FOR IMMEDIATE RELEASE
March 3, 2026

ESIG RELEASES NEW REPORT, LARGE LOAD PERFORMANCE REQUIREMENTS: CURRENT PRACTICES AND RECOMMENDATIONS

Report provides guidance for system operators and utilities as they develop interconnection performance requirements for large electronic loads tailored to their own jurisdictions

RESTON, Va. – The Energy Systems Integration Group (ESIG) has released a new report, *Large Load Performance Requirements: Current Practices and Recommendations*, as part of its Large Loads Task Force. The report provides minimum interconnection performance requirements for large loads based on an international review, and helping utilities and system operators approach the development of performance requirements tailored to their own jurisdictions. Three accompanying reports will also be released shortly: *Large Loads: Behaviors, Capabilities, and Limitations*; *Reliability Impacts of Large, Power Electronics–Interfaced Loads*; and *Large Load Disturbance Events*.

Today, the emergence of new types of large loads, such as data centers, crypto mining facilities, and others, introduces new high-impact behaviors to the power system. Unlike traditional industrial loads, these new loads feature the extensive use of power electronics, high power densities, and rapid power fluctuations that can adversely impact power system reliability. Interconnection performance requirements for large loads are critical for ensuring reliable grid operation.

“As large loads grow in size and geographical concentration, their interaction with the grid can no longer be treated as a local power-quality issue alone,” said Julia Matevosyan, Associate Director and a Chief Engineer at ESIG. “In the absence of clear and comprehensive interconnection requirements, system operators lack guardrails to manage reliability impacts, while large load developers face uncertainty about how their facilities need to be designed and operated from the perspective of bulk power system reliability. The report aims to close that gap and provide guidance on developing technically grounded interconnection requirements for new large loads.”

Many of the emerging issues for new large loads are similar to issues that have arisen with inverter-based resources (IBRs) such as solar and wind plants, as well as battery storage systems, and utilities and grid operators can build on this experience. Similar to

the requirements for IBRs, large load performance requirements need to be developed to safeguard the reliability of the system while also considering the capabilities and limitations of equipment at these facilities. Remaining reliability gaps will then need to be addressed by grid improvements and through operational practices.

“Large electronic loads exhibit materially different behaviors and possess inherently different characteristics than loads historically supplied by the power system,” said Ahmed Rashwan, Vice President for Transmission Planning and Operations, Utilities, at Electric Power Engineers and the project team lead. “The Large Loads Task Force examined those differences in detail, identified potential resultant impacts to the power system, and catalogued large electronic load–related disturbance events. The report provides an international survey of existing or proposed standards for each category of performance requirements and recommends a minimum set of performance requirement categories. Based on these, it details how utilities and system operators can approach the development of interconnection performance requirements tailored to their own jurisdictions.”

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About Energy Systems Integration Group

ESIG began in 1989 as the Utility Wind Interest Group, an organization created to educate utilities about wind power. Within ten years, it developed into a significant technical educational organization and convener of peer-to-peer workshops to assist utilities, system operators, project developers and equipment manufacturers from around the world with the integration of wind power, and then by 2011, also with the

integration of solar power. With renewables becoming the mainstream sources of new generation and reliability services, the organization expanded its mission, branding and international participation in 2018 through a merger with the International Institute of Energy Systems Integration (IIESI) to become the Energy Systems Integration Group (ESIG), taking on not just the planning and operations of electricity systems and power markets, but also the growing issues for other energy vectors, including the electrification of transportation, buildings and industry for decarbonizing the entire energy supply.

ESIG now serves as a resource for a broad cross-section of the global energy industry, including utilities, ISOs, independent power producers, project developers, manufacturers, forecasters, consultants, educational institutions, and government agencies, including regulatory bodies.

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