Frequently Asked Questions:

Transient Overvoltage Management for Distributed Energy Resources

Why does Rocky Mountain Power require transient overvoltage management from distributed energy resource (DER) customers?

Rocky Mountain Power is committed to operating its electric grid in a safe, efficient, and reliable way while supporting clean energy solutions. Customer generation systems can increase the risk of elevated voltage levels, especially during phase-to-ground short circuit events, which can lead to equipment failure and prevent safe and reliable operation of the system.

Does Rocky Mountain Power have a policy that defines transient overvoltage management requirements?

Rocky Mountain Power requires that customer generators shall not contribute to transient overvoltage events according to the requirements described in the Protection & Control section of its Distributed Energy Resources Interconnection Policy 138.

What standards are used by Rocky Mountain Power to impose transient overvoltage management requirements?

In addition to company-specific requirements, Rocky Mountain Power follows IEEE 1547, UL 1741, and ANSI C84.1 as well as other national, state and local jurisdiction rules.

Are there any exceptions for Rocky Mountain Power's transient overvoltage management requirement?

With approval from Rocky Mountain Power, transient overvoltage management may not be required when particular criteria are met, which would preclude the possibility of transient overvoltages. Based on IEEE 1547 guidelines in addition to Rocky Mountain Power's policy, some criteria include:

- The DER is connected on a single-phase distribution transformer, and is connected line-to-neutral,
- The DER is connected using a three-phase, three-wire configuration,
- When the DER peak power on the primary distribution system aggregates to less than 10% of the local system's minimum load (for solar interconnections, minimum daytime load), then the load will likely be sufficiently large to limit transient overvoltages,
- Installation or existence of certain transformer configurations might be exempted based on interconnection study results as determined by Rocky Mountain Power's Protection & Control group.

What amount of generation requires mitigation solutions for managing transient overvoltage?

Although more common on larger generation interconnections, transient overvoltage management can be required on any DER system. Individual circuits behind a protective device on a distribution line can have very low minimum loads, thus necessitating transient overvoltage management regardless of the size of the interconnected DER.

What methods are available to manage transient overvoltage?

There are generally two methods available to ensure customer generation systems do not contribute to transient overvoltage conditions. The first option is to utilize inverters which

comply with the transient overvoltage limits of the IEEE 1547-2018 standard (manufacturer documentation may be required – specifically compliance with section 7.4.2, figure 3). The second option is to utilize an effective grounding transformer with associated relay control system. Customer generators connecting to Rocky Mountain Power's primary wires will be limited to the second option.

Both of these options will require a low-impedance neutral path from the generation system/grounding system to Rocky Mountain Power's primary wires. Any transformer along this neutral path (including the service transformer) will need to be a wye/wye transformer with the neutral on both sides solidly grounded.

What is effective grounding?

Effective grounding is defined by the National Electrical Safety Code (NESC) as "*Bonded to an effectively grounded neutral conductor or to a grounding system designed to minimize hazard to personnel and having resistances to ground low enough to permit prompt operation of circuit protective devices.*"

Rocky Mountain Power's distribution system is effectively grounded, as is the majority of the systems across North America. During fault conditions, an effectively grounded system in addition to neutral overcurrent protection helps prevent overvoltage issues by maintaining voltage levels within acceptable levels as published by the American National Standards Institute (ANSI).

For additional information, please see the document "Effective Grounding for Customer Generation Facilities" on the Resources webpage.

Can you give a simple example of how this works when an application is processed?

A simple example is a distribution circuit that has a peak load of 8,000 kVA and a daytime light load of 1,500 kVA. In this case, the limit of distributed solar generation that can be installed without transient overvoltage management is 150 kVA (10% of light load). If 140 kVA of solar generation already exists and a customer applies for 10 kVA of solar generation, that applicant will need to have transient overvoltage management.

How can an applicant or developer know whether or not the light load threshold is going to be exceeded when submitting an application?

The applicant will not be able to determine whether the light load threshold is already exceeded or will be exceeded with a given application. Applications are addressed in a queue (first in, first out). It is conceivable that a 20 kVA application could be approved without transient overvoltage management immediately before a 10 kVA application is reviewed and found to require mitigation solutions for managing transient overvoltage (or other improvements). Rocky Mountain Power uses the queue to ensure fair treatment of all applications.

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