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# Potential Revenue from Electrical Energy Storage in ERCOT: The Impact of Location and Recent Trends

Raymond H. Byrne, Ph.D.  
Sandia National Laboratories  
[rhbyrne@sandia.gov](mailto:rhbyrne@sandia.gov)

# Background

- Electrical energy storage is becoming more prevalent
  - ARRA Energy Storage Demonstration Projects
  - Renewable integration, state renewable portfolio standards (RPS)
- Valuing energy storage can be complicated
  - Market versus non-market area
  - This paper looks at estimating maximum potential revenue from market data (arbitrage and frequency regulation) – LP optimization
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# Results

- Looked at all load zones in ERCOT
  - 2011, 2012, 2013 data
  - Day ahead market for energy and frequency regulation
  - Assumed perfect foresight (also looked at trading algorithms – not described in the paper)
  - Assumed a notional plant size, 32MWh, 8MW rating, 80 percent round-trip efficiency
- Results
  - Frequency regulation provides more revenue than arbitrage
  - 2011 revenue was significantly higher, can be attributed to heat wave and ice storms which raised prices
  - Arbitrage revenues are higher in west Texas, but only slightly

# Conclusions/Recommendations

- Since frequency regulation is the dominant revenue source – location is not important (one market) unless additional revenue streams are added (e.g., T&D deferral)
- 2012 and 2013 potential revenue is more likely “normal” – more years of data are needed for analysis
- Future research - plan to add mileage payment to the optimization code