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Elements in Grid Energy Storage

edited by

Babu Chalamala

Sandia National Laboratories

Vincent Sprenkle

Pacific Northwest National Laboratory

Imre Gyuk

US Department of Energy

Ralph D. Masiello

Quanta Technology

Raymond Byrne

Sandia National Laboratories

ENERGY STORAGE APPLICATIONS IN TRANSMISSION AND DISTRIBUTION GRIDS

Hisham Othman

Quanta Technology LLC



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Energy Storage Applications in Transmission and Distribution Grids

Elements in Grid Energy Storage

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Hisham Othman
Quanta Technology LLC

Author for correspondence: Hisham Othman,
hothman@Quanta-technology.com

Abstract: The application of energy storage within transmission and distribution grids as non-wire alternative solutions (NWS) is hindered by the lack of readily available analysis tools, standardized planning processes, and practical know-how. This Element provides a theoretical basis along with examples and real-world case studies to guide grid planners in the siting, sizing, and lifetime techno-economic evaluation of storage systems. Many applications are illustrated, including feeder peak shaving, feeder reliability improvements, transmission reliability, transmission congestion relief, and renewable integration. Three case studies, based on the author's consulting experience, illustrate the versatility of the analysis methods and provide a guide to grid planners while tackling real-world problems.

Keywords: non-wire solutions, T&D applications, congestion relief, feeder reliability, energy storage

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