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Rule 21 Working Group 3

SIWG CALL ISSUES 27 AND 28

FEBRUARY 21, 2019

HTTPS://ZOOM.US/J/488565400

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Agenda

1:00-2:00 Use cases

- List of use cases
- Questions for each use case
- Technical issues

2:00-2:30 DERMS

- Questions to be answered

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Issues 27 and 28

Issue 27. What should be the operational requirements of smart inverters? What rules and procedures should the Commission adopt for adjusting smart inverter functions via communication controls?

Issue 28. How should the Commission coordinate with the Integrated Distributed Energy Resource proceeding to ensure operational requirements are aligned with any relevant valuation mechanisms?

Action Items from Jan 31 Call

- Stakeholders will provide written comments on SCE's Issue 27 Use Case document by 2/7
- Issue 27 subgroup will prepare a framing document for discussion on 2/21. (Sub-group met 2/8, led to suggested framework by Gridworks, following)
- Issue 27's proposed use cases to include a 'business needs' section (unfilled). (No action on this yet.)

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Use Cases

1. Interconnection — Overloads
2. Interconnection — Overvoltage
3. Capacity
4. Reactive power
5. High voltage (potentially multiple use cases)
6. Low voltage (potentially multiple use cases)
7. Storage as a dispatchable resource (CALSSA proposed)

Questions to be Answered for Each Use Case

a) Do we include it in our proposal?

b) What is the priority (order) and timeline for developing it?

c) Do we expect it to provide services under IDER tariffs?

d) What does WG3 need to reach agreement on regarding it?

e) What are the proposed procedures and rules for services from it, that are anticipated from IDER tariffs? (Being filed 2/15)

f) What needs to happen (i.e., standards completed) before it becomes viable?

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Technical Issues

- Volt-Var and PF functions for reactive power support — should we wait for further IEEE standard for Constant Reactive Power mode?
- Disconnect and Reconnect — must wait for DERMs? Is there another way of facilitating these functions?
- Can we identify further evidence of value of making seasonal changes for voltage support?
- Are there scenarios under which smart inverters can provide voltage support on the primary? If so, what are they? If not, can we demonstrate this conclusively? Is additional study needed?

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Function Description	Smart Inverter Phase	Grid Services				Interconnection	
		Use Case 1 (Reactive Power)	Use Case 2(Capacity)	Use Case 3 - High Voltage Support)	Use Case 4 - (Low Voltage Support)	Use Case 5 (Overloads)	Use Case 6 (Overvoltages)
		Provide Reactive Power Support (Var)	Provide Real Power Capacity (Watts)	Reactive Power & Load control (Reduce Gen/Increase Loading)	Provide Reactive Power With Load control (Increase Gen/Decrease Loading)	Reduce Impacts Of Interconnection	Reduce Impacts Of Interconnection
Anti-Islanding	Phase I	ON	ON	ON	ON	ON	ON
Low/High Voltage Ride Through	Phase I	ON	ON	ON	ON	ON	ON
Low/high Frequency Ride Through	Phase I	ON	ON	ON	ON	ON	ON
Dynamic Volt/Var Operations (RPP)	Phase I	Disabled - Evaluate Grid Impact	Enabled	OFF - Evaluate Grid Impact	OFF - Evaluate Grid Impact	Disabled	Disabled
Ramp Rates/Soft Start	Phase I	ON	ON	ON	ON	ON	ON
Fixed Power Factor	Phase I	Disabled	Disabled	Disabled	Disabled	Disabled	USE (Limited results)
Communication Capabilities	Phase II	Disabled (Service = Baseload) Enabled (Servcie>Baseload)	Enabled	Enabled	Enabled	Enabled	Enabled
Monitor Key Data	Phase III	Disabled (Service = Baseload) Enabled (Servcie>Baseload)	Enabled	Enabled	Enabled	Enabled	Enabled
DER Disconnect and Reconnect Command	Phase III	Disabled	Disabled	Enabled	Enabled (for Storage)	Enabled	Enabled
Limit Maximum Real Power Mode	Phase III	Disabled	Disabled	Scheduled through communication, Functions 1 & 8 (DERMS Function)	Disabled	Enabled with communication and Function 8	Enabled with communication and Function 8
Frequency/Watt	Phase III	ON	ON	ON	ON	ON	ON
Volt/Watt	Phase III	ON	ON	ON	ON	ON	ON
Scheduling Power Values and Modes	Phase III	Disabled (Service = Baseload) Enabled (Servcie>Baseload)	Enabled	Enabled	Enabled	Scheduled through communication, Functions 1 & 8 (DERMS Function)	Scheduled through communication, Functions 1 & 8 (DERMS Function)
Constant Reactive Power	IEEE1547 -2018	Constant ON For Baseload Scheduled through communication, Functions 1 & 8 (DERMS Function)	Disabled	Scheduled through communication, Functions 1 & 8 (DERMS Function)	Scheduled through communication, Functions 1 & 8 (DERMS Function)	Disabled	Disabled
Active Power/Reactive Power (Watt/VAR)	IEEE1547 -2018	Disabled	Disabled	Disabled	Scheduled through communication, Functions 1 & 8 (DERMS Function)	Enabled with communication and Function 8	Scheduled through communication, Functions 1 & 8 (DERMS Function)
Set Real Power Mode	Phase III Function 4 - Future Standards	Disabled	Scheduled through communication, Functions 1 & 8 (DERMS Function)	Disabled	Scheduled through communication, Functions 1 & 8 (DERMS Function)	Disabled	Disabled

CALSSA Proposal (Jan 11)

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Voltage Support Use Cases

- Change settings of voltage functions in response to feeder reconfiguration
- Schedule changes to settings of voltage functions to address seasonal differences
- Ongoing adjustments to settings of voltage functions in place of other voltage regulators

Interconnection Use Cases

- Schedule changes to Limit Maximum Active Power (Function 3) in response to seasonal or hourly hosting capacity constraints
- Curtailment using DER Disconnect and Reconnect (Function 2) in response to abnormal grid operations to address operational flexibility constraints

Other Use Cases

- System restoration – When service is restored to a circuit after a grid outage, communication with smart inverters can stagger the timing of DERs coming back online to avoid voltage spikes
- Storage dispatch as a capacity resource

DERMS Are Part of This Issue

- In order to utilize Phase 3 functions, utilities need to build communications systems on their end.
- Customers are required to deploy capabilities. Utilities should also be required to deploy capabilities.

IOU Comments on CALSSA Proposal

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1. General comments
2. Voltage function/voltage support
3. Interconnection use cases
4. Other use cases
5. Communication/DERMS

1. General comments

- SDG&E: Many things need to happen prior to being in a position to possibly leverage DER and smart inverters for new potential grid services:
  - impact of having implemented residential TOU rates needs to have been determined
  - appropriate levels of smart inverter penetration need to have been reached
  - communications need to exist and be activated
  - DERMS needs to be available and can be used to manage DER
  - IOUs have to have identified applicable needs for DER and smart inverter services
- SDG&E: The existing and Feb 22 autonomous settings that are required for smart inverter will be sufficient for the near future without additional functions being developed.
- PG&E:

2. Voltage function/voltage support

- SCE: Disconnecting DERs as currently allowed in the tariffs may be the best option.
- SCE: Volt/Var and PF functions are not an appropriate function for voltage support.
- SCE: Possible that SI can provide the localized reactive power support to maintain the grid
- SCE: IEEE1547-2018 may be more appropriate.
- SDG&E: SI penetration is currently too small to provide any primary voltage regulation services.
- SDG&E: Demo C voltage regulation pilot had no impact at the primary circuit level but was able to modify the secondary voltage levels.
- SDG&E: Four requirements for voltage service: location, size, timing and certainty.

2. Voltage function/voltage support (continued)

- PG&E: Smart Inverter-enabled PV was proven to be effective at addressing secondary voltage rise caused by high PV penetration.
- PG&E: Abnormal voltage conditions caused by high PV penetration may be more effectively addressed by existing utility voltage management strategies.
- PG&E: No clear impact to voltage on the primary (medium voltage) system, even at moderate to high PV penetration levels.
- PG&E: Seasonal changes to SI voltage functions beyond the Volt-VAR and Volt-Watt curves may have value to distribution grid operations.
- PG&E: LTCs, regulators, and capacitors remain the most effective devices at regulating the primary, medium voltage distribution system.

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3. Interconnection use cases

- SCE: not necessarily opposed in concept but believes discussion is premature given will require that bi-directional communication between DERs and Utility DMS (DERMS) be operational, and given that it will be several years until this is available.
- SCE: IOUs were strongly opposed to having local DER controls (using) ICA data derived from historical information. Wait until PUC issues final decision on WG2 report.
- PG&E: PG&E: An in-depth discussion on technology and processes to enable limited generation profiles for interconnection will be provided in WG2 Issue 9 responses.

4. Other Use Cases

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- SCE (system restoration use case): Function is not necessary, already required in R21 section Hh2.k (ramp rate requirements)
- PG&E (system restoration use case): PG&E: Phase 1 function “Reconnect by soft start” was adopted specifically to address the issue of many DER systems simultaneously coming online and creating a spike in generation following a grid outage.
- SCE (Storage dispatch as capacity resource): Requires appropriate interconnection application, bi-directional communication, approved tariffs.
- PG&E (storage dispatch as capacity resource): This is being discussed in IDER.

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5. Communication/DERMS

- SDG&E: Modifying inverter setpoints will require communications which today are not available.
- PG&E: Likely require bi-directional communication between the DERs and utility operational systems (e.g. DERMS).
- PG&E: Optimistic that certain direct control use cases could provide distribution grid services beyond autonomous use cases.
- PG&E: Utility investment in an Advanced Distribution Management System (ADMS) and DERMS software would provide visibility and control of SI-enabled DERs to the utility and could allow DERs to fully realize their value through dynamic management for distribution grid services

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DERMS Questions

a) Priorities for DERMS development given use case priorities and IDER tariffs?

b) Timelines and phases of DERMS development?

c) What flow-charts are needed to show correspondence of DERMS development with smart inverter functions and operational requirements?

d) Which communications networks are best able to facilitate the realization of (use-case) benefits?

e) How do we show net benefits to rate payers of communication investments to use Phase 3 functions?

Schedule –
SIWG-WG3 Issue 27/28 Calls

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For Issues 27 and 28, there is a separate set of Working Group 3 phone discussions with all SIWG members invited, which will lead to discussion during the WG3 in-person meeting on April 17. Remaining calls:

Mar 14	1-2:30pm PST
Apr 4	1-2:30pm PST