African Energy Solar Success Series

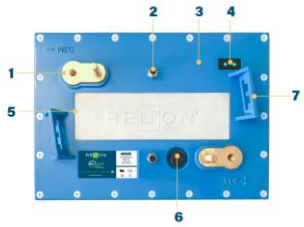
Plusses and Minuses of a Lithium Battery

By Lincoln Dahl

For years we wished that the price of solar modules would decrease – and now that a watt costs less than a piece of candy, we are wishing that battery prices would drop! Although many promising technologies are being developed, the best way to decrease the cost of storage today may be to spend more money. In other words, to buy a battery that can give a significantly longer life. This leads many of us to look at lithium batteries and compare options. After watching manufacturers for quite a while, African Energy has decided that the time is right to start offering a lithium battery.

The first decision we had to make was about which lithium chemistry we would use, as there are at least five different options. We chose lithium iron phosphate, because it is inherently safer, much less likely to overheat (produces only 5% of the heat of other lithium chemistries), does not include rare metals like cobalt, and still has a decent energy density. LiFeP04, as lithium iron phosphate is called, is also within the voltage range of a traditional lead acid battery, meaning it will work with all of our existing chargers and charge controllers.

The second decision was about a very important part of lithium batteries - the battery management system. We had seen many complicated management systems, including some that even need to be programmed for your inverter before shipping. This did not seem very sustainable and kept us from adopting those technologies. (We didn't think you needed expensive headaches in the field.) So, we looked for a "drop in replacement" battery that looks and feels like the lead acid batteries we already know. These batteries are made in standard BCI case sizes like GC, G27, G31 and so on. They have terminals at the top like a lead acid battery and you connect directly to the inverter and set your inverter for constant current and constant voltage (basically a bulk charge). The integrated battery management system does the rest.

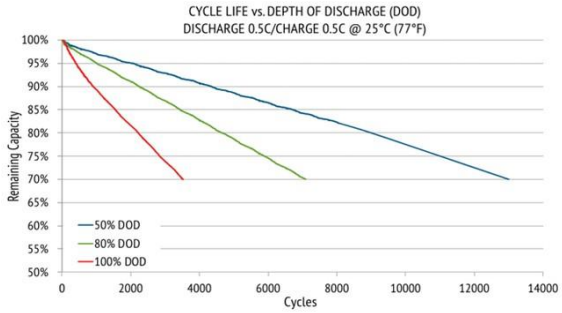


1. Dual M8 Terminals (insert & stud)
2. CANbus Input/Output
3. Wake-Up Button
4. SOC/Status LEDs
5. Heatsink
6. Vent
7. Lifting Brackets

Next, we looked for a company we could trust who was dedicated to their technology. We preferred one for whom lithium batteries was the core business, not a sideline or a distraction. We felt that they would do a better job of developing with the technology and ensuring that their products were market-ready.

This search process led us to choose Relion Battery in South Carolina, USA. They make a range of lithium iron phosphate (LiFePO4) drop-in replacement batteries from 12v, 5 ah up to 48v, 300 ah that are simple to use drop-in replacements. Their new Insight series allows up to 128 batteries in parallel and has super simple monitoring and connection. Relion also has UN38.3 and UL ratings, so their batteries can travel by air cargo.

Considering a cycle life for the Relion battery of about 5,000 cycles to 80% depth of discharge (until 80% of capacity remaining), let's look at the economics. Relion makes a 200 ah, 48v battery bank and at 80% DOD, this would be roughly equivalent to a bank of 8 x Deka 8G4D. The 8G4D gives 183 ah at c/20, so assuming 50% DOD, two parallel strings would provide about 183 ah. An 80% DOD on a Relion 200 ah would give about 160 ah or about 12% less. Without disclosing prices here in public, let's just say that assuming 4,500 cycles from the Relion makes it 40% cheaper per cycle than the Deka assuming 1,000 cycles from the Deka. The Deka data sheet states 1,000 cycles at 50% but many of us have experienced that as too low. So choose the number that you believe from Deka, but even if it was 2,000 cycles, the Relion still comes out cheaper per cycle.



Thanks to these Relion batteries, lithium is now a great alternative, but of course not for everyone. Cash flow and opportunity cost of capital are two of the most under-rated considerations in consumer behavior regarding energy storage. But for your customers who can afford it, we are shipping Relion batteries now.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