EV Charging with Lead Battery Energy Storage

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Battery Day Event – Capitol Hill
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Electric Vehicle (EV) Charging Infrastructure

• Widespread EV adoption is dependent upon access to efficient EV charging
  • Availability of rapid charging at public charging stations is key

• U.S. is using gas station model
  • DC Fast Charger (FC) can charge EV in 15 minutes or less

• However... DCFC can cause dramatic increases to business owner’s electricity bill
  • Electricity Demand Charges
Lead Batteries and EV Fast Charging – Concept

• On-site lead batteries can charge and discharge using direct current (DC)
• Batteries charge from the grid when demand is lower, store the power, and release it when demand is higher
• When a car arrives, the battery can quickly deliver electricity to the EV charger without drawing power from the grid, avoiding demand charges
EV Fast Charging Plan for Missouri

**Missouri DNR:** VW Trust Beneficiary Mitigation Plan
- $6M identified
- Develop network of EV FC stations highway corridors - promote adoption of EVs in Missouri

**Ameren Missouri:** Charge Ahead Program
- $4.4M EV FC Corridor Plan – PSC approved in February 2019
  - 11 sites selected
- $6.6M Multi-Family, Workplace, & Public Charging
  PSC approved October 2019
Integration of Lead Battery Energy Storage Feasibility Study

• Grant from MO Division of Energy
• Analysis of actual electricity data for Kum & Go Gas Station, Springfield, MO
• City Utilities, Springfield applies a demand charge tariff for maximum amount of energy used during any 30-minute time period
• EV DCFC will increase demand charges for K&G
• Integration of 200 kWh lead battery energy storage system will mitigate demand charges
Lead Batteries with EV Fast Chargers – Proposals Under Development

- Missouri DNR EV Fast Charger RFP
- In support of Army’s plan to increase the use of EV’s
- At Ameren HQ
  - Demonstration and Proof-of-Concept
  - Smoothing of peaks created by DC Fast Charging
  - Support larger roll-out of electric vehicles
Our Team

• Consortium for Battery Innovation (CBI)
  • Coordinating donation of batteries and matching funds for proof-of-concept demonstrations

• Paragon Solutions, Inc.
  • Project management and coordination
  • Missouri Woman Owned Small Business

• LilyPad EV
  • Electric Vehicle charging stations and installation
  • Ameren’s EV Charging contractor

• EAI Grid Storage
  • Battery integration experts
Timing is right for Advanced Lead Battery Energy Storage

• Missouri Senate Bill 564 – 25% of utilities’ capital investment plan to grid modernization projects
  • PSC can approve utility investments in pilot projects including but not limited to “renewable generation, microgrids, or energy storage”

  • Establishes requirement that all Army installations ensure available power and water to sustain critical missions for a minimum of 14 days

• US DOE Energy Storage Grand Challenge
  • Design new technologies to strengthen U.S. manufacturing and recyclability, and to reduce dependence on foreign sources of critical minerals
Paragon Point of Contact

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