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ESIG RELEASES NEW REPORT, STRESS TESTING METHODS FOR EVALUATING RESILIENCE TO EXTREME EVENTS: VALUING INTERREGIONAL TRANSMISSION

Stress testing simulates grid performance across a range of weather-related high-risk conditions and guide planners in determining which grid improvements, including interregional transmission, can most cost-effectively support grid reliability during high-impact, low-probability events

RESTON, Va. – The Energy Systems Integration Group (ESIG) has released a new report, *Stress Testing Methods for Evaluating Resilience to Extreme Events: Valuing Interregional Transmission*, outlining a methodology to develop stress tests of power systems to assess their resilience to extreme weather events. The methods employed also focus on enhancing stress testing practices to assess the resilience value of interregional transmission during extreme events.

The electricity grid is adapting to shifting resource portfolios, increasing electrification, and the growing impact and frequency of extreme weather events. New analytical practices are needed to conduct stress testing simulations on current and future power systems in order to better understand system reliability during high-impact, low-probability events—such as recent winter storms affecting the Texas and Eastern Interconnections and wide-area heat domes across the Western Interconnection. Reliability planning today often simplifies or omits resource availability in neighboring systems, but the stress testing practices outlined in this report and accompanying case study of the Southwest Power Pool (SPP) use grid topologies that include various representations of neighboring systems to isolate the resilience value of interregional transmission

“The increasing frequency and severity of extreme events is a real threat to grid reliability and, ultimately, to customer service, community well-being, and the broader economy,” said James Okullo, Director of System Planning at ESIG. “We need better methods, tools, and planning processes to understand these risks and then target the right mitigations. Interregional transmission is one of the most powerful options we have in real time during extreme conditions, but it’s too often undervalued in planning. We should be intentionally utilizing, maximizing, and expanding it as part of a resilience strategy.”

By assessing a smaller set of critical conditions, planners can analyze grid risks, mitigations, and operational considerations in detail, including adding greater resolution of neighboring regions and their transmission capabilities. Planners can thus determine which grid improvements, including interregional transmission, can most cost-effectively support grid reliability during high-impact, low-probability events.

“Today, systems’ neighbors already provide critical reliability and resilience services, particularly during extreme weather events,” said Ryan Deyoe, Senior Analyst at Telos Energy. “Planners need to become increasingly comfortable with analyzing and quantifying the value of interregional transmission, and stress testing methods enable the types of detailed assessments that give planners confidence in interregional transmission’s value.”

The report outlines a four-step stress testing framework to guide planners in developing their own stress tests for system planning. A case study was also conducted for a future (2029) Southwest Power Pool system to implement stress testing principles and evaluate the resilience value of interregional transmission. The case study assessed the resilience value of interregional transmission during extreme events for the Southwest Power Pool by analyzing the system with and without detailed interregional transfer capability. In the simulations performed for this case study, interregional transmission mitigated almost all load-shed risk. This shows that existing interregional transmission offers significant resilience today, and points to potentially greater benefits if transfer capabilities between regions are expanded.

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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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