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FY02 ANNUAL REVIEW OF THE DOE ENERGY STORAGE PROGRAM

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Energy storage is poised to play a key role in the electricity grid of the future. Whether in aggregated dispersed form or applied directly to the transmission system, storage can provide substantial relief in the mitigation of transmission congestion and overloads and ultimately effect deferral of costly upgrades. Energy storage is also an essential component for the control of power quality and stability on the grid. Storage can thus substantially increase the capacity factor of electricity generation, transmission, and distribution. Storage will also be required to make renewable generation dispatchable and to allow distributed generation to load follow in minigrids and backup applications. And the entire digital industry will need storage in combination with distributed power to provide high reliability premium power. However, before these various applications become acknowledged as standard solutions, much work remains to be done on reducing cost, increasing performance, and developing field experience.

The Department of Energy's research program on Energy Storage Systems is managed by Sandia National Laboratories. The aim of the program is the development of a broad portfolio of storage technologies for a wide spectrum of applications. The program funds development of storage systems based on advanced batteries, flywheels, and ultracapacitors. Other technologies, such as compressed air and SMES are monitored, but are not currently under investigation. Analytical studies explore the feasibility of new applications, and determine economic benefits. An important task for the program is the development of new power electronics devices, which are essential for all distributed generation technologies as well as storage. Projects are competed and, where appropriate, substantially cost shared.

The Program takes pride in the wide scope of its partnerships. Besides representatives of most of the advanced storage technologies, the program also works with major utilities, power marketing authorities, and state agencies such as the California Energy Commission and the New York State Energy Research and Development Authority. The program has working relationships with associations such as EPRI, NRECA and the **Electric Drive Transportation Association**. A new direction for collaborations is represented by the Coast Guard with their multitude of remote sites and the Navy, whose 'electric ship' concept will require considerable storage. Of course, the program also cooperates with the Electricity Storage Association and the Energy Storage Council in furthering the cause of the storage industry.

This is the fourth of the Annual Peer Reviews held by DOE's Energy Storage program. Over the past few years these reviews have developed into a significant forum for the storage community. They attract a sizable audience of utility and industry representatives, prospective users, and fellow scientists and engineers. The meetings showcase the work and progress of DOE-funded energy storage projects. They provide program management with a comprehensive view of the current status of the research and form a basis for evaluation, strategic planning and future directions of work. Projects are evaluated by a distinguished international panel of reviewers who provide specific comments and numerical scores. But besides this formal review, presenters also receive important feedback from their peers through audience participation in general discussion. Finally, the Peer Review represents an effective marketplace, bringing researchers together with potential customers for future ventures.

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