



Sunnytek Solar Sweden Long life battery solutions small and medium size installations

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Sunnytek use battery energy storage in many of the solutions we offer. Battery technology is complex with many ways to look at the design and get best performance versus costs. This paper is related to smaller systems and what is best here. Larger systems use other solutions and are explained in other documents and papers. In general we use 2 different technologies depending of application and demands.

Li-Fe-Po4 Lithium iron phosphate technology

This is the standard solution in most cases with lots of advantages and not so many limitations. Some Lithium cells make problems in transports and reliability in making unexpected overheating and fire and therefore we do never use them and use the Li-Fe-Po4 chemistry instead. They are very rugged and make no surprises. Price is good and life time in a correct installation can be 10-12 years. We have a demand here of 5000 cycles / 70 % discharge depth and always optimise to get this specification out of our systems. This includes all from solar street lamps to hot e power systems. This battery can be deep cycled and used at temperatures of over 60C in temperature for many years.



LTO Lithium Titanium oxide technology.

This is the solution when reliability and life time is a key. The cells are a bit like the Li-Fe-Po cells but voltage is only 2.4 volts and they are larger and heavier as a complete unit. They are however far better than lead battery solutions and this is normally OK in most applications.

Here we have a battery in Solar street lamps where battery is not the weak point any more. The unique is the 10000-20000 cycles in life time and deep cycles are OK. In solar led lamps we can see battery works for 15-25 years with no replacement so we have a better balanced life cycle of the entire street lamp.



Conclusion about the future for smaller energy storage systems

These will be main solutions for energy storage in systems we make in the future in range up to 25 KWH. Lead battery with deep cycle gel is also always an option and they can be rather good if not too warm. Here the charge limit is 25C and we can only deep cycle 40% if we want 8 years life cycle or more.



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Li-Fe-Po4 Lithium Iron Phosphate energy storage solutions

Here there are many models and designs where most have an internal BMS battery management system to control charging and discharging of all cells. The cells are rugged and can handle a lot. Max temperature when charged is 60C and battery can be 95% deep cycled.

Well designed system handle 5000 cycles 70-80% depth in cycle. We normally offer 5 years warranty but practically they would work for 10-15 years and maybe more.

Smaller systems are designed around packs of smaller round cells. They are often wrapped in blue plastics. They start at 12 Volt and 3 Ah and ends at 12 volt 40Ah. This is a good solution for smaller systems like solar street lamps and small houses with a few lamps only.

Next step is a car battery design with BMS inside and a round plastic box. They starts at 12 volt 20 AH and ends at 24 volt 100 Ah in size. They can be charged like any normal car battery and use lead chargers etc. Very good solution for most applications.

The larger units have a rugged mostly metallic case and have electronics integrated. They starts at about 12 Volt 200Ah to 48 Volt 300 AH and if needed we have 72 Volt 500AH.





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LTO Lithium Titanium oxide technology.

This is the more advanced solution when no problems and very long life time is essential. In many ways they are like Li-Fe-PO4 cells but they are larger and with 2.4 volt / cell you need more cells. Then they are more costly and more heavy. They handle 50 C when charged and discharged. Reasons to use them are some unique characteristics no other battery offer.

Reason 1 is they can if stressed be discharged and charges in 6-10 minutes only. Peak power is by far best of all battery packs. In some applications this is the key.

Reason 2 is is they handle 10000-20000 Life cycles to large depth discharge of 70-80% of capacity. Here only 20 % is left in cells and this cycling stress a lot.

Battery is packaged in similar ways as Li-Fe-Po4 cells. The smaller 12 volt 20AH - 60AH his the perfect system for solar street lamps with solar power by a solar panel. Here we have 15-25 years life time or more so battery get tired when lamps are repaid many times and all lamps is candidate to be retired for pension.

Small cells can have plastic wrap design.

Medium sized like a car battery in a plastic box. It is a very good car battery. In fork lifters the peak power is very suitable from LTO cells.

Larger systems are in metallic cabinets and racks and can be over 50 KWH in storage capacity. We make what is needed here.

LTO technology is mechanically very solid and robust and make no problems when transport by air is needed.

Sunnytek can offer 10 years warranty of LTO battery systems. This is the ultimate solution for rural tropical areas where maintenance and no problems is Nr 1.

