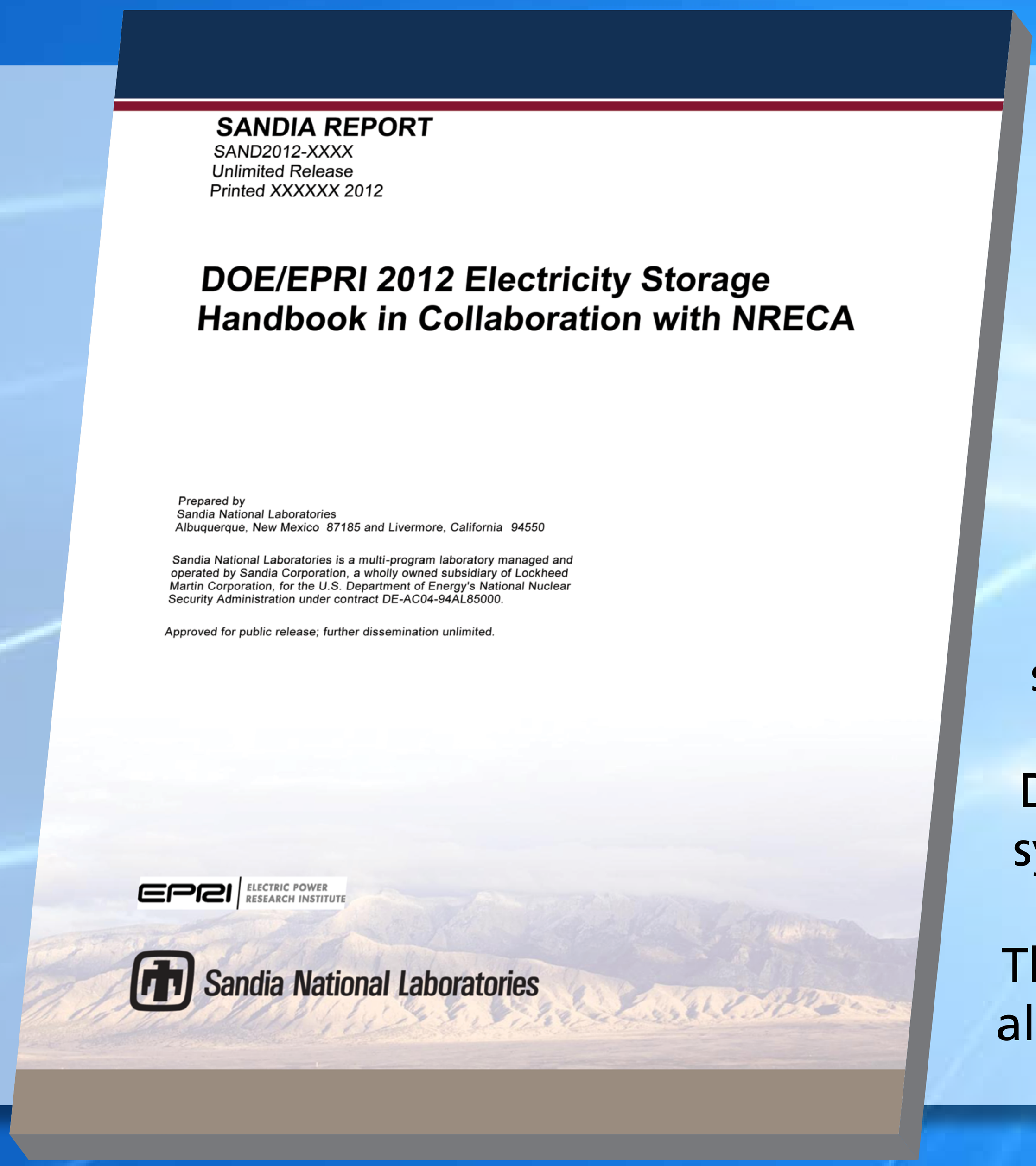
SAND2012-3167C

DOE/EPRI Electricity Storage Handbook In Collaboration with NRECA

The Handbook is sponsored by:
Dr. Imre Gyuk, US DOE; Haresh Kamath, Electric Power Research Institute;
Ross Guttromson, Sandia National Laboratories; in collaboration with
Dale Bradshaw, National Rural Electric Cooperative Association

THE HANDBOOK AT A GLANCE

- Electricity Storage Applications, Benefits and Use Cases
- Select Application Combinations and Benefits
- Policy and Regulatory Framework for Energy Storage
- Description of Storage Technologies:
  - Batteries
  - Flywheels
  - CAES
  - Pumped Storage
- Storage Systems Costs for Specific Applications
- Methods and Tools for Evaluating Storage Impacts and Benefits
- Considerations in Acquiring an Energy Storage System
- Past and Present Storage Projects (including AARA-funded)
- Comprehensive List of Energy Storage Reports from Multiple Sources



A how-to guide for electric systems engineers/planners, energy storage system developers and financiers to aid in the selection and installation of stationary energy storage systems in the electric grid.

The Handbook chapters include descriptions of energy storage in various applications, discussion of Federal and State policies that promote energy storage in the electric grid, brief descriptions of various storage technologies and guidelines for procuring energy storage systems. One section is devoted to a comprehensive cost database with input from 40+ vendors for a range of applications for batteries, flywheels, CAES and pumped storage, along with representative schematic diagrams for select storage applications.

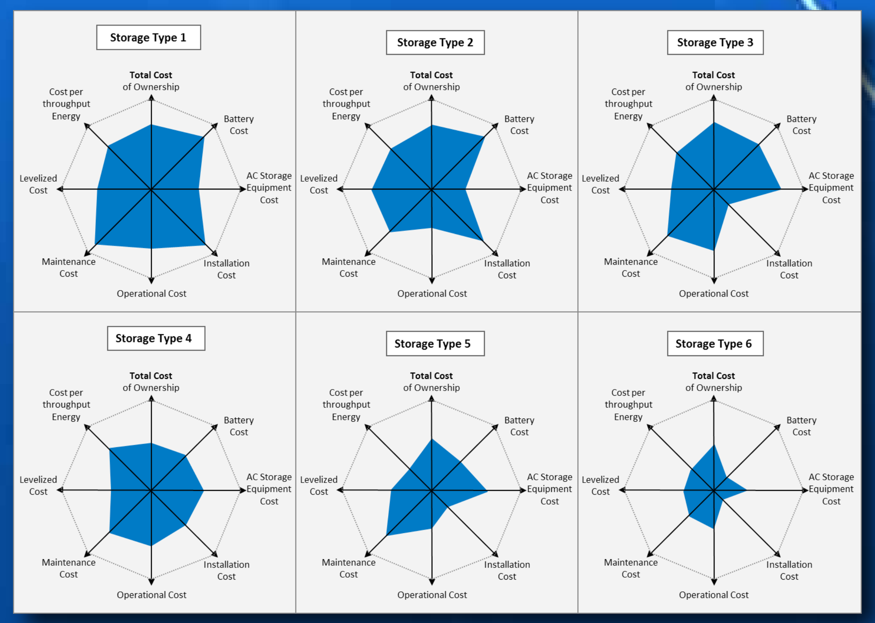
Development of the Handbook is guided by a 10 member Advisory Panel representing system vendors, electric utilities, regulatory and trade associations.

The Handbook will be released in late 2012 in print form as a DOE/Sandia report and will also be available as a PDF.

SAMPLE COST SUMMARY CHART

Application	Technology Type	Supplier	Unit Capacity, Gross kW	Hours of Energy storage at rated Capacity	Energy Capacity kWh @ rated DOD	Round Trip AC / AC Efficiency: Energy Rate (Btu/kWh)	Number of cycles / year	Battery replacement, yrs	$/kW	$/kWh @ rated DOD	Power - $/kW	Storage - $/kWh @ rated DOD	Fixed O&M - $/kW-yr	Variable O&M - $/kWh	Technical Maturity
Storage Technology 1															
Storage Technology 2															
Storage Technology 3															
Storage Technology 4															
Storage Technology 5															
Storage Technology 6															
Storage Technology 7															
. . . . .															
. . . . .															
. . . . .															

SAMPLE RADAR CHART



Comparison of Storage Technologies

The cost database consist information from a detailed survey of 40+ system vendors and presents their costs breakdown according to parameters shown in the sample summary table, above, and in radar charts, above right, that present a visual comparison between different storage technologies and their characteristics.

Sandia National Laboratories

U.S. DEPARTMENT OF ENERGY

NNSA National Nuclear Security Administration