

RULE 21 WORKING GROUP, ISSUE 18 BRIEFING NOTE

Gridworks

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Issue 18

Should the Commission adopt changes to anti-islanding screen parameters to reflect research on islanding risks when using UL 1741-certified inverters in order to avoid unnecessary mitigations? If yes, what should those changes entail?

Background

Anti-islanding is an essential function that requires DERs to shut down during a grid failure. It prevents DERs from operating as an unintentional “island” of generation that could pose a safety risk to utility personnel repairing equipment that they expect to be de-energized. Anti-islanding functionality is required by UL 1741.

Since 2016, PG&E has conducted an interconnection screen under screen M that screens for anti-islanding mitigations depending on technical analysis of the characteristic of a particular distribution feeder. Those characteristics include the presence of other synchronous machine generation or non-certified (non UL 1741-certified) inverters (commonly found on distribution-connected wind turbines within PG&E territory). The presence of such machine generation and/or non-certified inverters in sufficient capacity on a circuit can degrade the ability of certified DER inverters on the circuit to react properly and disconnect when required, and thus requires mitigation, namely the installation of Direct Transfer Trip (on the synchronous machines). This results in significant additional costs for the certified DER inverter interconnection.

This is mainly or entirely an issue for PG&E currently, as PG&E has much larger numbers of machine generation and inverter-based wind generation on its distribution circuits than either SCE or SDG&E. Neither SCE nor SDG&E conduct such screens.

PG&E has based its requirements partly on specific past research that indicates when mitigations are warranted. Proponents claim that other research points to potentially narrower or alternative criteria for when mitigations are warranted.

The Working Group may wish to identify and examine the most recent studies in determining an answer to Issue 18. An example of a recent study is a 2019 Sandia report, “Evaluation of Multi-Inverter Anti-Islanding with Grid Support and Ride-Through and Investigation of Island Detection Alternatives.” Other relevant studies have been published by EPRI in 2019.

In the Working Group Two Final Report, for Issue 8-k, it was stated:

...PG&E's policy document on anti-islanding screening stipulates that islanding becomes a concern when the ratio of machine-based synchronous generation to inverter-based generation is over 40% and generation is more than 50% of minimum load...

...The extent to which UL 1741-certified inverter-based systems create a risk that unintentional islands will be created is an area of significant dispute. PG&E currently has assessed that risk to be significant enough that it actively screens for the risk. SCE and SDG&E currently do not screen for this but have indicated that there is a possibility that they could do so in the future...

...There is considerable dispute about what is the "acceptable" way to screen for anti-islanding conditions, and there are not any nationally accepted standards that fully address this...

...The risk of a generation to load match that could create the potential for an island, while somewhat challenging to characterize, has been shown to be very low... Some Working Group members are skeptical about whether screening is really needed, and if so, whether the Screens currently used by PG&E (via their protection handbook) are sufficiently narrow as to target the real risks...

...Currently, the consequences of determining that a project could create the risk of an unintentional island forming are significant. PG&E requires that a project install Direct Transfer Trip, which is both very costly (for ratepayers in the case of NEM projects, or developers/customers in the case of non-NEM projects)... and can extend the timeframe for interconnection by 18 months or more...

...PG&E has stated that the current approximate percentage of circuits impacted by the PG&E anti-islanding standard is approximately 7%. This appears to be understated based on customer experience. Stakeholders should have the opportunity to independently verify this data point before any additional criteria are added to the anti-islanding standard. In addition, PG&E has implemented only one mechanism to address anti-islanding and that is to install Direct Transfer Trip at the substation level...

Scope of Issue

(a) In Issue 8-k of Working Group Two, proponent IREC stated that Issue 18 would be "a more thorough discussion of whether a screen for anti-islanding is necessary, and if so, what the screen will be"

(b) What research points to potentially narrower or alternative criteria for when mitigations are warranted? What does the research say? How conclusive is it? How does it apply specifically to

California's utilities? Do the alternative research conclusions make a small or large difference in practice, in terms of mitigations being required?

(c) The issue appears to have two parts. Which part do we focus on? Part 1: identifying and vetting alternative technical evaluation criteria to potentially adjust the criteria for when mitigations are required. Part 2: if mitigations are determined to be required, are there cheaper alternatives to Direct Transfer Trip? What are those alternatives?

(d) Does resolution of Rule 21 Issue 8-k related to Integration Capacity Analysis (ICA), which is still not ruled upon, bear on our ability to put forward proposals for Issue 18? What are the overlaps?

(e) Higher levels of DER penetration and technology changes in the future may impact anti-islanding for all utilities, not just PG&E. To what extent do we consider the longer-term future?