

Lead vs LiFePO4

Characteristic	Lead Acid	Lithium Iron
Total storage Capacity	Typically, lead acid batteries can store between 100Ah and 200Ah @ 12V or 1.2kWh-2.4kWh. A suitable domestic grid back-up solution will require 5kWh – 25kWh of storage. This is dependent on what requirement need to be met.	Lithium Iron Batteries for solar are generally supplied in packs rated 2kWh – 10kWh per unit. These units are self contained with inbuilt BMS or Battery Management Systems, which enable the battery to perform in a manner that ensures longevity of the battery service.
Daily Usable Capacity	In order to obtain maximum life span of a lead acid battery, it is recommended that the battery is only discharged to 30% of its capacity, referred to as the “Depth of Discharge” or DoD. This means that the battery capacity available for everyday use is only 30% of the actual storage capacity. Use beyond this limit dramatically shortens battery life.	Lithium Iron Batteries can generally be discharged to 90% of their storage capacity with very little or no harm done to the battery. This means that the daily capacity for everyday use is 90% of the actual storage capacity.
Full Cycle Efficiency	The charge efficiency of Lead Acid batteries declines up to 30% as they approach full charge.	Most Lithium Iron batteries have a full cycle efficiency of more than 98%. This makes them suited to Solar PV systems that require an almost complete discharge at night and then a full charge during the day.
Number of Lifetime Cycles	A well-managed system where batteries are configured to use only 70% of their storage can expect a cycle life of 1700 – 2500 cycles. In a well-designed system, the life expectancy would be between 4-5 years.	A quality Lithium Iron Battery should have a conservative life span of 3500 cycles to 7000 cycles at up to 90% DoD, which equates to well over ten years’ life. Even then, Batteries still have 70% of their original capacity. Built in management systems should ensure the battery is functioning optimally and a full ten-year life should be expected.
Weight	Lead Acid Batteries weigh in the region of 75kg per kWh – a 7kWh system would therefore weigh in the region of 525kg. The amount of space that this takes up needs to be taken into account too.	A Lithium Iron Battery pack will weigh between 10 – 15 kg per kWh. A domestic or residential battery 7kWh pack will generally weigh in the region of 80kg. The amount of space consumed by the pack is significantly less than lead acid.
Operating Temperatures	Environmental conditions play a significant role in the lifespan of lead acid batteries. One of the critical issues that needs to be considered when comparing lead acid and lithium Iron is the affect of temperature variances. Lead Acid can lose as much as 50% of its life span if there are moderate variances	Lithium Iron is less impacted by moderate temperature changes. Performance and lifespan should not be noticeably influenced by these environmental factors in South Africa.