

NREL/CCSE PEV Battery Second Use Project



EESAT

October 2011

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NREL/PR-5400-52627

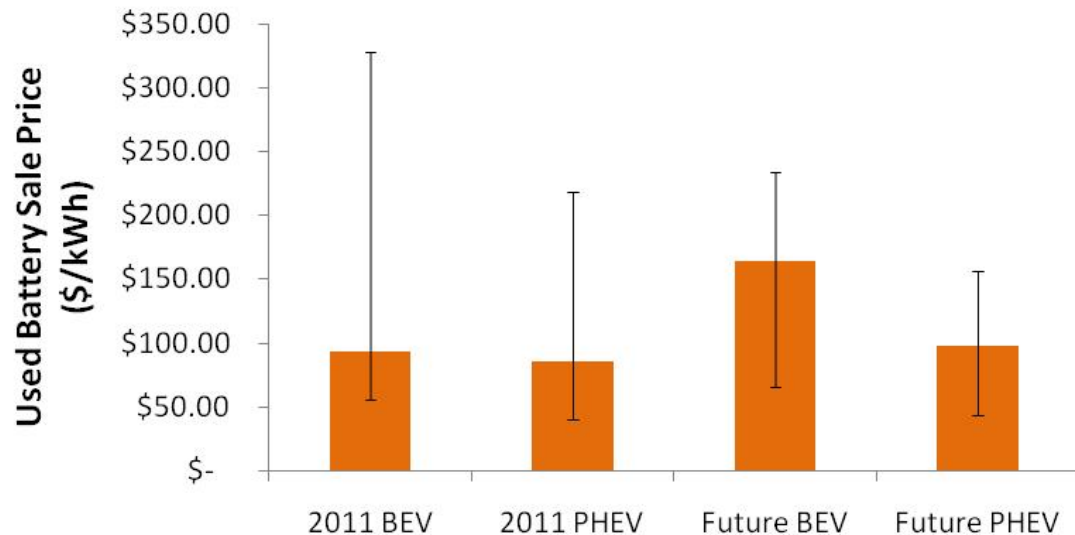
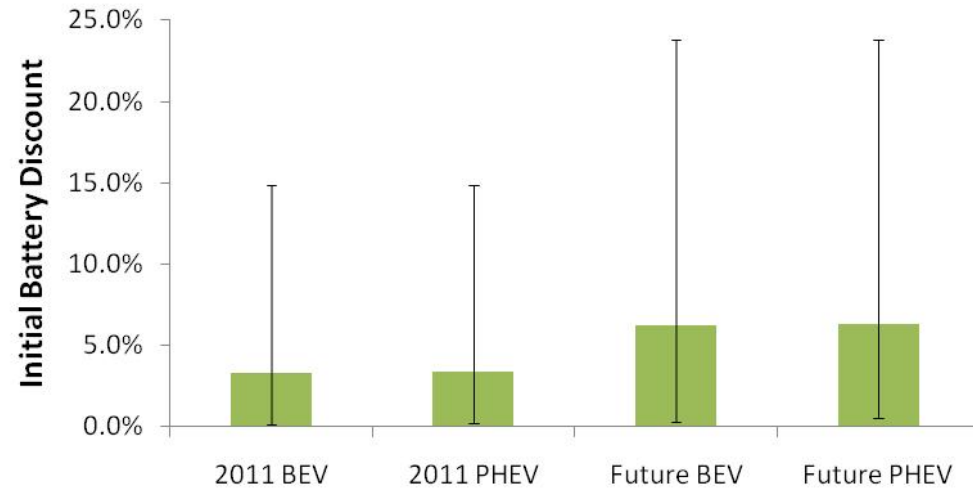
NREL/CCSE PEV Battery Second Use Project

- Competitively bid \$1.4M / 50% cost share project to
 - **Perform detailed second use analysis**
 - **Acquire aged PEV batteries**
 - **Perform long-term field testing**
- Combines expertise of utilities, hardware developers, and PEV research centers
- Leverages UC Davis' \$1.1M second use study
- Provides access to UCSD's extensive micro-grid for controlled field testing

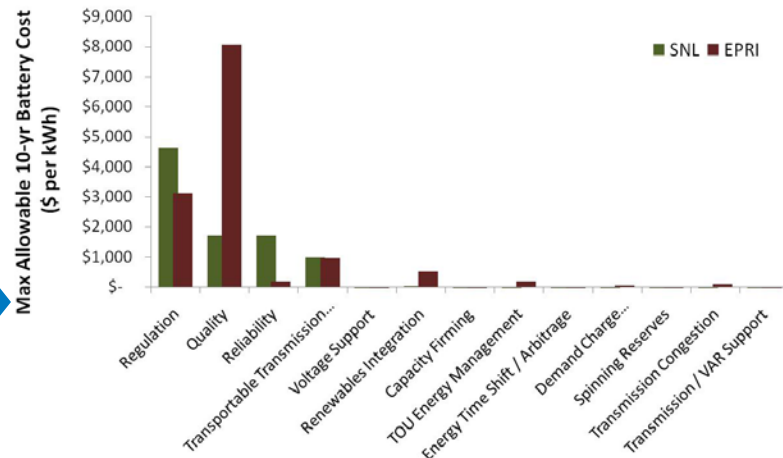
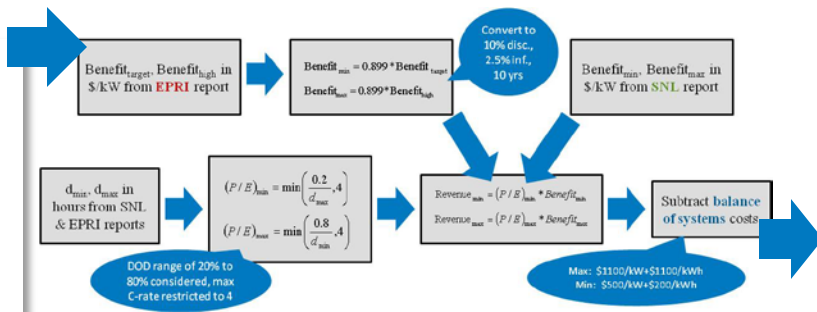
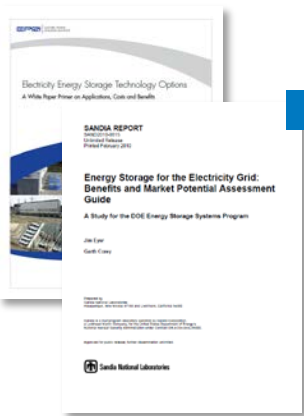


Competitive Technology

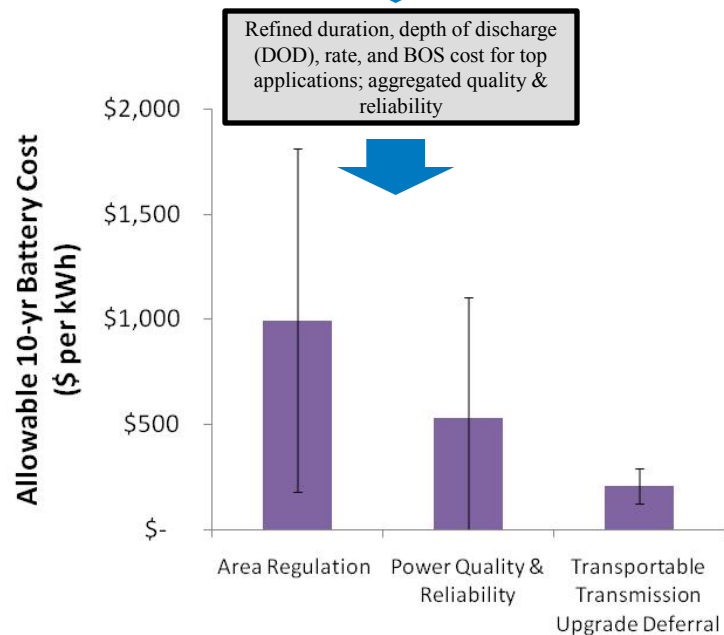
- Maximum salvage value of a used battery will be limited by future battery prices
- Under favorable conditions, second use can only discount today's battery prices by **12% or less**
- However, second use will offer batteries to secondary applications at reduced cost (typically **<\$170/kWh**)



Revenue Streams

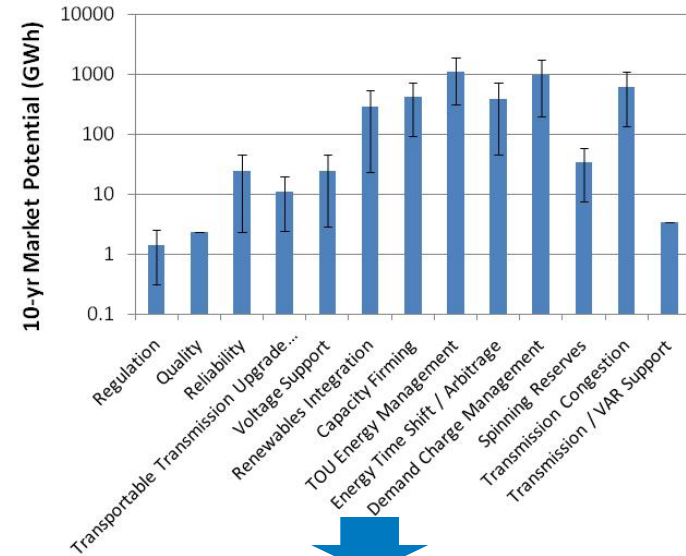


- Revenue is highly variable
- Allowable battery costs are highly sensitive to balance-of-system (BOS) costs
- Batteries need to be very cheap for these applications to be viable

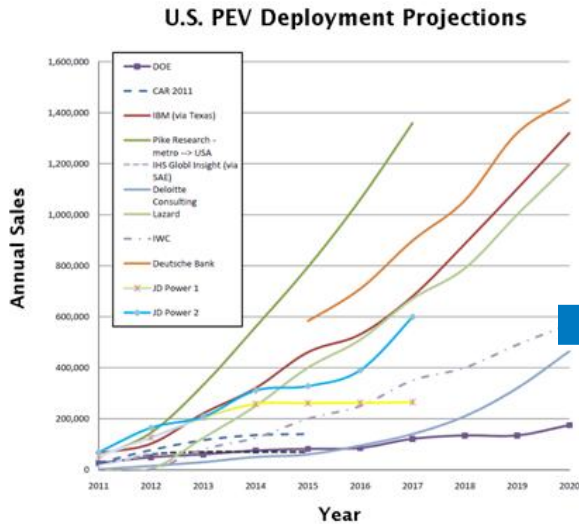


Supply and Demand

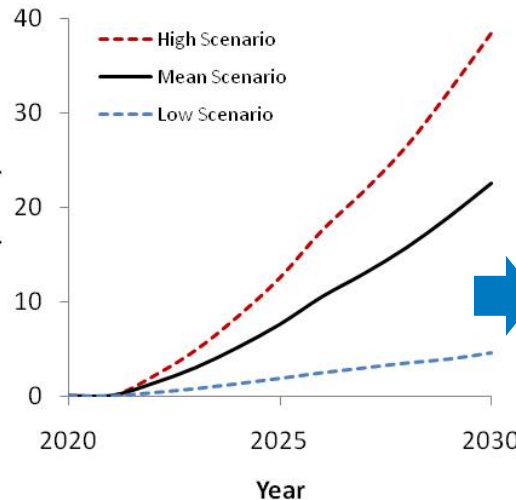
- High-value applications have both competition and small markets
- Supply from PEVs has the potential to overwhelm many second use markets



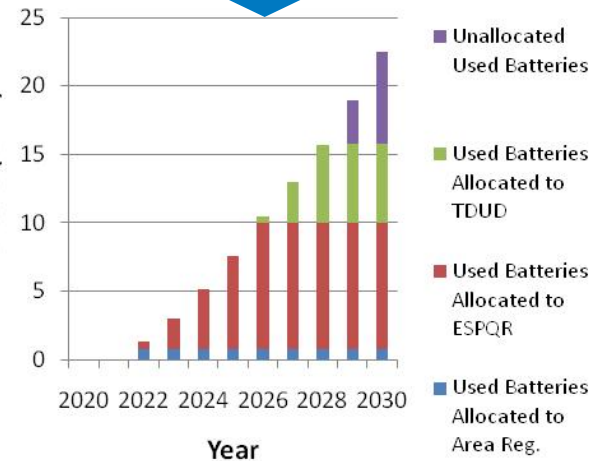
Refined duration, DOD, and rate; aggregated quality & reliability



Second Use Batteries In-Play (MWh)



Amount of Used Batteries Available (GWh)



Acknowledgements

- This activity is funded by the DOE Vehicle Technologies Program, Energy Storage Technology
- We appreciate the support provided by DOE program managers
 - David Howell
 - Brian Cunningham
 - Steve Goguen
- Thanks to Mike Ferry and the entire CCSE second use team
- Technical questions regarding battery second use should be directed to Jeremy Neubauer at 303-275-3084 or jeremy.neubauer@nrel.gov