented grid changes – (equivalent to non-LGP projects - not expected to be permanent)

# Safety and Reliability Discussion(1.a.ii.2)

## Generation Outage Process

### SDG&E:

- Planned outages:
  - Customers are notified a minimum of 5-days in advance
  - Assigned commercial/industrial customers are called to coordinate timing
  - SDG&E prefers using 3-phase isolating devices to de-energize larger generation customers, but manual switching via field personnel may occur.
- Unplanned outages:
  - Distribution based generation will automatically disconnect with anti-islanding protection when that section of circuit becomes de-energized.
  - Customers are notified of outages through their preferred channel via SDG&E's unplanned customer outage notification process.

### SCE:

- SCE's Operations group will treat non-LGP and LGP customers the same, per SOB104.
- For the disconnection/outage process SCE follows System Operating Bulletin 104 "Outage Request Procedures".
- Distribution based generation will automatically disconnect with anti-islanding protection when that section of circuit becomes de-energized.
- SCEs current practice is to utilize Remote Control Switches (RCSG's) as a utility isolation point for generators over 1MW.

### PG&E:

#### System Operational Needs:

PG&E operations group will treat non-LGP and LGP customers the same, following TD-2700P-03, which is PG&E's system operations procedure utilized during switching operations. Within the procedure, there is language that instructs the operator how to handle generation on the line.

Per TD-2700P-03, "Clearances and Non-Tests", inverter based generation is given an exception to stay online during planned or emergency switching.

However, if the generation is large enough (such as 1-MW nameplate or above) Distribution System Operators can send a clearance or non-test for a Distribution Operations Engineer to review and approve.

#### System Emergency Conditions:

If the T&D system is significantly damaged by an unplanned event and the rebuild design that best serves long term objectives and short-term needs leads to a reduction in hosting capacity during some or all hours of the year, the IOU may call for a reduction of export power and/or interconnection upgrades.

- Example: a generator is connected to circuit A before circuit A is destroyed in a wildfire. The rebuild design that best serves long term objectives and short-term needs connects the generator to circuit B, which has less hosting capacity than circuit A.

# Safety and Reliability Discussion(1.b)

1.b: Discuss how safety and reliability would specifically inform whether and how curtailment should be imposed

Future Grid Conditions: discuss specifics of what this entails and how this would inform whether and how curtailment should be imposed

- i. Define Future Grid Conditions
- ii. Articulate what future grid conditions are expected to result in actual hosting capacity being below the published ICA-SG value
  1. Discuss the extent to which Large IOUs may need to reduce generation to ensure safety and reliability without grid upgrades
  2. Discuss the effect future grid conditions may have on LGP customers and how those effects would differ from those experienced by a non-LGP generation customer

## 1.b.i – Future Grid Condition Definition

Due to the dynamic nature of the grid, a condition where the grid has undergone set of changes such that the initial study conditions are operationally different than when the generation resource was studied and approved for interconnection. These Future Grid Conditions may include:

- Different load profiles (higher, lower, flatter, etc.)
- Different grid configurations
- Different operating procedures
- Addition, removal, or replacement of distribution equipment

## 1.b.ii

- IOUs may need to reduce generation due to Future Grid Conditions for the 11 months of the approved LGP profile not including the lowest LGP value. Cost for upgrades will be further discussed in the Mitigations Option Section.
- IOUs expect that the most impactful grid condition for LGP projects would be “Load profiles changes(lower load)”.
  - While possible, IOUs do not expect this condition to occur frequently
- While load profiles changes may also impact non-LGP projects, that is much less probable as non-LGP rely on the minimum ICA-SG value of the 12 months while LGP projects rely on the minimum ICA-SG for each month
- There are no current provision to reduce level of approved export for non-LGP projects
- PUC allows LGP projects to have export limits reduced (for safety and reliability) down to the minimum ICA-SG value



# Reduction of a Customer's Export Power (2.a)

2.a: Criteria for Reduction of Export Power—Clearly outline the criteria that will prompt the IOU to call for a reduction of export power and specific reasons for doing so

## Criteria/conditions that may cause reduction of LGP

- Voltage in excess of Rule 2 (1.05 pu.)
- Thermal limits exceeding 100% of normal thermal rating
- Voltage flicker exceeding Voltage Flicker limits.



# Reduction of a Customer's Export Power (2.a.i)

## i. Under what conditions/situations is a reduction to a customer's LGP expected?

While the scenarios below are unlikely to occur for LGP projects, these would be scenarios that should be monitored for future discussion as experience in the LGP application is gained

- When system conditions have changed and LGP is causing an overvoltage or an overload condition
- Operators' system observes a potential grid safety issue and determines that LGP is causing the condition
- Premature equipment failure investigation determines that LGP was the cause of the equipment failure
- Inadvertent equipment malfunction (such as inverters tripping offline)
- If generation has telemetry, then Distribution Operations Engineer can scrutinize more and based on non-test, actual generation export, clearance limits and/or loading, Distribution Operations Engineer can approve generation to stay online or come offline
- If generation has no telemetry, then most likely Distribution Operations Engineer will ask generation to come offline i.e., reduction to zero.
- Other

# Reduction of a Customer's Export Power (2.a.ii)

ii. How will the utility identify conditions that prompt a reduction of export power and what tools/data will be used?

- Identification of conditions requiring LGP reduction will likely be informed by:
  - Customer complaints (high voltage, inverters tripping)
  - Grid operator observations
  - Grid equipment not functioning as designed
    - Capacitor bank constantly off
    - Voltage/LTC regulators not maintaining adequate voltage
- The following is a set of tools/data which would be used
  - System operator tools for real time observation
  - Modeling tools (such as CYME)
  - AMI metering information
  - Potential use of power quality instrumentation if deemed necessary
  - Other tools and data as may be needed

# Reduction of a Customer's Export Power (2.a.iii)

iii. Address how each condition is justified based upon differences between an LGP and non-LGP customer interconnection. How does an LGP based upon the ICA introduce additional risk relative to a non-LGP customer based either on static ICA Op-Flex value or the historic 15% screen M criteria?

- LGP introduces additional risk than non-LGP project because it has 12 limits (one for each month) while the non-LGP projects rely on the minimum ICA-SG value of the 12 months
  - LGP projects are more prone to be impacted to load profile changes as compared to non-LGP projects because load profile changes could impact months higher than the minimum ICA-SG value
- Load profile changes has less impact to non-LGP projects
- PUC Decision allows IOUs to reduce the LGP monthly values as long the reduction is not below the minimum value of the ICA-SG profile
  - This would be equivalent to how the non-LGP projects are approved in the Interconnection Process
- There is not approved ruling to allow the reduction of non-LGP projects

# Reduction of a Customer's Export Power (2.a.iv)

2.a.iv: What is the duration of the curtailment and what will prompt a return to the original LGP?

- The permanence of that reduction of capacity in generation.

## Duration of the curtailment and what will prompt a return to the original LGP

- The duration of curtailment will depend on the issue that triggered the curtailment
- If the IOU can mitigate the issue, the LGP project can return to the original profile
- If the issue cannot be mitigated or is cost-prohibitive to the ratepayers, then the IOU's may require the LGP project to reduce the export to the lowest ICA SG value in order to maintain system safety and reliability

# Reduction of a Customer's Export Power (2.b)

## 2b. Fairness to non-LGP customers who may have paid for grid upgrades

### i. When a temporary reduction in generation is needed, whose export power should be reduced first?

1. If there is a customer that paid for grid upgrades on that grid segment, should they have priority to retain their hosting capacity over the LGP customer?

## Fairness to non-LGP customers who may have paid for grid upgrades

- For temporary reductions, IOU's will apply the conditions/criteria equally for LGP and non-LGP interconnections.
  - For temporary reductions (such as for emergency or planned maintenance)
- Generally speaking, the IOUs do not envision a permanent reduction of export power for LGP projects, similar to how the IOUs do not currently permanently reduce non-LGP projects when subject to curtailment.
- However, temporary reduction of export of power for LGP projects, if and when they occur, would remain in place until mitigations or upgrades are identified and constructed.
- Generally speaking, curtailments would be limited to:
  - a) An emergency system condition as indicated in slide 8
  - b) A significant unexpected reduction of load where the export of an LGP project could cause a safety and reliability concern
    - i. While this condition is possible, there is very limited operating experience in curtailment of non-LGP exporting projects, and thus the IOUs do not expect this to occur frequently for LGP projects
    - ii. If this condition does occur, IOUs would require LGP project to reduce export until such time that mitigations are completed
- Priority of curtailment generally follows a proration across the board. No priority enhancement for generators that have paid for upgrades. If operators need to curtail, they will curtail sufficient resources to solve the problem.
- If curtailment is required, the IOU's may reduce the LGP to the minimum ICA-SG value. There is no ruling to reduce non-LGP values to any lower minimum and therefore would need to upgrade the distribution system in order to maintain agreed upon generation value.

# Mitigation Options (3.a./3b)

3a. Provide definitions for each mitigation option and discuss how mitigation options differ from upgrade measures

3b. Define and evaluate the availability of mitigation options

Define and discuss what low-cost and common mitigations are available to avoid curtailment and under what circumstances they could be applied.

- There is no guarantee of "original LGP" other than minimum ICA-SG.
- Mitigations are temporary efforts (such as switching)
- Upgrades are more lasting efforts (but no such thing as permanent)
- Examples of mitigations (low cost):
  - a) Add load to circuits by switching
  - b) Adjusting voltage regulator equipment
  - c) Temporarily altering circuit configurations
  - d) Enabling or disabling existing capacitor banks
  - e) Adjust Generating Facility operational capabilities if determined to be viable (such Smart Inverters)
    - a) Recognizing that Volt/var and Volt/Watt are enabled at interconnection
- Examples of upgrades (medium to high cost):
  - a) Transformer upgrades at the substation
  - b) Adding capacitors or other equipment at the substation
  - c) Line reconductoring (including underground cables)
  - d) Permanently altering circuit configurations,
  - e) Creating new circuits
  - f) Phase balancing of the circuit

# Mitigation Options (3.c)

## 3.c: Cost of Mitigation Options and Future Grid Conditions Affecting LGP Customers

- i. Discuss responsibility for any associated costs for mitigation options
- ii. Future Grid Upgrades
  1. How upgrades should be treated if reduction to the lowest ICA-SG values are not sufficient to ensure the safety and reliability of the grid.
  2. Should the LGP customer have the option to perform grid upgrades (or pay for low-cost mitigation options) at a later time in order to maintain its original LGP
  3. If a subsequent upgrade increases hosting capacity, can the LGP customer reapply with the intent of increasing their export power?

## Who pays?

- Financial responsibility to resolve reduction of the LGP would be as follows:
  - IOUs will pay for system upgrades to meet the minimum requirements up to the minimum ICA-SG values.
  - IOUs will pay for system upgrades to return the LGP profile to its original LGP value when IOUs deem the upgrade to be low cost and construct the upgrade on its timetable
  - If the customer wants to return the LGP to the original approved value and the IOUs are not funding the upgrade (due to high cost), or meeting the customer's requested timeframe, the customer can fund the upgrade.
- NEM projects less than or equal to 1MW have upgrades funded by IOUs.
  - NEM projects cannot participate in LGP.
  - If an upgrade is put in place in support of NEM project such upgrade may benefit an LGP project (if previously impacted)

# Implementation Process(4.a)

- a. Establish a process to implement a reduction of the LPG once criteria are established
  - i. What is the required documentation and the delivery timeline for an IOU to justify to the customer a reduction of the existing LGP.
  - ii. Specify how the customer will be notified of the change to LGP and how this change will be reflected in the Interconnection Agreement.
- When curtailment are deemed necessary, the IOUs envision utilizing contact information to inform them of a need to change the operating profile.
  - If customer is unable to make those changes, then customer will be required to disconnect from the system until such time that they can make the change.
  - IOUs will require confirmation that the changes have been performed.
- Some examples to consider:
  - IOUs will notify customers in writing as soon as safety and reliability issues result in a need to temporarily adjust LGP (does not include emergency conditions)
  - The temporary LGP changes will not require a new Interconnection Agreement; update to the attachment may be needed
  - It would be customer's responsibility to engage authorized personnel to implement the LGP changes within customer's power control system
  - IOUs reserve the rights to request proof of the updated profile
- Implementation Process will be memorialized in the appropriate interconnection agreement.
- Notifications for planned maintenance and system upgrades will the requirements set for in the interconnection agreements (i.e., notification in advance). All other drivers implementation would be required with subsequent information provided to the customer.



# Implementation Process(4.a.iii/4.b)

## 4.a.iii: Clarify whose responsibility it is to reduce the programmed schedule

- Will IOUs provide new schedule or identify the new limits and let customer re-do the schedule to fit within those limits?
- Will customer have to re-submit a schedule for evaluation?
- What time will the customer be allowed for completing LGP changes?

## • Initial Application Prior to PTO:

- Customer identifies profile with the format as shown
- As approved per the interconnection process

## • LGP reductions after PTO:

- IOUs will provide customer new monthly limits, except for the minimum value of the ICA-SG which is not allowed to be reduced
- Customers do not have to re-submit a schedule for evaluation. IOUs will provide the values
- If the reduction is for a short period of time and only requires changing the current limit value, the new value will be communicated via email.
- If the reduction is determined to be beyond the current month and requires a new set of LGP value, the revised LGP values will be provided to customer in the same format as required during the Interconnection Process.

## • For unforeseen events necessitating curtailment, implementation will be required immediately. If customer is unable to change settings, disconnection will be required until customer can arrange for changes

- IOUs will require documentation showing that the new limits have been applied

# Implementation Process(4.b)

## 4.b: Scheduling Format

- i. Discuss the file format proposal to submit a Limited Export Profile schedule
  1. Discuss each IOUs' scheduling option
- ii. Discuss if a standard file format across all IOUs is best suited to submit the schedule
  1. Justify why or why not a standard file format is not suited

## Scheduling Format For LGP Profile Application

### 4.b.i

- The format is one value per month with the impacted months being reduced as shown in the table to the right

### 4.b.ii

- The proposed format is appropriate as:
  - It is simple to communicate between LGP customer and IOU during the interconnection process
  - It is simple to communicate between IOU and customer for any future reductions of LGP monthly limits

## Sample LGP Profile

Month	Limits (MW)
Jan	2.00
Feb	2.00
Mar	2.00
Apr	1.53
May	2.00
Jun	2.00
Jul	2.00
Aug	2.00
Sept	1.79
Oct	1.14
Nov	2.00
Dec	2.00

Questions?

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