

Extreme Weather—is your Network Vulnerable?

Whether hurricane season, winter storms or summer wildfires, extreme weather events seem to constantly be in the news. Their frequency and severity seem to increase every season. Across the United States, utility grids are suffering interruptions during these events. These utility grid interruptions are, in turn, highlighting the vulnerability of [cable broadband](#) networks to extended utility power outages. Homes and businesses depend heavily on the internet connectivity provided by these networks and have grown to expect reliable network availability. Pressure is consequently growing on multiple-system operators (MSOs) to solidify their distributed hybrid fiber-coax (HFC) networks against more significant power outages by extending runtimes. While longer runtimes at any HFC network site can be achieved by adding generators, batteries, or both, it is not always that simple.

A Cable Broadband Network Contains Many Site Types

Although it may seem straightforward, increasing energy storage within an HFC network requires careful planning and budgeting to ensure the solution fits the application.

[Inside plant](#) (ISP) sites typically do not require an upgrade as most will have permanent fuel connections, enabling their generators to continue running through the longest of power outages. [Outside plant](#) (OSP) site configurations vary widely, however. They are physically smaller, consume less energy, and are distributed in residential and business areas. Many factors must be considered when planning for an increase in energy storage. Target runtime is obviously a key driver of any OSP site design as this, along with the power system loading, will help determine the final stored energy solution.

Generators are a potential answer but truck rolls for deployment and re-fueling can be costly and portable generators are easily stolen. Curbside generators may be an option, provided gas connections are available and local restrictions on size and noise levels allow them. For those sites where generators are not practical, increasing standby times will require more batteries to be added.

Existing OSP sites will have been designed around three or six batteries, so adding batteries may not be easy. Sites mounted on utility poles or those in front of residences may not have space for additional cabinets. Also, local restrictions will often either prohibit them or require lengthy and costly re-permitting applications.

Where there isn't enough space to house the required number of additional batteries, energy densities can be increased by using alternative battery technologies.

New Battery Technologies Deliver More Energy Density

Batteries are already integral to most network standby solutions, with traditional lead-acid being the most commonly deployed chemistry. Battery technology has evolved considerably in recent years, however, bringing opportunities to increase runtimes even when space is limited.

Thin plate pure lead (TPPL) offers significant improvements in energy densities over traditional lead-acid so more capacity can be held in existing cabinet space. Advanced charging cycles result in as much as a 30% reduction in energy consumption and TPPL batteries can be stored for up to two years on a single charge, unlike lead-acid batteries which need to be recharged every six to twelve weeks. The resultant savings on power consumption, and logistics handling, more than offset the higher upfront costs of TPPL, giving favorable outcomes for total cost of ownership (TCO).

Heavily used in other sectors such as transportation and warehousing, lithium-ion is rapidly emerging as a safe, viable alternative to TPPL. Lithium-ion batteries are lighter than TPPL and deliver even more energy density, making them attractive options for sites with space restrictions and for pole-mount sites. Ground-mount sites with space for additional cabinets can achieve significantly extended runtimes when lithium-ion batteries are installed.

The above examples give an insight into how different battery technologies can help achieve extended runtimes. It is not just a case of ripping out existing batteries and replacing them with new ones, however. For optimal performance and safety, it is essential to adopt a total systems approach when engineering a solution.

Engineering the Total Solution

The design of the overall energy system is key to unlocking maximum battery performance, life and safety. To unlock their maximum life and runtime potential, TPPL batteries need multi-mode charging cycles to reduce charging times and extend their lifetimes well beyond traditional lead-acid batteries. Their performance is also heavily influenced by temperature and humidity, and there is usually limited environmental control at an OSP site. Lithium-ion batteries bring even more runtime and life benefit that can be realized by using the right battery management system (BMS), for safe operation.

Adding either TPPL or lithium-ion batteries therefore requires a total systems design approach. Uninterruptable power supply (UPS) solutions must accommodate advanced charging modes. For lithium-ion batteries, a BMS needs to be integrated. Cabinets may also have to provide heating or cooling and adequate airflow to support maximum battery life and performance.

Remote monitoring systems can deliver additional benefits for network operations teams. Data collected, such as charge status and battery health, can be used to gain visibility of the overall power system protection solution and potentially minimize truck rolls to a site.

Increasing energy storage in a cable broadband network requires expertise in both network power solutions and battery technologies. Getting the solution wrong will, at best, result in sub-optimal battery performance and, in the worst case, compromise safety.

When extending network runtimes, MSOs therefore need to work with a partner who understands all aspects of network power.

EnerSys[®], the Power Behind Cable Broadband

With over 40 years of experience in powering broadband networks and over 100 years of world-leading expertise in battery technology, EnerSys is uniquely positioned to help their customers in all aspects of network energy solutions.

In response to a series of severe wildfire seasons, the California Public Utilities Commission (CPUC) mandated a challenging 72-hour runtime for communications providers. EnerSys has developed a range of complete system solutions under exceptionally tight timescales to help meet these new mandates.

Based on the next-generation Alpha[®] XM3.1-HP broadband UPS, and advanced PowerSafe[®] SBS190 or AlphaCell[®] 210FT batteries, these solutions will leverage the comprehensive EnerSys product range. The highly flexible and modular Alpha[®] PN4 enclosure systems or the Alpha[®] PWE outdoor pole-mount enclosures provide secure housing and optimal environmental management, depending on site type. Working with the Alpha[®] XM3.1-HP broadband UPS, the Alpha[®] Continuity HFC monitoring solution provides a feature-rich tool, giving network operations teams visibility of all standby power supplies in their networks.

EnerSys expertise and wide-ranging capabilities have delivered for its customers in California. For a deeper understanding of what we can do for you please visit us at www.enersys.com, sign up for email notifications and search for EnerSys Cable Broadband to connect on LinkedIn.

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. Motive power batteries and chargers are utilized in electric forklift trucks and other industrial electric powered vehicles requiring stored energy solutions. 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. More information regarding EnerSys can be found at www.enersys.com.

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/>.



World Headquarters

2366 Bernville Road
Reading, PA 19605 USA
+1 610-208-1991 / +1 800-538-3627

EnerSys EMEA

EH Europe GmbH
Baarerstrasse 18
6300 Zug Switzerland

EnerSys Asia

152 Beach Road
Gateway East Building #11-08
Singapore 189721 / +65 6508 1780