



ADDRESSING THE ENERGY CAPACITY SHORTFALL

IN STANDBY FLOAT/STABLE GRID
BATTERY IMPLEMENTATIONS



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INTRODUCTION

In an increasing majority of standby float (stable grid) applications, there are expectations to ramp up energy storage capacities. In existing battery deployments, this must be done without extra space needing to be assigned for accommodating racking, etc. And even in new installations, space can often be at a premium - so packing in storage capacity as tightly as possible is still a priority. Therefore, across the board, higher density battery solutions are being called for.

THE OBJECTIVE OF THIS ARTICLE IS TO HIGHLIGHT THE DYNAMICS THAT ARE CURRENTLY DEFINING STANDBY FLOAT/STABLE GRID APPLICATIONS.

The objective of this article is to highlight the dynamics that are currently defining standby float/stable grid applications. Following that, the influence this is having on battery model development will be discussed - in terms of performance, features and functionality.

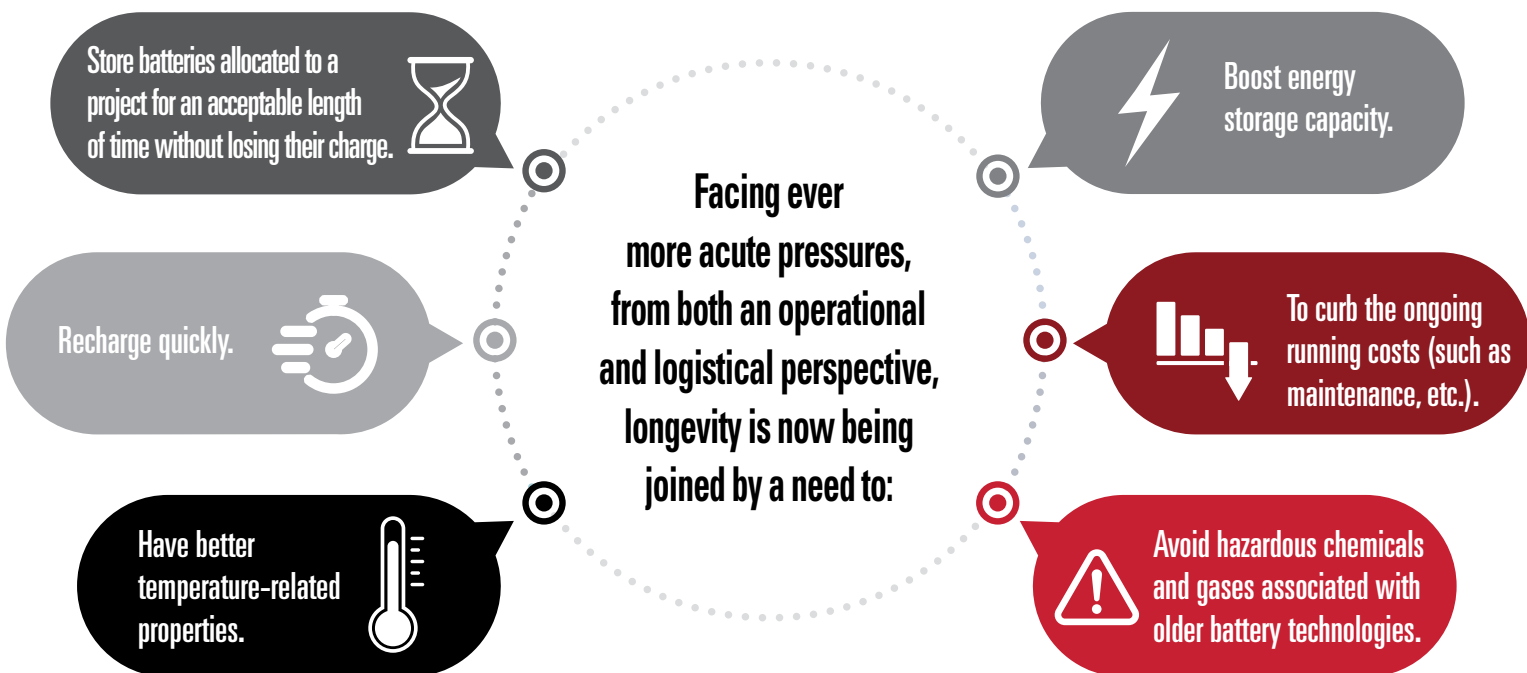


STANDBY FLOAT/STABLE GRID AND ITS ENERGY STORAGE REQUIREMENTS

In standby float/stable grid applications a float charge is used to constantly maintain the batteries at a full state of charge (SoC). This means that it should always be prepared to deal with the prospect of interruptions to the mains electrical supply. Consequently, if such situations should arise, there is a large enough backup supply ready to support the connected load.

There are a multitude of applications where there is a need for standby float/stable grid backup power. Electrical switchgear, utility substations, communication infrastructure, industrial systems, oil and gas drilling/exploration platforms and data center equipment are amongst the most prominent of these. Although, for many years, the batteries used in such applications were deemed to be adequate, new demands have started to emerge. As a result, it is now recommended that batteries with numerous other key facets are sourced.

Standby float/stable grid represents a major market for battery suppliers. A large proportion is served by either flooded or gel-based batteries. The operational lifespan of batteries used in this context was previously the main concern.



By having greater storage capacity, batteries can provide backup autonomy for longer periods - meaning that there is more time for the issue causing a break in the mains supply to be resolved. If this can be done while remaining within the same footprint (via the use of high density solutions), then the need for undertaking expensive and time-consuming redesign work of battery/equipment rooms or reconfiguring racks may be avoided.

The flooded batteries typically employed in standby float/stable grid installations have a large maintenance overhead, as their electrolytes will need topping-up regularly. This can contribute substantially to the total cost of ownership (TCO) of battery reserves, especially if long distances must be traveled by engineers to reach the batteries.

There is the risk of acid spillages occurring with flooded batteries. Because of this safety procedures must be put in place. It makes the transport of such batteries more complicated, and limits their deployment orientation. The gas emanating from flooded batteries has implications too, with space often needing to be assigned for dedicated battery rooms and ventilation adding to the TCO.

Valve-Regulated Lead-Acid (VRLA) gel batteries are not able to deal with extreme temperatures, yet this is something that will be obligatory for many remotely deployed standby float/stable grid applications. Under colder conditions, their capacity will be reduced (thus cutting their autonomy times). When situated in hotter ambient environments, their operating lifespan will be shortened.

It should be noted that conventional gel and flooded batteries are not able to recharge that rapidly. This can be problematic if a second break in the mains supply happens soon after the first, as there may not be enough autonomy time left. Batteries with faster recharge capabilities will therefore be more appealing.

How long batteries can be kept in storage is sometimes overlooked. Though installation work may be scheduled, it is quite common for projects to suffer from unexpected delays, and various unanticipated factors could lead to this occurring. Therefore, a solution that is not susceptible to short-term voltage drops should be selected.

For flooded batteries, a significant voltage drop will be seen within just 3-4 months (at 68°F). In response to this, their charge will need to be replenished after only a fairly short period. Though gel batteries have a slightly better shelf life, it is still only likely to be 6-12 months before their charge starts to diminish.

**A SOLUTION THAT IS NOT
SUSCEPTIBLE TO SHORT-TERM
VOLTAGE DROPS SHOULD
BE SELECTED.**

AN EVOLUTION IN STANDBY FLOAT/STABLE GRID BATTERIES

Drawing on a deep understanding of the challenges being faced in either implementing new standby float/stable grid power systems or upgrading existing ones, EnerSys® looked to develop a game-changing breed of battery solution that was specifically intended for such purposes. Highly-optimized EnerSys® PowerSafe® SBS XL 2V batteries are certain to shake up orthodox thinking. These units will instigate changes in the main sectors where a standby float/stable grid approach is being utilized.

AS TPPL IS A MATURE FIELD-PROVEN TECHNOLOGY IN WHICH ENGINEERS ALREADY TRUST, IT IS THE IDEAL CHEMISTRY FOR MIGRATION.

The PowerSafe® SBS XL 2V battery series takes VRLA batteries into a whole new era. Through the latest innovations in thin plate pure lead (TPPL) technology, these battery units are set to enable customers to attain the design lives they have come to associate with flooded and gel-based batteries, while at the same time getting much higher energy storage densities. As TPPL is a mature field-proven technology in which engineers already trust, it is the ideal chemistry for migration.



Figure 1:
PowerSafe®
SBS XL 2V
battery units

The industry-leading Ampere-hour (Ah) capacity of PowerSafe® SBS XL 2V batteries means that greater quantities of charge may be held within the specified footprint. For instance, up to 51% storage capacity increases can be achieved over OPzV or OPzS battery units of the corresponding size*. These new batteries have enhanced temperature performance compared to gel-based batteries and require far less maintenance than flooded units.

An additional important feature of the new PowerSafe® SBS XL 2V series is the inclusion of a catalyst into each unit. Having catalysts directly integrated into these batteries significantly reduces dry-out issues from arising - by providing a sophisticated mechanism via which oxygen/hydrogen recombination is facilitated. A further prolonged design life while in float mode is thereby enabled.

The purity of the grid is another key aspect. By being 99.99% pure lead, the long-term structural integrity of the grid is maintained, outlasting competing lead-calcium batteries by a considerable margin. An extensive operational temperature range is covered, going from -40°F to +122°F (-40°C to +50°C). Units can be stored for 24 months (at 68°F/20°C) while still retaining their charge (while flooded and gel-based batteries start losing their charge much sooner).

Thanks to the DIN form factors used, PowerSafe® SBS XL 2V batteries can provide drop-in replacements within legacy installations, so that storage capabilities can be heightened while keeping to the same design outlines. Conversely, in brand-new deployments, the density enhancements will allow the physical space designated for energy storage to be lowered significantly. This is of real value in what are often highly constrained environments where every spare inch of space counts. Having orientation flexibility will also be invaluable, so that units can either be installed vertically or horizontally depending on the space available.

STORAGE LIFE	AT 68°F (20°C)	AT 86°F (30°C)
PowerSafe® SBS XL 2V Batteries	24 months	12 months
PowerSafe® OPzV Batteries	12 months	6 months
Competitors' OPzV	6 to 12 months	3 to 6 months
Conventional VRLA lead-calcium batteries	6 months (typically)	3 months (typically)
Flooded batteries	3 months	1.5 months

Table 1:
Storage life comparison between the PowerSafe® SBS XL 320-3900 battery series and rival solutions

By selecting this new EnerSys® battery series, a wide variety of different industry sectors can be attended to that are now finding gel and flooded batteries insufficient for their needs. Among the most prominent are utilities, mobile network operators (MNOs), and petrochemical companies.

THE INDUSTRY-LEADING AMPERE-HOUR (AH) CAPACITY OF **POWERSAFE® SBS XL 2V BATTERIES** MEANS THAT GREATER QUANTITIES OF CHARGE MAY BE HELD WITHIN THE SPECIFIED FOOTPRINT. FOR INSTANCE, UP TO

51%

STORAGE CAPACITY INCREASES CAN BE ACHIEVED OVER OPzV OR OPzS BATTERY UNITS OF THE CORRESPONDING SIZE*.

HAVING ORIENTATION FLEXIBILITY WILL ALSO BE INVALUABLE, SO THAT UNITS CAN EITHER BE INSTALLED VERTICALLY OR HORIZONTALLY DEPENDING ON THE SPACE AVAILABLE.

CONCLUSION

There is no question that most of those involved in the use of standby float/stable grid systems need to gain heightened energy densities. They must also avoid the capital and operational expenses of making regular battery change-outs, as well as the further costs that come with electrolyte replenishment. Likewise, reliable operation and ease of transport must be assured.

Through the EnerSys® PowerSafe® SBS XL 2V battery series, customers will have access to energy storage solutions that exhibit extended float life performance and support longer autonomy times, but take up only minimal space. On top of this, customers can simultaneously leverage the numerous other favorable attributes that the latest generation of TPPL technology possesses - such as less gassing, plus the cost and convenience benefits of greatly reduced maintenance requirements.



**THROUGH THE ENERSYS® POWERSAFE®
SBS XL 2V BATTERY SERIES,
CUSTOMERS WILL HAVE ACCESS
TO ENERGY STORAGE SOLUTIONS
THAT EXHIBIT EXTENDED FLOAT LIFE
PERFORMANCE AND SUPPORT LONGER
AUTONOMY TIMES, BUT TAKE UP ONLY
MINIMAL SPACE.**

***Note:**

The capacity improvement is representative when comparing at C10/1.80Vpc/68°F Ah capacities.

CONTACT ENERSYS®

**For more information
about the high-performance,
long-life batteries for
commercial and industrial
applications available
from EnerSys®,
please visit: [enersys.com](https://www.enersys.com)**

**OUR PRODUCTS
FACILITATE POSITIVE
ENVIRONMENTAL,
SOCIAL, AND
ECONOMIC IMPACTS
AROUND THE WORLD.**

About EnerSys®

EnerSys®, the global leader in stored energy solutions for industrial applications, manufactures and distributes energy systems solutions and motive power batteries, specialty batteries, battery chargers, power equipment, battery accessories and outdoor equipment enclosure solutions to customers worldwide. Energy Systems, which combine enclosures, power conversion, power distribution and energy storage, are used in the telecommunication, broadband and utility industries, uninterruptible power supplies, and numerous applications requiring stored energy solutions. Motive power batteries and chargers are utilized in electric forklift trucks and other industrial electric powered vehicles. Specialty batteries are used in aerospace and defense applications, large over-the-road trucks, premium automotive, medical and security systems applications. EnerSys® also provides aftermarket and customer support services to its customers in over 100 countries through its sales and manufacturing locations around the world. With the NorthStar acquisition, EnerSys® has solidified its position as the market leader for premium Thin Plate Pure Lead batteries which are sold across all three lines of business.

Sustainability

Sustainability at EnerSys is about more than just the benefits and impacts of our products. Our commitment to sustainability encompasses many important environmental, social and governance issues. Sustainability is a fundamental part of how we manage our own operations. Minimizing our environmental footprint is a priority. Sustainability is our commitment to our employees, our customers, and the communities we serve. Our products facilitate positive environmental, social, and economic impacts around the world. To learn more visit: <https://www.enersys.com/en/about-us/sustainability>.

Caution Concerning Forward-Looking Statements

EnerSys is making this statement in order to satisfy the "Safe Harbor" provision contained in the Private Securities Litigation Reform Act of 1995. Any of the statements contained in this article that are not statements of historical fact may include forward-looking statements that involve a number of risks and uncertainties. A forward-looking statement predicts, projects, or uses future events as expectations or possibilities. Forward-looking statements may be based on expectations concerning future events and are subject to risks and uncertainties relating to operations and the economic environment, all of which are difficult to predict and many of which are beyond our control. For a discussion of such risks and uncertainties that could cause actual results to differ materially from those matters expressed in or implied by forward-looking statements, please see our risk factors as disclosed in the "Risk Factors" section of our annual report on Form 10-K for the most recently ended fiscal year. The statements in this article are made as of the date of this article, even if subsequently made available by EnerSys on its website or otherwise. EnerSys does not undertake any obligation to update or revise these statements to reflect events or circumstances occurring after the date of article.



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