Chapter 6 - Appendix C

Fatal Flaw Analysis – Energy Storage Technologies[1]

Description	Fatal Flaw
Pumped Hydro Energy Storage	✓
Compressed Air Energy Storage (CAES)	✓
Sodium Sulfur Battery (NaS)	✓
Hydrogen Storage/Fuel Cell Generation	✗
Thermal or Pumped Heat Energy Storage	✗
Zinc – Bromine Flow Battery (ZnBr)	✗
Lithium – Ion Battery (Li-Ion)	✓
Advanced Lead Acid Battery	✗
Vanadium Redox Flow Battery	✗
Flywheels	✗

A high-level fatal flaw analysis was conducted as part of the first stage of the supply-side selection analysis. Options that did not pass the high-level fatal flaw analysis consist of those that could not be reasonably developed or implemented by Ameren Missouri for one or more of the following reasons:

- The storage technology is cost prohibitive to install and equally cost prohibitive and/or burdensome to maintain.
- The storage technology, while perhaps advancing, is still in the development or demonstration phase. (Few storage technologies above have utility scale applications that are operational in the United States, and some are still not commercially available even in community or household scale applications.)
- The storage application is overly limited by a short cycle life, especially if deeply discharged.
- Several battery storage applications are limited for various reasons in their scalability to either utility-grade or community-grade installations. The application may, in fact, not be intended for anything other than consumer end-use behind-the-meter.
- The storage application is hampered by low cycle efficiencies or energy densities.
- The storage application is hampered by environmental risk (e.g. batteries whose chemical elements are considered hazardous materials or have combustible tendencies under different operating conditions).

[1] 4 CSR 240-22.040(2)(C)2

Compliance References