NAWEA Sideevent IEA Wind Task 51 -- 29th October 2024

Summary OpenSpace Discussion

The OpenSpace discussion on potential topics/issues for next year's Extreme Events Workshop was rather limited because two other topics (State of the art of datasets for power system planning and "Matching applications and evaluation) attracted most of the participants for most of the session time. Here is a summary of the points that were made in the Extreme Events Workshop discussion (we will compile the key points on the other topics shortly):

1. Ability to measure meteorological variables in extreme weather conditions. It was noted that a number of the remote sensing systems such as LiDAR or SoDAR fail to provide measurement data in extreme conditions such as heavy precipitation, low visibility or very high winds. Do we need to consider the ability to measure extreme meteorological conditions when planning sensor selection/deployment?

2. It might be useful to get engineering data from generation hardware during extreme conditions - a specific example mentioned was SCADA data for turbine vibrations in extreme winds and/or turbulence. The key point is understanding how generation assets respond to extreme conditions and when impact to the generation/grid system will occur and the magnitude of that impact.

3. There were several points made about the time to recover from generation asset damage caused by extreme weather. Examples: - turbine or transmission damage from extreme winds such as in a. hurricane - specific example was a cat 3 or 4 hurricane whose path crosses many of the proposed/planned wind farms off theist coast of the US (North Carolina to Massachusetts). The climatological tracks of such storms in this area makes it a reasonable possibility that many of the offshore wind farms could be impacted by one storm.

    - Hurricane damage to behind the meter roof-top solar. Hurricanes often do considerable damage to the roofs of houses and it is possible that a large amount of behind-meter solar might not be available for a long period after severe storm. How would that impact grid operations/net load forecasting? A related example is hail damage to roofs and PV panels although this generally has a smaller area of impact than a hurricane.

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    - It is often argued that additional transmission is needed to effectively integrate large amounts of wind/solar into a grid. But does this increase the vulnerability of the grid to extreme weather (higher probability of significant transmission outages)?

    - A different type of example was a longer term event that could cause slow degradation/damage to generation assets. An example that was cited was "atmospheric rivers" impacting the west coast area of the US. The frequent heavy precipitation/ high winds (& ocean spray) with individual rivers can increase the erosion of offshore/coastal turbine blades due to the salt content of the water. A period of very active atmospheric rivers might have a significant impact. One might also envision other processes (e.g. dust storm impacts on PV?) that do not directly cause disabling damage at a single time but result in accelerated degradation in cases where the conditions occur with a high frequency and larger than normal amplitude over a period of time (a season?)

4. What is a grid-operation-relevant definition of “low generation” (“droughts”) & high demand (load) events
   - what amplitude and what time scale?
   - what degree of alignment between wind, solar.hydro,demand is significant?

5. It would be useful to have generating facility operators and grid operators at the workshop in order to get their perspective on which extreme events (type, amplitude, duration etc.) have significant impact on their processes and what type of information they would need to more effectively mitigate the impact of these events