



Three Angles on PEV Battery Second Use



The Battery Show

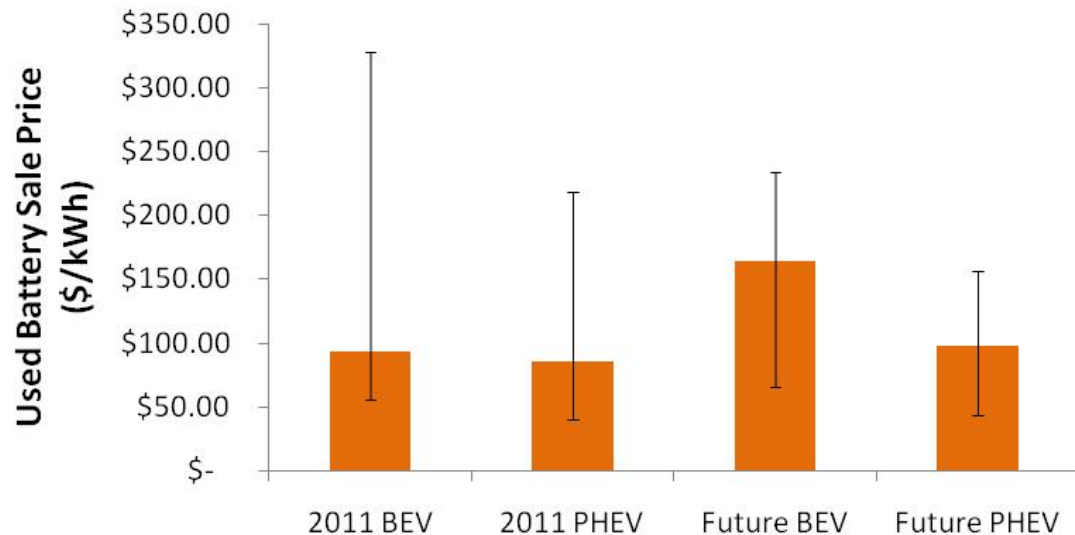
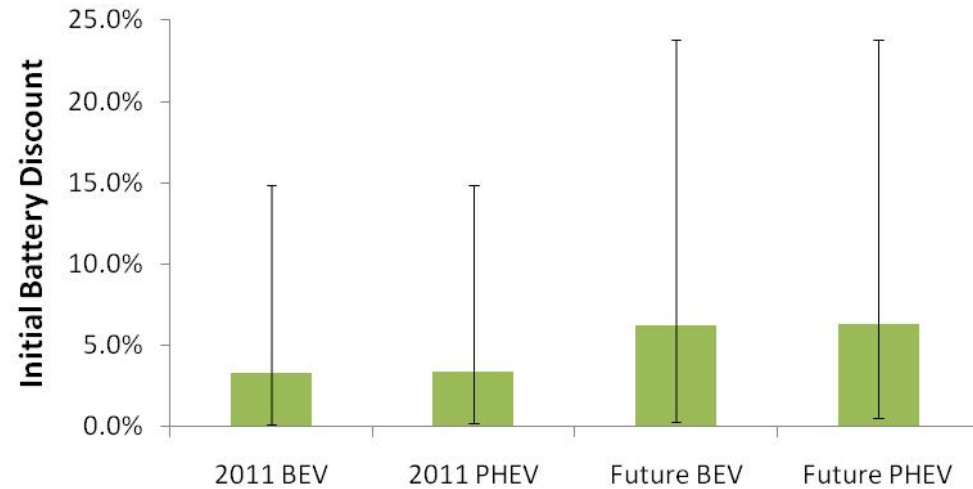
October 2011

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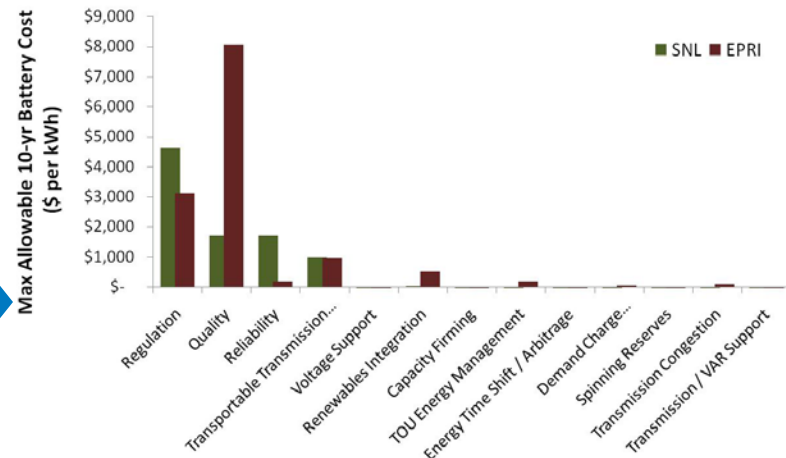
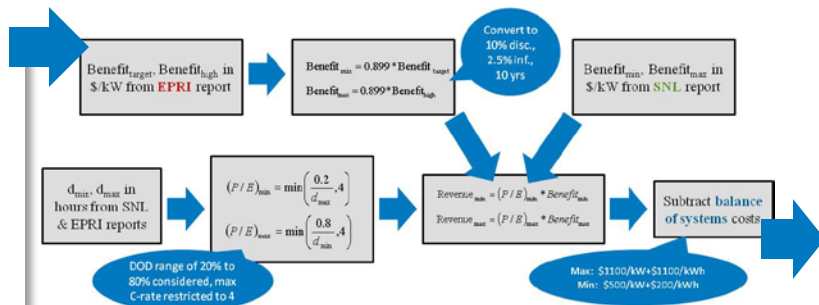
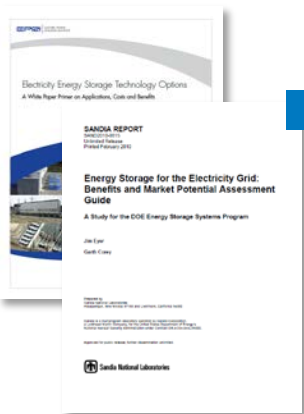
NREL/PR-5400-52632

Competitive Technology

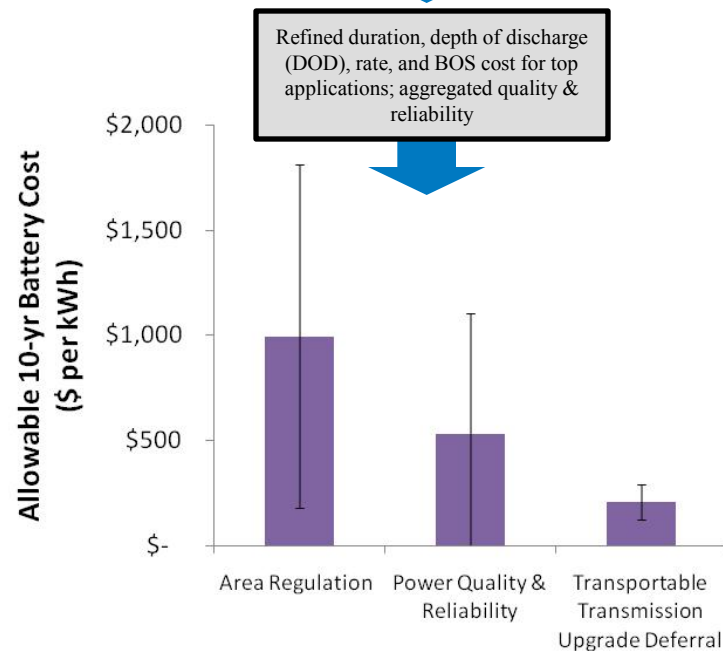
- Maximum salvage value of a used battery will be limited by future battery prices
- Under favorable conditions, second use can only discount today's battery prices by **12%** or less
- However, second use will offer batteries to secondary applications at reduced cost (typically **<\$170/kWh**)



Revenue Streams

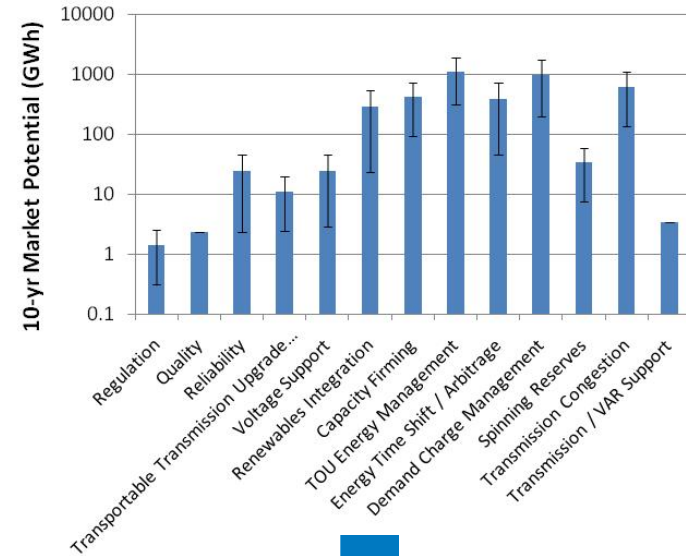


- Revenue is highly variable
- Allowable battery costs are highly sensitive to balance-of-system (BOS) costs
- Batteries need to be very cheap for these applications to be viable

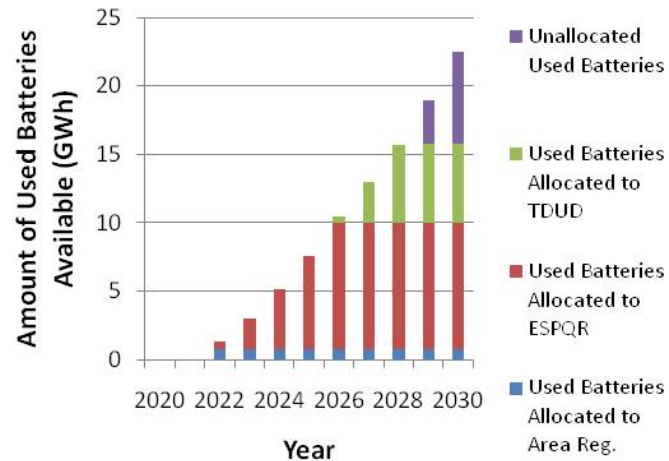
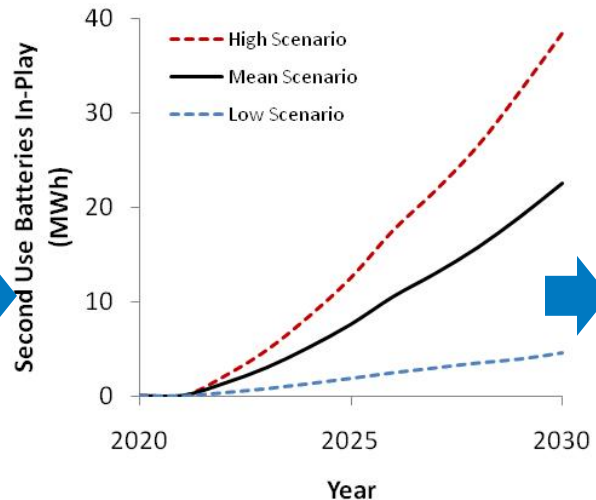
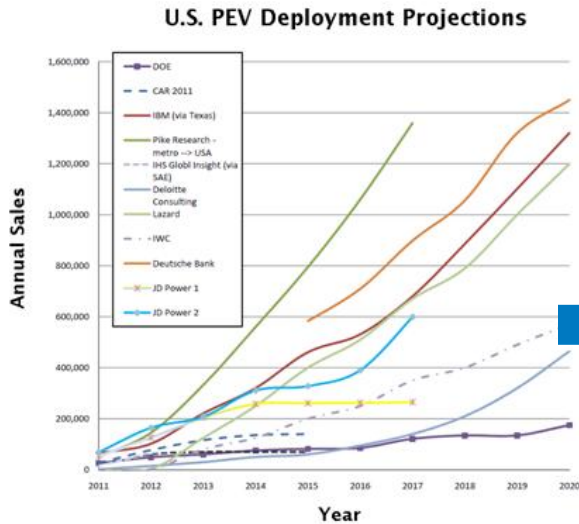


Supply and Demand

- 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



Acknowledgments

- 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