

ISO-NE PUBLIC

1. Pg 6, 1st paragraph under objective states that the paper is to evaluate each Directory for potential impacts of DER and VER. However, this is not in alignment with the discussion on storage which also states that the effort is intended to remove any impediments to the deployment of batteries. These two scopes are very different from each other and should be unified.
2. Pg 5, last paragraph uses the term “essential reliability ancillary services, which is different than the term used at the beginning of the same paragraph – essential grid reliability services. Consider using the same term if the same meaning is intended.
3. Pg 6, definition of DER. Punctuation is not correct after the word “capacity”. More importantly, please remove "non-BPS or." Since the BPS is a smaller subset of the transmission, most utility-scale renewables are also not BPS-connected. Almost every utility-scale PV and wind installation in New England is not BPS-connected. Additionally, "or reactive" should be removed - by this logic a distribution-connected capacitor bank would be considered a DER, which is not the intent of the definition.
4. Pg. 6, definition of VER. Suggest a little more detail in this definition. One could argue that a natural gas plant fits this definition, since pipeline interruptions are beyond the control of the owner/operator.
5. Pg 6, second to last paragraph, the sentence that starts “NPCC is now beginning to observe aggregations...” This reads as if aggregations are coming out of Order 2222, yet no areas in NPCC have filed their Tariff changes associated with Order 2222 at this point.
6. Pg 6, last sentence. Please revisit the wording... will these directories have the most impact "on" DER and VER, or does the introduction of DER and VER have the most immediate impact on these directories?
7. Pg 7, first sentence, should bulk power system be capitalized?
8. Pg 8, middle paragraph, insert the word “load” in “traditional base generation” so that it reads “traditional base load generation”
9. Pg 8, middle paragraph, "Severe weather assumptions because of new technology" makes it sound like wind and solar are causing the weather conditions. Suggest "different weather assumptions to acknowledge the relationship between weather conditions and VER output"

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10. Pg 8, last paragraph, suggest removing generation ramping capability from this statement. This is not a good fit for the type of analysis that is currently performed as part of Directory 1 compliance.
11. Pg 9 first paragraph, states "DER shouldn't be curtailed in an emergency". This statement is not always true, as in some instances, like over-frequency, curtailing DER should be considered to address the issue. Additionally, References to UFLS in this paragraph seem out of place. NPCC is in the process of retiring Directory 12, which was previously the home of any UFLS-related requirements. Any changes to UFLS should be addressed in PRC-006-NPCC and not in an NPCC directory.
12. Pg 9, last paragraph, more specificity would be helpful here - replace "observed in California" with "DER tripping due to remote transmission system faults".
13. Pg 11, paragraph under Directory 6, the connection between inertia and reserve is not accurate... inertia would help on a second-to-second basis while reserves will help restore ACE on a minutes or tens-of-minutes time scale.
14. Pg 12, top paragraph, it is not clear why UFLS is called out here, since it is not a Remedial Action Scheme.
15. Pg 13, chart, Page 5 specifically calls out D4 as needing attention, yet in this chart it is given the same priority as D5 and D8. Shouldn't it be described as more important if it is going to be called out like pg 5 does?
16. Pg 13 chart – the chart and paper are silent on A-10. While it is not technically a Directory, it is relevant to the discussion.
17. Pg 14, last sentence in the first paragraph, "Criteria" should start with a lower case "c".
18. Pg 14, item 5, please delete this question... overbuilding solar does not necessarily have a reliability benefit and adding more of it may magnify system concerns. It just pushes the net peak later, which means that you can count on less solar. It also makes the evening ramp even steeper.
19. Pg 14 item 7, end of first sentence needs a question mark.
20. Pg 15, suggest specifying whether these are electric system goals or economy-wide goals, and also whether they are binding requirements or aspirational targets. There appears to be a mix of both on the list. Also, define (ET) as used in the MA and ME bullets.

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