PROSPECTIVE STABLE GRID FLOAT USE CASES

WHERE HIGHER ENERGY DENSITY BATTERIES ARE SET TO MAKE A MAJOR DIFFERENCE


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INTRODUCTION

Having sufficient battery power back-up in non-cyclic stable grid float applications is essential across a diverse array of different application scenarios. As the operational pressures and resource constraints that these applications are subject to become ever more acute, the need for batteries with stronger performance characteristics continues to rise. This will, in turn, affect procurement strategies.

The following article looks at several specific use case examples where incumbent battery technologies are already struggling and are certain to fall short of future expectations even in the near term. Because of this, there is an evident need to start specifying the more advanced alternatives that are now being introduced to the market.

HAVING SUFFICIENT BATTERY POWER BACK-UP IN NON-CYCLIC STABLE GRID FLOAT APPLICATIONS IS ESSENTIAL ACROSS A DIVERSE ARRAY OF DIFFERENT APPLICATION SCENARIOS.

KEY USE CASES

Utility Example 1:

Electrical switchgear equipment

Switchgear is a fundamental part of electricity distribution networks. It is through this that the electric supply is regulated and controlled. If at any stage the ability of such hardware to function is compromised, then this could not only result in service interruptions but also have safety implications too. In situations where interruptions do happen, then the protection of critical infrastructure from malicious third parties may be necessitated. For this reason, having effective stable grid float battery reserves connected is paramount.

There is a clear need for the Vented Lead Acid (VLA) and Valve Regulated Lead Acid (VRLA) batteries previously used in this context to be superseded by units that have augmented performance characteristics - most notably greater energy storage capacity so that long enough autonomy periods can be supported. By doing this, such infrastructure can remain adequately protected, enabling lighting, surveillance cameras, and perimeter fencing to be powered until the issue that originally caused the mains supply interruption can be resolved. Up to 72 hours of autonomy may be needed in a use case of this kind. In terms of capacity, switchgear will probably require the installation of 24 cells, to serve 48V systems, or possibly 55 cells, for 110V systems, or 60 cells, for 120/125V systems.

Utility Example 2:

Substation installations

Substation batteries will be expected to handle autonomies of at least 8 to 12 hours, possibly reaching 24 to 48 hours. A large proportion of these substations are dated, so making changes to their physical outlines is going to be extremely difficult; especially when they are situated in inner city locations. Therefore, getting any extra room in which to place back-up batteries, to extend autonomy times, is impractical. Nevertheless, utility companies want to boost the energy storage capacity of the batteries they deploy as much as possible. In addition, substations can often be at remote rurally-based sites that might take many hours for an engineer to get to. Having to action a truck-roll for an engineer to carry out maintenance work will be very costly. It will also take already busy engineering staff away from other vital tasks that they need to be doing.

Specifying a low-maintenance battery solution will undoubtedly be advantageous, which is something that flooded batteries simply cannot offer, since they need to have regular electrolyte top-ups. There are also temperature fluctuations to consider - as there can be big differences experienced between frozen winters and the intense heat of summer. On the other hand, running above the sized temperature level will cut the operational lifespan of these batteries, adding expense, as they will need to be replaced more frequently.

Communication Infrastructure Example

Cellular base stations now need to support much longer autonomy times than they did in the past. Power outages, adverse weather conditions (storms, flooding, etc.) or natural disasters could all cause communication services to be compromised - unless appropriate back-up mechanisms are put in place. The fact that disaster relief is now highly dependent on mobile communications to help with the relocation of the people affected and suchlike, makes having guaranteed back-up power even more important. Running off 24V or 48V systems, base stations will require 12 to 24 cells with high storage capacities.

The increasing regularity of extreme weather events, plus greater reliance on intermittent renewable energy generation could both increase the chances of a supply interruption arising. Rather than having to have a back-up operating for 4 or 5 hours, it might now be necessary for periods of at least 24 hours to be covered. In some cases, it could be 48 to 72 hours that have to be covered, varying from country to country, and the geographic characteristics present. How temperature fluctuations influence battery lifespan, capacity and autonomy periods need to be considered in this type of application too. As well as base station infrastructure, battery back-up will be required in communication companies' large back office exchanges, to ensure autonomy on the rare occasions that a power outage occurs there. Here batteries with higher energy densities are of particular value, due to the limited available installation space that can often be witnessed.

Oil & Gas Examples

Much like the examples already described, the oil & gas industry presents significant challenges when specifying a suitable energy storage solution. Among the places where batteries can be utilized are as back-up power sources to the onshore data acquisition and metering infrastructure that supports transportation pipelines. As little room is likely to be available, the batteries employed will need to be positioned wherever possible, so that capacity can be maximized. With batteries potentially being installed in remote locations, such as across transcontinental pipelines, a prolonged operation is equally important.

The rarity of technicians having to carry out replacement work will mean that the costs this represents are not too heavy. Access to high-density solutions which may be configured in different ways to match the limited space available and have extended design lives will clearly be attractive.

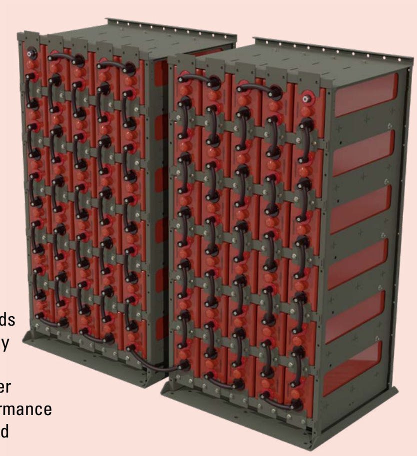

Figure 1:
More exacting application demands mean higher energy density long-life batteries with better temperature performance are being mandated

THE NEW ENERGY STORAGE PARADIGM IN STABLE GRID APPLICATIONS

Through the EnerSys® PowerSafe® SBS XL 2V battery series, customers involved in stable grid use cases, such as the ones just discussed, will be able to install batteries that can fully meet their float life requirements. Beyond that, it will also provide them with numerous other beneficial attributes that are synonymous with thin plate pure lead (TPPL) technology - such as higher energy storage density, wider temperature range and much less maintenance effort.

POWERSAFE® SBS XL 2V BATTERIES HAVE

99.99%

PURE LEAD GRIDS, WHICH ARE FAR LESS PRONE TO DETERIORATION OVER TIME THAN THEIR LEAD-CALCIUM EQUIVALENTS.

PowerSafe® SBS XL 2V batteries have 99.99% pure lead grids, which are far less prone to deterioration over time than their lead-calcium equivalents. This translates into longer operational lifespans. Offered in 320, 400, 480, 580, 680, 780, 900, 970, 1200, 1500, 1800, 2700, 3100, and 3900 cell versions, these batteries have single cell Ampere-hour (Ah) capacities going up to 3900Ah. Also, they comply with the dimensional requirements outlined by the DIN 40742 standard.
As a result, the series can be a drop-in replacement for the gel-based OPzV or flooded OPzS battery units often employed in stable grid float applications. This facilitates the whole upgrading process.

Figure 2:
EnerSys® PowerSafe® battery strings with TPPL technology installed for backing-up mobile network infrastructure

In addition to the use cases mentioned previously, there are opportunities for these cutting-edge TPPL batteries in various other scenarios too. For instance, they can also serve as a non-cyclic back-up supply in data centers. Here a longer design life and less frequent change-outs can lead to a lower total cost of ownership (TCO).

Figure 3:
Racks of TPPL-based EnerSys® PowerSafe® batteries providing back-up power in a subsea fiber optic cabling application

CONCLUSION

By providing customers with the opportunity to source extended life VRLA batteries, a wide variety of different use case criteria may be met. Thanks to the lower maintenance that these batteries need when compared to flooded units and the longer period between battery replacements, both capital and operational cost benefits can be reduced substantially. Furthermore, the high energy storage densities attained means that the storage capacity to footprint ratio is considerably higher too. Consequently, industry sectors where legacy flooded or gel-based batteries are still being used now have convincing arguments about why they should finally make that long overdue switch.

THANKS TO THE LOWER MAINTENANCE THAT THESE BATTERIES NEED WHEN COMPARED TO FLOODED UNITS AND THE LONGER PERIOD BETWEEN BATTERY REPLACEMENTS, BOTH CAPITAL AND OPERATIONAL COST BENEFITS CAN BE REDUCED SUBSTANTIALLY.

CONTACT ENERSYS®

For more information about the high-performance, long-life batteries for commercial and industrial applications available from EnerSys®, please visit: enersys.com

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Sustainability
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