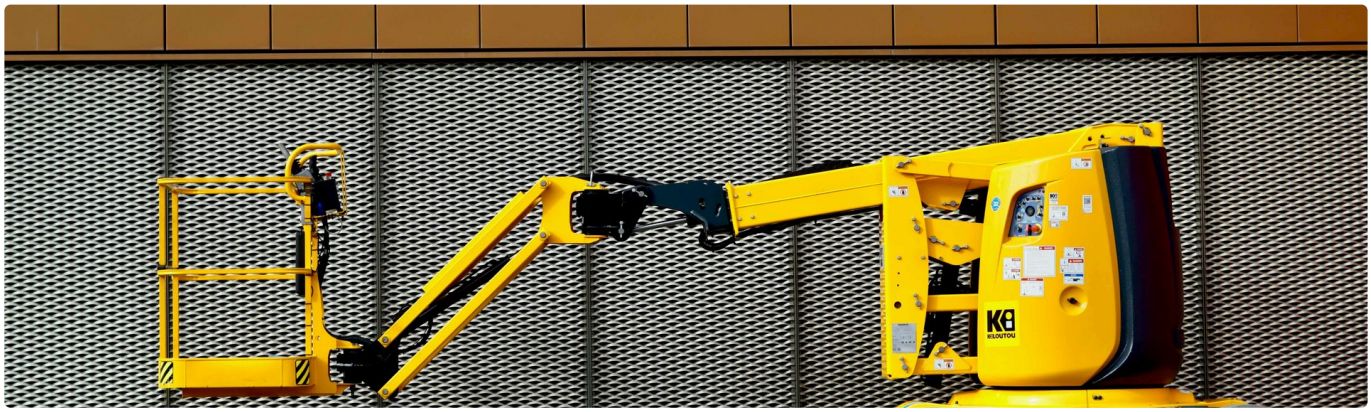


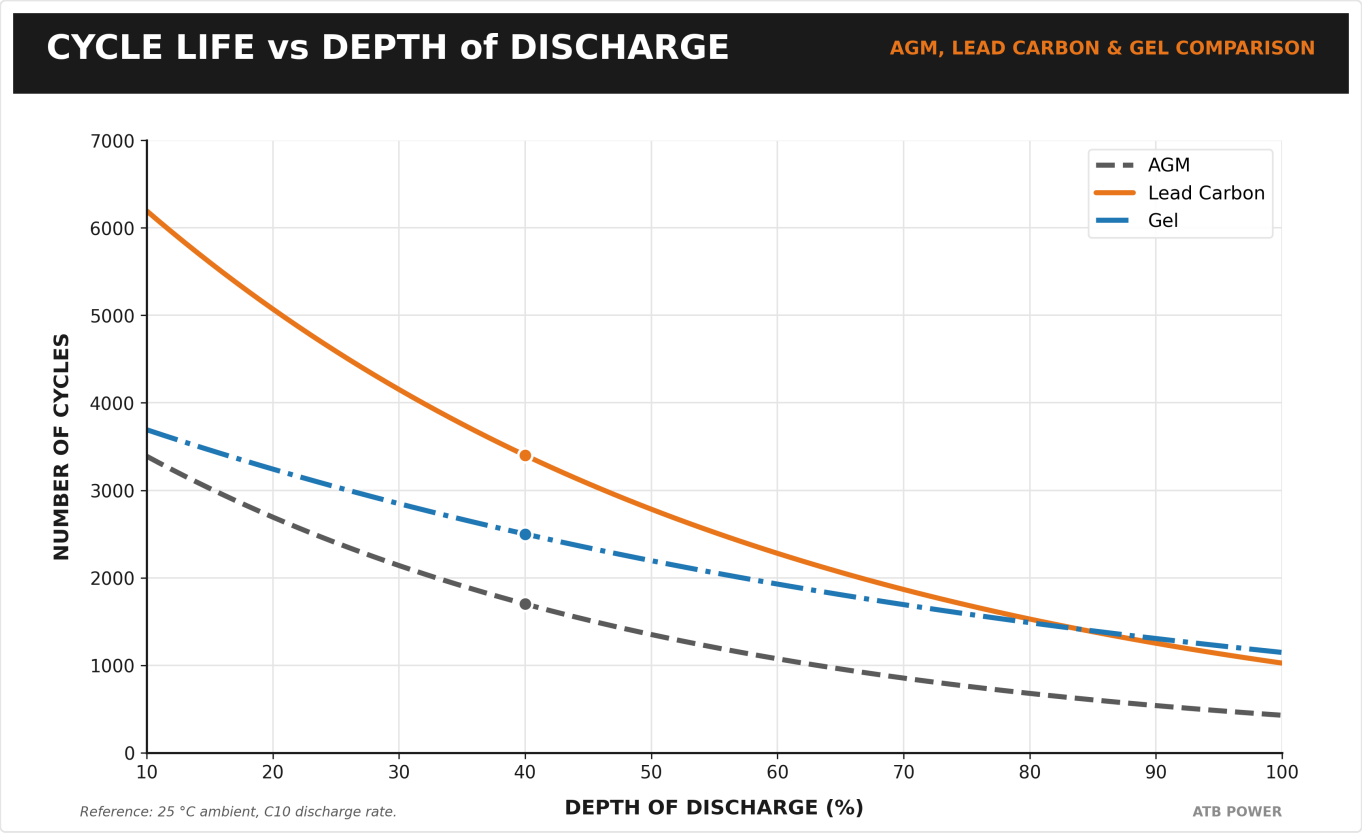
LITHIUM GUIDE

LiFePO4 vs Lead-Acid: Total Cost of Ownership and When to Switch

Lithium costs more up front and far less over its life. Here is how to compare the two honestly and decide when a switch pays off.

ATB Power · Battery Solutions · 6 min read

Lead-acid is proven, low cost and recyclable. Lithium iron phosphate (LiFePO4) costs more to buy but delivers more usable energy, far more cycles and almost no maintenance. The right choice depends on how hard you cycle the battery and how long you keep it.



ATB cycle life by series. Cycle life falls as depth of discharge rises, and lithium delivers many times the cycles of lead-acid at the same depth.

The honest comparison

FACTOR	AGM / GEL (VRLA)	LIFEPO4
Up-front cost	Low	2 to 3 times higher
Usable capacity	~50% of rated (deep cycle)	~90 to 100% of rated
Cycle life (to 80%)	~400 to 1200 cycles	2000+ cycles
Weight	Heavy	~50 to 60% lighter
Charge time	Slow, multi-stage	Fast, high charge acceptance
Maintenance	Low (sealed)	None; managed by BMS

Why usable capacity matters

A 100 Ah lead-acid battery in deep-cycle service gives roughly 50 Ah before you should recharge. A 100 Ah LiFePO4 gives close to 90 to 100 Ah. So a lithium battery often replaces a much larger lead-acid bank, which changes the cost comparison before you even count cycle life.

When lithium pays off

- Daily deep cycling: floor care, MEWP, golf, off-grid solar, where lead-acid wears out fast.
- Weight or space limits, or where a single drop-in beats a heavy multi-battery bank.
- Long ownership, where 2000+ cycles spread the higher purchase price over many years.
- Fast turnaround, where opportunity charging keeps equipment running across shifts.

When lead-acid still wins

- Pure standby and float duty (UPS, alarms, telecom) where the battery rarely cycles.
- Tight budgets and short replacement horizons.
- Very cold charging without heating, since lithium cannot charge below 0 degrees C.

RULE OF THUMB

If you cycle the battery most days, lithium usually wins on cost per usable kWh over its life. If it mostly sits on float, lead-acid is hard to beat on price.

Need help choosing or specifying?

Talk to ATB for datasheets, fitment and custom configurations.

Request specifications