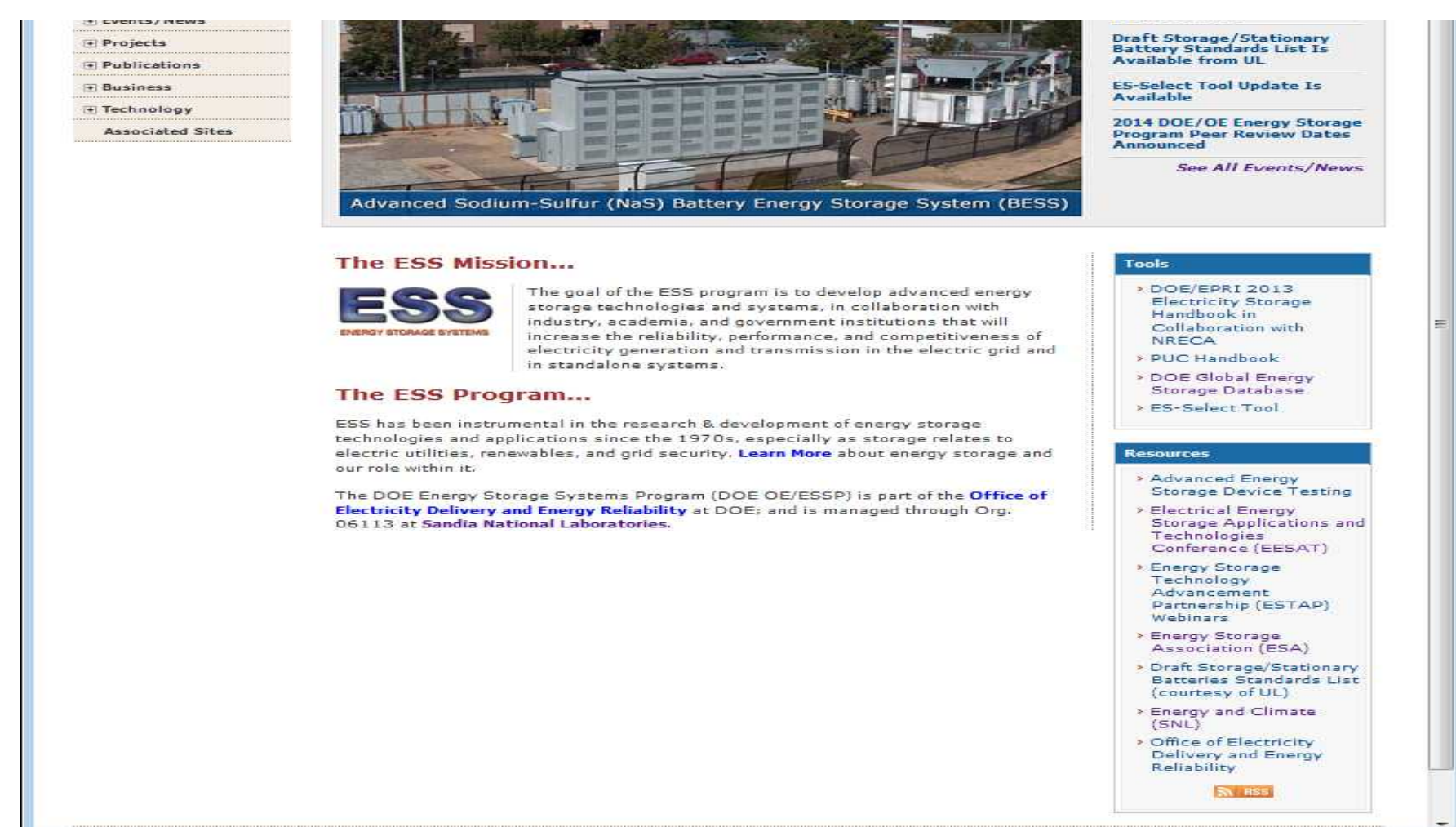


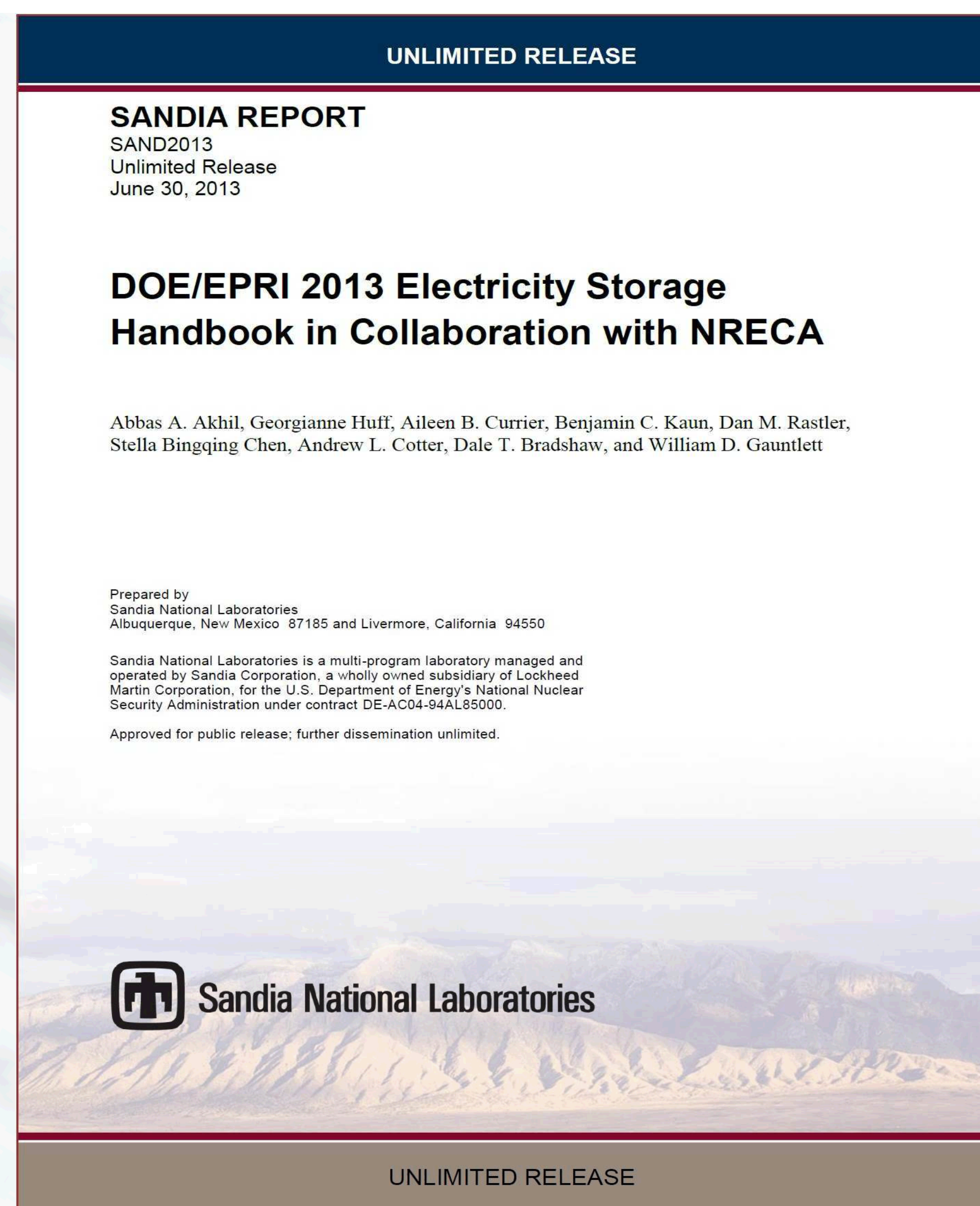
*Exceptional service in the national interest*



# SELECT DOE ENERGY STORAGE TOOLS



<http://www.sandia.gov/ess/>

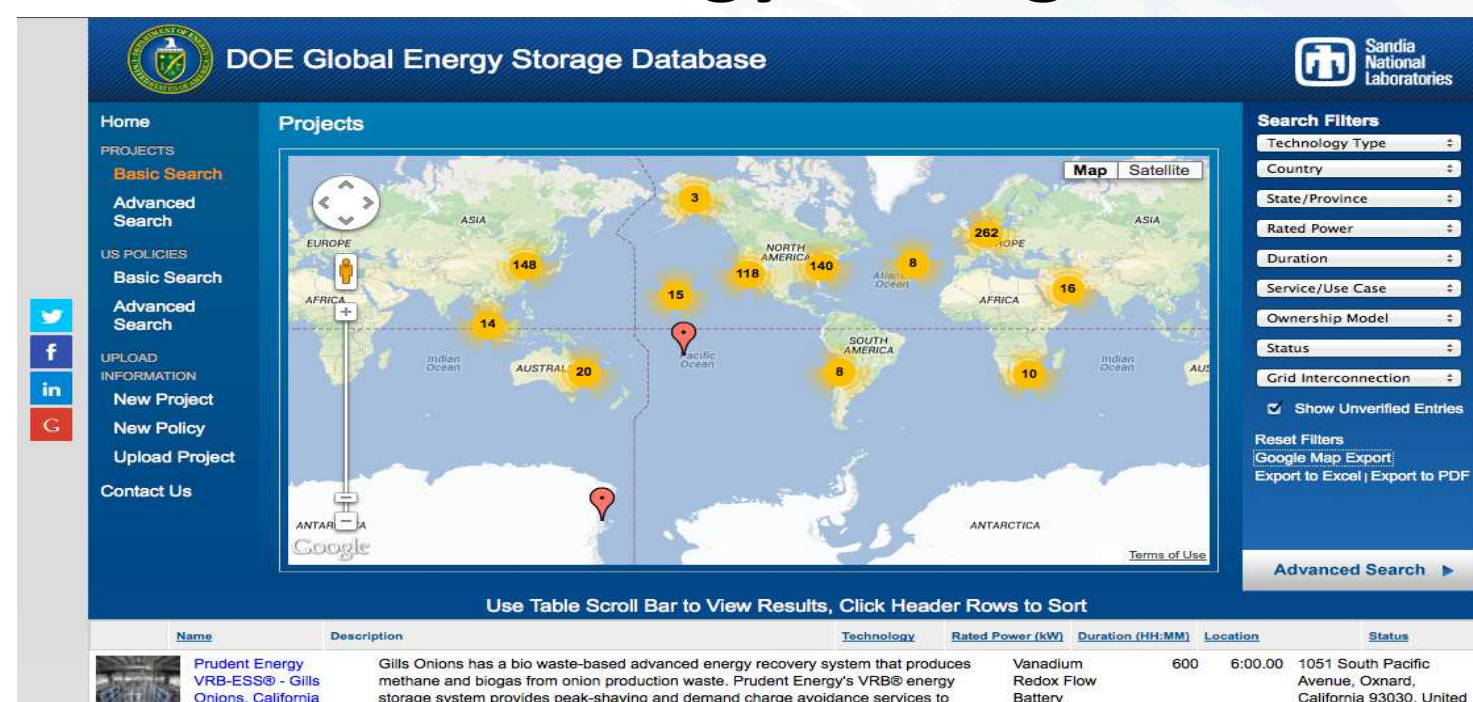


Hands-on approach and how-to guide:

- Storage benefits and services
- Storage technologies, cost, performance and maturity
- System and component cost details
- Methods and computational tools for evaluating storage
- Storage system procurement and installation
- Sample procurement documents
- Typical interconnection schematics
- Publically available resource

*Handbook ~ 170 pages; Appendices ~ 170 pages*

## DOE Global Energy Storage Database



<http://www.energystorageexchange.org>

- Shows 185 GW installed storage systems worldwide
- Representing 50 different types of storage technologies
- Lists 860+ storage projects in 54 countries
- Database is accessed more than 5000 times monthly
- Global resource - 62% of traffic is from outside of US
- Publically available resource

*With gratefully acknowledgment of the support of Dr. Imre Gyuk and the Department of Energy's Office of Electricity Delivery & Energy Reliability for supporting analysis of energy storage technologies.*

## SNL Energy Storage System Analysis Laboratory

### Testing Capabilities Include:

- Expertise to design test plans to fit technologies and their potential applications
- OE supported testing
- Cooperative Research and Development Agreements
- Work for Others (WFO) contract arrangements



Energy Storage Test Pad (ESTP)

### System Testing

- Up to 1 MW, 480 VAC, 3 $\phi$
- 1 MW/1 MVAR load bank

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dmrose@sandia.gov; 505.844.3722



72 V 1000 A Bitrode (2 Channels)

### Cell, Battery and Module Testing

- 14 channels from 36V, 25A to 72V, 1000A: battery to module-scale
- 125+ channels; 0V to 10V, 3A to 100+ A: cell tests

<http://www.sandia.gov/batterytesting/>