Energy Storage at PNNL

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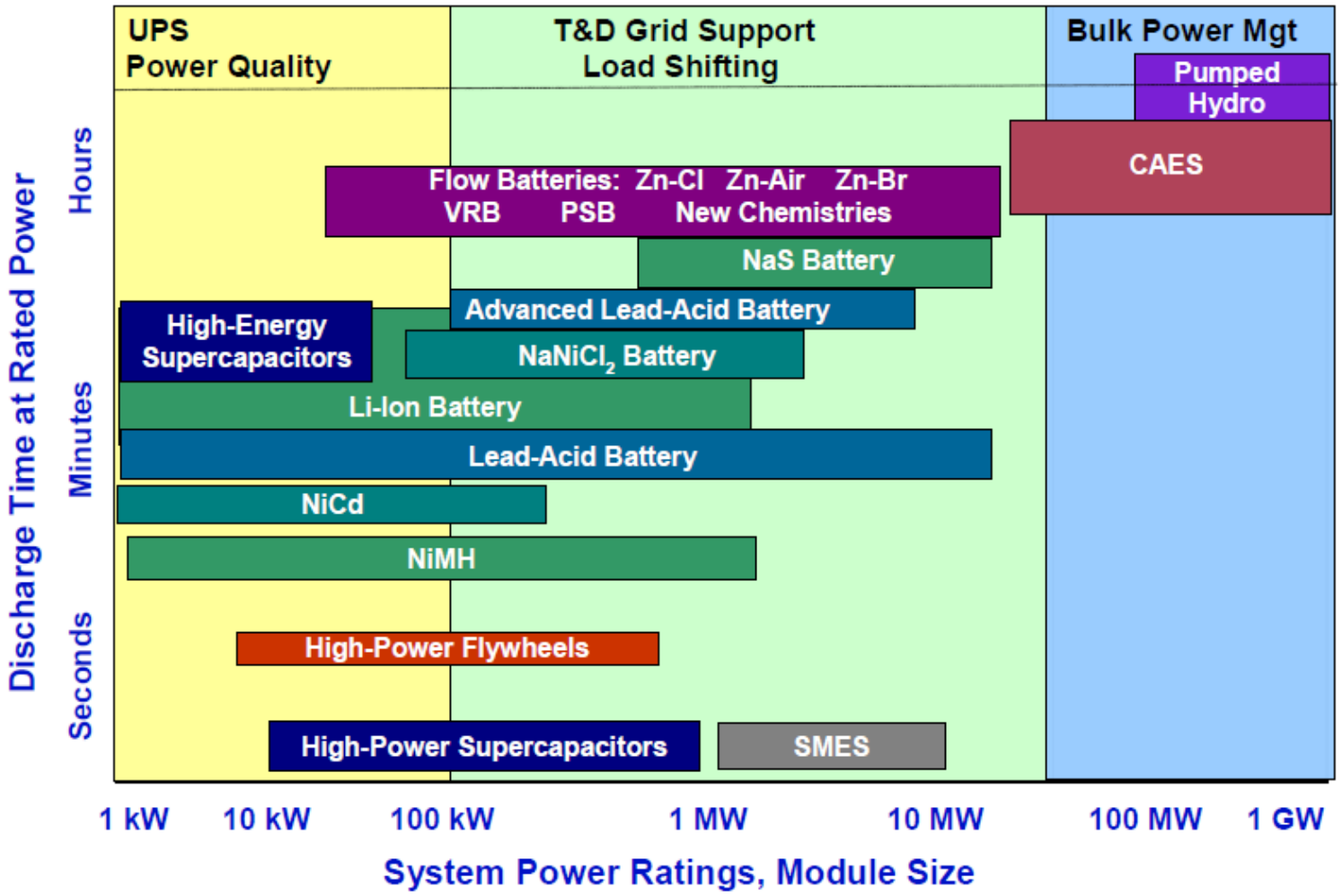
For NWEC Clean & Affordable Energy Conference

Energy Storage Technology Overview



EPRI

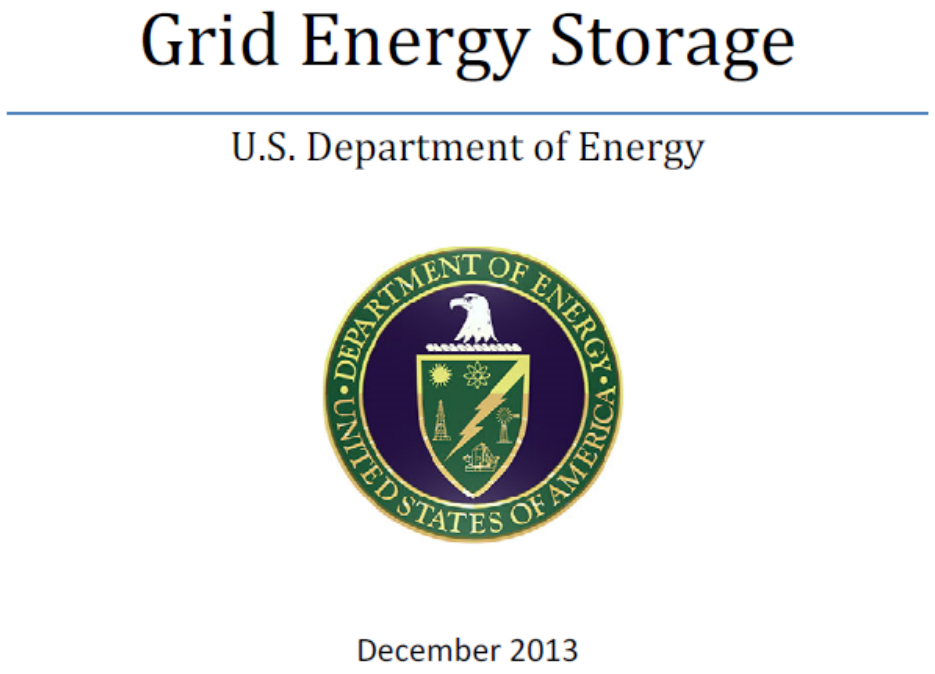
The Upshot:

- "Storage" is lots of things
- More granular resource analysis required
- Resilience, renewable integration place greater emphasis on longer durations (ARPA-E)

Energy Storage Program Summary

The Department of Energy's Grid Energy Storage report (2013) identified a four-pronged strategy to overcoming the barriers to energy storage deployment:

- Cost-competitive energy storage technology development;
- Validated reliability and safety;
- Equitable regulatory environment; and
- Industry acceptance.



Current Energy Storage Research at PNNL

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Cost-competitive energy storage technology development:

- Battery technology (aqueous soluble organic flow, low-cost vanadium, membranes, sodium metal/ion)
- Common manufacturing platform (economies of scale across chemistries)

Validated reliability and safety:

- Reliability laboratory (long-term testing facility)
- Codes and standards development

Equitable regulatory environment:

- Publications: Energy Storage in Integrated Resource Plans report, Valuation Handbook
- Regulatory workshop

Industry acceptance:

- Analytical support: Washington Clean Energy Fund, HECO Demand Response
- State of health modeling

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