



# USING DATA CENTER RESOURCES TO SUPPORT **GRID STABILITY** AND **PEAK SHAVING** ACTIVITIES



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**If our society is going to successfully reduce carbon emissions and stem climate change in line with the objectives set out in Paris Climate Accords and reconfirmed in the United Nation’s recent COP 27 summit, much greater emphasis needs to be placed on sustainable energy resources. Consequently, the amount of energy generated by wind turbines, solar farms, and other renewable sources must be dramatically increased.**

The International Renewable Energy Agency (IRENA) estimates that by 2050 total renewable energy generation capacity will need to reach 28 Terawatt (TW)<sup>[1]</sup> - more than ten times above where we currently are. As well as the substantial financial outlay involved, greater dependence on power generation via renewable sources is set to bring major challenges to power distribution networks - as it means they will become increasingly exposed to supply variations. Fossil fuel power stations offer assured outputs, but renewable resources are simply not as consistent. There can be acute fluctuations (both on a daily and a seasonal basis), which can pose significant challenges to grid reliability. A solution to this problem is energy storage.

Stored electricity can be made available when customer usage is high and the output from renewables is insufficient. The alternative is frequency instability which may cause power outages.

What may not be obvious is that increasingly power-hungry data center facilities could play a pivotal role in solving this problem. To handle their Megawatt (MW) power consumption (tens of MW in the case of hyperscale sites) when outages occur, data center operators need access to extensive backup power reserves. They are, therefore, very well placed to contribute to maintaining grid reliability while at the same time presenting an extra revenue stream that will boost operators’ profitability.

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Another opportunity that data center operators are now starting to consider is peak shaving. Here, electricity can be brought from a utility company at off-peak times (when the cost is low), then stored for subsequent usage during periods when it would have been more expensive to draw from the grid.

If a facility's batteries are to function effectively for peak shaving and/or maintaining grid frequency, two key factors must be considered. First, the appropriate models will need to be selected. Second, the chosen batteries will need to be charged and discharged periodically, so they must have the necessary operational robustness.

The patented Thin Plate Pure Lead (TPPL) technology that EnerSys® uses in its batteries delivers markedly better performance levels than conventional lead-acid battery units. The thinner plates employed allow more of them to be fitted into a given battery enclosure volume, with higher power densities thus being derived. Furthermore, TPPL grids benefit from pure lead construction rather than having the more porous lead-calcium construction that many other vendors employ. This is another important differentiator - helping to significantly mitigate corrosion and extend operational longevity.

THE PATENTED THIN PLATE PURE LEAD (TPPL) TECHNOLOGY THAT ENERSYS® USES IN ITS BATTERIES DELIVERS MARKEDLY BETTER PERFORMANCE LEVELS THAN CONVENTIONAL LEAD-ACID BATTERY UNITS.



Figure 1:  
Comparison of the grid construction used in conventional lead-acid and EnerSys® TPPL batteries

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The rapid charging capabilities and strong charge cycle durability of certain EnerSys® TPPL battery models mean they are very well suited to grid balancing and peak shaving work. Operators looking to participate will have a highly optimized data center battery solution that combines elevated performance with a low Total Cost of Ownership (TCO).

By leveraging TPPL batteries, there is scope for this valuable energy storage resource (which would otherwise remain idle for much of the time) to be put to better use. Of course, appropriate steps need to be taken before starting peak shaving or grid balancing work. Real-time monitoring and diagnostic mechanisms must be put in place to ensure that there is always ample stored charge available if battery backup needs to be initiated. The critical load must always be the priority, and non-critical activities will need to be immediately suspended if the quantity of charge goes down to a certain predefined threshold.

There is undoubtedly considerable potential for data center facilities to employ their UPS battery assets in a grid support context. Stored energy could then be fed back into the electricity distribution network, addressing any supply/demand imbalance. Likewise, peak shaving will mean day-to-day running costs can be lowered. Though these are whole new areas for data center operators to explore, with new revenue streams emerging and financial rewards to be gained, they also take these organizations out of their usual comfort zone. Getting expert technical and logistical advice will certainly prove crucial before embarking on such ventures - and the highly professional team at EnerSys® can offer all the support needed.

## REFERENCES

<sup>[1]</sup> IRENA - World Energy Transitions Outlook (March 2022)

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## 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>.

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AROUND THE WORLD.**

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