

Comments of Pacific Gas and Electric Company
Reactive Power Requirements for Asynchronous Resources

Submitted by	Company	Date Submitted
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Pacific Gas and Electric Company (PG&E) appreciates the opportunity to comment on the California Independent System Operator’s (CAISO) issue paper and straw proposal, “Reactive Power Requirements for Asynchronous Resources.”

As CAISO notes, synchronous resources traditionally have been “the primary source of reactive power on the transmission system.”¹ The displacement of synchronous resources by asynchronous resources is rapidly occurring in part due to California’s Renewable Portfolio Standards, the State Water Board’s regulations on once-through-cooling, and the California Public Utilities Commission’s (CPUC) energy storage procurement target for Load Serving Entities. PG&E is concerned that the displacement of conventional resources by renewable and energy storage resources could result in an increased occurrence of over-voltage scenarios. Reactive power supply and absorption capability is clearly needed to ensure the operations of a safe and reliable grid.

The increasing levels of variable energy resources pose many challenges to the operations of a safe and reliable grid. An adequate supply of reactive power is necessary to ensure that a voltage collapse does not cause the electric grid to fail. Additionally, the capability to absorb reactive power is needed to ensure that voltage levels do not exceed acceptable operating limits, which can jeopardize the integrity of the system. PG&E commends CAISO for taking the necessary steps to address this challenging issue.

PG&E supports the technical and operational requirements detailed in the straw proposal and recommends CAISO consider applying them retroactively to resources in CAISO’s interconnection queue.

PG&E agrees with CAISO’s claim that there is a level of uncertainty when conducting an interconnection study to determine reactive power needs. Though these assumptions may be reasonable at the time of the interconnection study, the operating conditions that manifest after a project interconnects and becomes commercial could be vastly different. Defining technical requirements in an Interconnection Agreement provides an increased level of confidence.

PG&E understands that CAISO will replace the current system impact study approach to determine reactive power capability. PG&E requests that CAISO confirm that the overarching

¹ *Issue Paper*, p.4.

interconnection study process will continue to assess if network upgrades are needed after the effective date of the new reactive power requirements.²

On the stakeholder call held on March 13, 2015, CAISO indicated that it was considering hosting a technical conference on the requirements in its straw proposal. PG&E supports holding a technical conference and looks forward to discussing the requirements in the straw proposal further with CAISO and other stakeholders.

PG&E suggests that CAISO consider applying reactive power interconnection requirements to asynchronous resources already in the queue. In a recent informational report, CAISO has indicated that the generator interconnection queue contains approximately three times the amount of new generation needed to meet the 33% RPS by 2020.³ It is not clear that a going-forward requirement would provide the necessary amount of reactive power supply or absorption capability that CAISO has indicated it needs.

PG&E supports the current scope of this initiative at this time and believes it should remain focused on defining an interconnection requirement.

On the recent reactive power stakeholder call, CAISO mentioned that the initial scope of this initiative is to define a technical interconnection requirement. PG&E believes that the initial scope of this initiative is appropriate and should remain focused on addressing interconnection requirements.

In addition, PG&E suggests that CAISO consider cost causation principles in discussions about compensation for reactive power. PG&E believes that load should not be allocated all the costs or uplifts caused by compensating resources for reactive power considering CAISO has noted in its issue paper that the need for reactive power supply and absorption capability is due in large part to the displacement of conventional resources by asynchronous resources.

PG&E requests that CAISO provide clear guidelines regarding which resources are required to meet the new reactive power requirements.

CAISO should provide clear guidelines indicating what constitutes a replacement or repowering of a generator. For example, what percentage of inverter replacement necessitates compliance with new reactive power requirements? Additionally, if a generator that is already required to meet a 0.95 lead/lag power factor at the point of interconnection (POI) requests a change in inverters, would it also be required to meet new dynamic reactive power and/or automatic voltage regulator requirements?

Additionally, PG&E requests clarification on the following items:

- CAISO's 2010 tariff amendment filing with FERC included frequency response.⁴ CAISO should clarify why it has separated defining reactive power requirements and frequency response.

² Network upgrades include: reliability network upgrades, local delivery network upgrades, or area delivery network upgrades.

³ [Update On Renewables in the Generator Interconnection Queue](#), p.1.

⁴ Tariff Amendment to Modify Interconnection Requirements Applicable to Large Generators and Request for Waiver (ER10-1706).

- Will CAISO have the ability to dispatch asynchronous resources to provide additional voltage support outside of the defined lead/lag power factor range?
- CAISO should clarify what compliance measures it anticipates taking to ensure generators are providing reactive power.
- What metering, telemetry, or communication requirements does CAISO envision are needed for resources that provide reactive power?
- CAISO should clarify how it plans to communicate voltage schedules to resources. Does the frequency or granularity of these voltage schedules differ under normal or contingency scenarios?