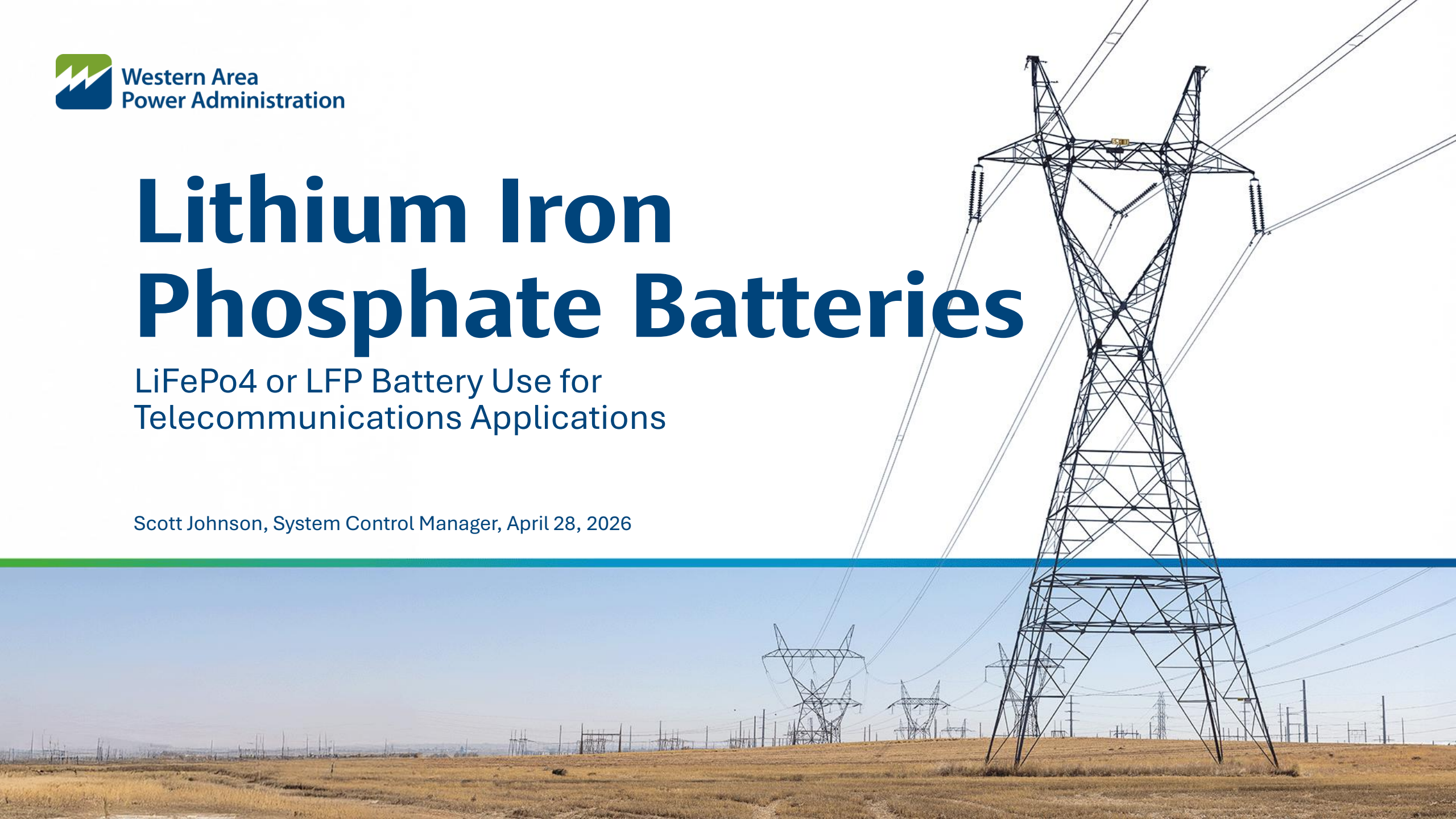
Western Area Power Administration

Lithium Iron Phosphate Batteries

LiFePo4 or LFP Battery Use for Telecommunications Applications

Scott Johnson, System Control Manager, April 28, 2026



LFP batteries, where did they come from?

LFP batteries were designed for the automotive/maritime (marine) industries with cell voltages equaling 12.8 VDC.

With the decrease in EV manufacturing, LFP companies are looking for new markets for their product, telecommunications being one of them.

Rivian battery pack (Credit: Emily Dreibelbis)

LFP Battery Advantages

- Thermal and chemical stability reducing risk of overheating and fire
- Long cycle life, 3,000 – 7,000+ charge/discharge cycles
- No off gassing and very low maintenance
- Roughly 60% lighter and 70% smaller than VRLA batteries of equal capacity
- Can discharge 80% of capacity, rather than 60% requiring less Ah capacity
- Perform reliably across a wider range of operating temperatures
- Does not use cobalt (a toxic heavy metal), considered more environmentally friendly both in production and disposal

LFP Battery Disadvantages

- Contains lithium, still has some risk of overheating and fire compared to other technologies
- Higher initial installed cost compared to other battery technologies
- Less forgiving to overcharging and requires a battery management system (BMS)
- Offered in limited capacity ratings between 50 and 280 Ah, can’t be sized to site specific requirements
- Do not follow IEEE standards outlined in WAPA equipment standards for batteries and chargers
- An unproven/untested long-term battery technology for the telecom and utility industry
- Difficult to determine continuous output of the battery from the data sheets, it tends to reference peak current but not continuous

What about EPRI on LFP?

EPRI upcoming project: LFP Battery Performance in Substation Applications.

The overall goal of this project is to evaluate the performance of LiFePO4 batteries at typical substation DC backup system voltage and amp-hour sizing, subjected to conditions typically seen in substation battery enclosures during extreme summer or winter months across the United States. One major objective is to consider what conditions initiate thermal runaway (which may lead to combustion) of the battery bank. A related objective is to estimate the level of thermal energy released if such an event occurs. Another objective is to assess how well the batteries and LiFePO4 compatible Battery Monitoring Systems (BMS) perform across a range of ambient temperature swings.

What about WAPA on LFP?

- WAPA's current battery and charger equipment standards do not address LFP batteries, chargers, or the BMS
- LFP battery technology will be an agenda item at the next P&CWG meeting
- WMMC will need to provide input and oversight regarding this battery technology
- Burns and McDonnel is providing the Oregon Mountain (SNR) design and will look to include a LFP system for that site
- The Oregon Mountain installation maybe considered a WAPA-wide pilot program for LFP technology
- Investigation with other utility company use of LFP technology should be pursued
- EPRI LFP Project results should be considered prior to incorporating this in WAPA equipment standards

Questions & Discussion

What do we want to do next?

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