FOR IMMEDIATE RELEASE
October 24, 2023

WITH RISING LEVELS OF WIND, SOLAR, AND STORAGE AND INCREASED ELECTRIFICATION, POWER SYSTEM PLANNING IS BECOMING MORE COMPLEX AND MORE WEATHER-DEPENDENT

The increase in electricity systems' weather dependence leads to a critical need to accurately model the impacts of weather variables on analyses of resource adequacy and system reliability

Reston, Va. – The Energy Systems Integration Group (ESIG) has released a new report, *Weather Dataset Needs for Planning and Analyzing Modern Power Systems*, focused on the weather data needs for modeling power systems that are becoming increasingly weather-dependent as shares of wind, solar, and battery storage increase, and as HVAC and transportation loads are electrified. The report discusses the gaps in our existing data and modeling approaches, and outlines a process for building the robust weather datasets needed for reliable, resilient systems.

Increasingly weather-dependent power systems have a greater need to accurately model the impacts of weather variables on resource adequacy and system reliability. "Modern power system models must rigorously account for the impact of weather on supply, demand, and system infrastructure," said Justin Sharp, the project lead. "The weather data being used today are not up to this task, and their shortcomings are poorly understood by the sector, which could have serious consequences for reliability."

Accurate power system analysis requires time series data for key weather variables—in particular, solar irradiance, wind speed, and temperature—that are temporally coincident, have sufficiently high spatial and temporal resolution, and are robustly validated. The project team enumerates seven attributes of the weather data needed for power system planning. Validated data meeting these criteria are necessary to prevent invalid conclusions from being drawn from planning studies using inconsistent weather inputs. This is of particular importance when assessing high-risk scenarios that present resource adequacy concerns, where biases and errors in the data could compromise system planning efforts.

Julia Matevosyan, chief engineer at ESIG, described how "the availability of the necessary weather data, together with education and coordination between the meteorology and power system communities, will equip system planners to guide future resource siting and build-out for a reliable, high-renewables grid."

The full report is accompanied by a shorter summary report, an executive summary, and a stand-alone educational overview of meteorology, data, and modeling for readers of the summary report who would like a deeper dive into those areas.

ESIG is a nonprofit organization that marshals the expertise of the electricity industry's technical community to support grid transformation and energy systems integration and operation. The report and summaries can be downloaded at https://www.esig.energy/weather-data-for-power-system-planning.

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