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Rapid increases in new types of large loads such as data centers are driving the industry to rethink rules and processes in system planning and operations

RESTON, Va. – The Energy Systems Integration Group (ESIG) has released a new white paper, "Historical and Modern Large Loads: Characteristics, Context, and Industry Actions to Meet Grid and Customer Needs," outlining the key differences between traditional large loads and new large loads, such as data centers, and discussing the main implications for system planning and operations.

The rapid development and integration of new types of large loads are having widespread impacts on the planning, operations, and reliability of the U.S. electricity system. While the country has experienced swift and sustained growth in electricity demand before, many characteristics of modern large loads driving the current growth—particularly data centers—are unlike traditional large loads of the past.

"Today's large loads are bigger and faster," said Debra Lew, executive director of ESIG. "Some facilities have electricity consumption of a small city, and they are often geographically concentrated."

Modern large loads are much harder to plan for in load forecasting, as utilities receive many more applications for interconnection from large loads such as data centers than are likely to ultimately materialize. In addition, data centers interface with the grid through power electronics and can change their power consumption (or disconnect from the grid) at unprecedented speeds and with a great deal of unpredictability for the grid operator. Trieu Mai, Visiting Fellow at ESIG, explained that "the electric industry is rethinking rules and processes across planning and operations to incorporate the unique characteristics of data centers and other new large loads."

The white paper discusses these unique characteristics of modern large loads, and emerging practices and opportunities for their integration into the grid in six key areas: (1) large load forecasting and tariffs, (2) large load interconnection processes, (3) resource adequacy and large load flexibility, (4) transmission service, (5) large load behavior and operational reliability, and (6) load and resource configurations. Many of these practices and other yet-to-be developed innovations are likely necessary to serve the needs of these

new customers and to ensure a reliable and affordable electricity system for all customers.

For more information on ESIG, visit www.esig.energy .

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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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