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KEMA Advances Understanding of Energy Storage Role in Bulk Grid System Reliability and Renewable Generation Integration

Report finds benefits of fast-response storage devices for system regulation in ISO markets

BURLINGTON, Mass., (December 1, 2008) – KEMA (www.kema.com), a global energy and utility industry consulting firm, today released a report highlighting the benefits of energy storage technologies for system regulation in Independent System Operator (ISO) markets. The report “Benefits of Fast-Response Storage Devices for System Regulation in ISO Markets” was prepared for The AES Corporation, a global energy company, to further the understanding of using storage for frequency regulation to improve electric grid system reliability, efficiency and flexibility.

As plans for deployment of renewable generation resources, especially wind and solar, gain momentum, there is recognition that these resources may increase volatility and will require an increase in regulation services. Advanced storage technologies, with the ability to provide fast-acting energy storage for regulation service, are a promising potential solution to the problem.

“Through our modeling we reached a number of conclusions about the use of fast-response storage devices to provide regional regulations services, the desirable energy-to-power ratio of the device, and the control schemes used to operate it,” stated Dr. Ralph Masiello, one of KEMA’s three innovation managers. “One finding is that a fast-response storage device with an appropriate duration period (energy-to-power capacity ratio) is at least as effective as conventional generation for the supply of regulating services. In addition, there may be additional benefits such as decreasing dependence on traditional generation units and thus reducing adverse emission effects.”

KEMA used a detailed dynamic simulation of three different representative ISO environments, including Automatic Generation Control (AGC) signals and real time markets, to explore the performance of fast-response storage devices for frequency regulation. These storage devices, such as advanced batteries and flywheels, are now being grouped into a category of devices called High Performance Energy Storage Systems (HPESS). The full report is available by contacting KEMA’s Richard Fioravanti at richard.fioravanti@kema.com.

The report addresses a number of questions that arise when considering storage for system regulation:

- What capacity and duration is needed for storage devices to respond to persistent calls for regulation service in each direction?
- What effects will large amounts of storage have on overall system performance?
- Can the AGC algorithms be designed to take advantage of the “fast response” capabilities of the emerging storage technologies?

KEMA is actively engaged in evaluating and developing energy storage systems to support a more resilient electric power grid. KEMA will be participating in the Advanced Energy Storage Roundtable (www.aes08.com) on December 2-4, 2008 in La Jolla, California.

About KEMA

Founded in 1927, KEMA is a global provider of business and technical consulting, operational support, measurement and inspection, testing and certification for the energy and utility industry. KEMA employs more than 1,700 professionals in 20 countries. The firm’s North American consulting operations are headquartered in Burlington, Massachusetts. KEMA’s global headquarters are in Arnhem, the Netherlands.

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