Quadrennial Energy Review

Public Meeting #5: Electricity Transmission, Storage and Distribution – West

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Remarks for Panel #3

Good afternoon, ladies and gentlemen, and welcome to our discussion panel on Electricity Storage here at the Department of Energy Quadrennial Energy Review Public Meeting #5. I am Haresh Kamath, Program Manager for Energy Storage and Distributed Generation at the Electric Power Research Institute, and I am very honored to have been asked to moderate this session on electric energy storage.

The electric power delivery system – the system we commonly refer to as the electric grid – was designed to operate without energy storage. It has successfully operated for over a century with only a relatively tiny base of installed storage, almost all of which is in the form of large central pumped hydro storage plants.

That is not to say that storage is of no value to the grid. System operators have stated that existing storage plants, though they represent a very small part of the total power capacity on grid, are invaluable in helping to regulate grid operations. Societal needs for highly reliable power continue to grow, and the rapid expansion of variable and distributed energy resources poses both challenges and opportunities in designing and operating a grid at maximum effectiveness. Energy storage may become an essential component in such an integrated grid.

Storage still faces many technical challenges before it can become a widely viable option. Tremendous progress has been made in improving the performance and life of storage technologies while lowering the potential cost. However, the cost of storage technologies is still quite high, and performance characteristics do not yet completely meet the desired requirements of potential users. The scientific community continues to work on the discovery and development of new and improved energy storage technologies, including mechanical technologies such as flywheels and compressed air storage, electrochemical technologies such as batteries, and other technologies such as ultracapacitors.

In those applications where present-day storage technology is sufficient to meet the challenge, there are still relatively few truly "grid-ready" storage product solutions with an established track record of safety and reliability available to potential users. To address these issues, EPRI in collaboration with over 80 utilities, vendors, and research organizations, including the DOE,

have convened the Energy Storage Integration Council as a free public forum in which stakeholders work together to define application requirements, performance reporting, standard specification, test protocols, and interface documents to facilitate the acquisition, installation, commissioning, and operation of storage systems.

Finally, it is important to recognize that the installation and operation of storage and other new technologies does not occur in a vacuum. The full value of energy storage can only be realized when it is installed and operated in coordination with other grid assets. Storage must be integrated into the planning and operation of the electricity grid and operated in conjunction with other assets to maintain the level of electric power quality and reliability that customers have come to expect. This process, part of what EPRI calls *The Integrated Grid*, will become increasingly important as energy storage and other distributed energy resources become a part of the grid of the future.

EPRI will continue to work with its members, the Department of Energy, and other stakeholders to help ensure that energy storage technologies can achieve their full value in the electric power industry. We believe that the expanded use of energy storage is important to improving the efficiency, reliability and security of the electric power delivery network.