



Market Insight Report Reprint

Vertiv partners with Enel X, adds Dynamic Grid Support to its Liebert EXL S1 UPS

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The datacenter technology specialist adds Dynamic Grid Support to its Liebert EXL S1 UPS for the European market in collaboration with Enel X. DGS offers datacenters an opportunity to monetize their backup capacity while supporting utilities in balancing the power grid.

451 Research

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Introduction

Utility companies are challenged to manage power supply and demand, creating frequency reserves and power backup to maintain grid stability while solar- and wind-generated power capacity fluctuates. Vertiv has added Dynamic Grid Support (DGS) to its Liebert EXL S1 uninterruptible power supply (UPS) in collaboration with Enel X. The DGS will offer datacenters an opportunity to monetize their backup capacity while supporting utilities in balancing the power grid through fast frequency response and by using UPS capacity to store excess power for demand management.

THE 451 TAKE

In the five years since Vertiv spun off of Emerson, it has found its mojo and has become a major player in the datacenter technology market, a challenging but growing market in the insatiable hunger for more data. With datacenter growth comes the need for power and datacenters sometimes cause utilities headaches in a power grid that is already stretched to the limits. By adding DGS to its UPSs, Vertiv offers its customers the opportunity to monetize their backup capacity and partner with the utilities to maintain grid stability, which is a first step toward more renewable energy resources and decarbonizing the power industry. With the grid support, Vertiv follows its competition, Schneider Electric and Eaton, in addressing the energy challenges faced by the industry. During the last few years, the datacenter industry has made rapid improvements in energy efficiency by focusing on improving power usage effectiveness (PUE) and has managed to maintain global datacenter power consumption at about 200 TWh (roughly 1% of current global electricity use) for the last decade while global internet traffic has grown twelvefold, according to the International Energy Association (IEA).

Context

Columbus, Ohio-based Vertiv spun off from Emerson Electric's Network Power business line and was acquired by Platinum Equity in 2016 in a \$4bn all-cash transaction. The company became publicly traded on New York Stock Exchange (NYSE) through a reverse merger with GS Acquisition Holdings in 2020. The company has more than 19,000 employees and has regional headquarters in the UK, Italy, India, China and the Philippines and customers across 130 countries. Vertiv reports net sales of \$1,098m over the first quarter of 2021, an increase of \$201m, or 22.4%, compared with 2020's first quarter, and up 19.5% excluding the impact of foreign currency.

Its most recent acquisitions date back to 2018 when Vertiv acquired the maintenance business of MEMS Power Generation Ltd, Geist (power distribution units) and Energy Labs (cooling systems) but Vertiv's journey began as early as 1985 when Emerson acquired ASCO, followed by the acquisition of Liebert in 1987, a brand which Vertiv still uses for its UPS systems.

Strategy

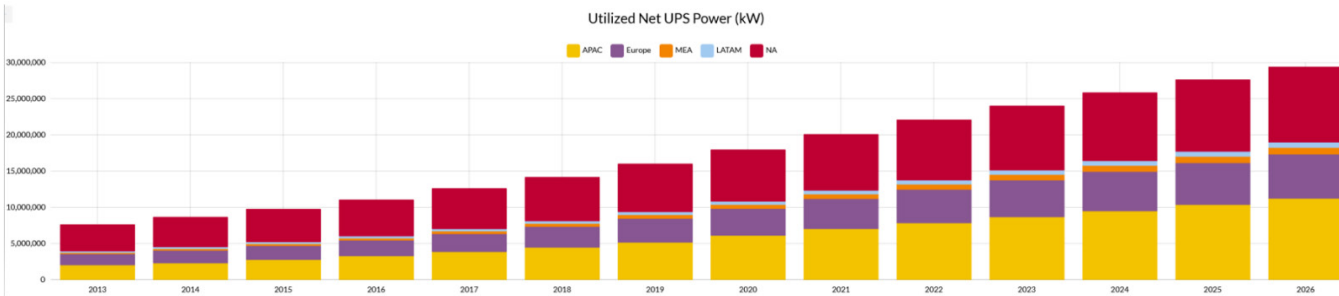
Vertiv developed Energy Logic, a 10-step roadmap for driving improvement in IT efficiency and support systems, and highly values operational sustainability in conserving energy and water and reducing carbon footprint. In 2020, Vertiv partnered with Honeywell to develop and market more comprehensive offerings for datacenter operators to help reduce operational costs and sustainability liabilities for datacenter owners (via energy optimization) while improving performance. More recently, the company partnered with Enel X, a business line of Rome, Italy-based Enel SpA, the worlds' second largest power company by revenue.

Decarbonization requires more batteries

In our technology business insight report the Sentient Grid and our recent spotlight The Internet of Things, five years later: Keeping the lights on, we explored how power & utilities are challenged to make an energy transition to decarbonize and how digital transformation supports the transition through the use of emerging technologies such as the Internet of Things (IoT) and artificial intelligence and machine learning (AI/ML). In this transition, the reduction of fossil fuel-generated power and the growth of clean energy is a major challenge in maintaining grid stability. Fossil fuel plants can generate a constant load, but solar and wind are intermittent and distributed energy resources (DERs) that have a variable output. Utilities are challenged to manage supply and demand, creating frequency reserves and power backup when the DERs do not produce enough energy as well as shed load when they produce too much. Energy storage batteries play a vital role in maintaining grid stability and new business models emerge, in which utilities pay battery owners to store excess energy and use the surplus during peak hours or to enroll some flexible capacity in frequency regulation programs. For consumers with electric vehicles (EVs) this can be a challenge when the utility would like to draw power from the car’s battery just when they plan to drive home at the end of the day when power consumption ramps up, but offers an interesting business case to the datacenter market, which sits on gigawatts of UPS power backup capacity that is unused 99.998% of the year.

According to the 451 Research Datacenter Knowledge Base, the utilized net UPS power for the global datacenter market is expected to grow from 18GW in 2020 to 29GW in 2026.

Expected Growth of Utilized Net UPS Power



Source: 451 Research Datacenter KnowledgeBase, Q4 2020

Vertiv Liebert EXL S1 with DGS

Vertiv has added DGS to its Liebert EXL S1 UPS for the European markets. The EXL S1 is a three-phase monolithic uninterruptible power supply with power capacity ranging from 300 to 600kVA in the low range and 800 to 1,200kVA in the high-range models. The EXL S1 comes in a Vertiv HPL U19 cabinet stacked with valve regulated lead acid (VRLA) batteries or Samsung SDI lithium-ion batteries (LIB) with a nickel-manganese-cobalt (NMC) chemistry. DGS functionality is available for both types of batteries, but LIBs are the preferred solution for grid applications due to a higher number of cycles, quick charge and discharge, and the possibility of being monitored and controlled through battery monitoring system (BMS) by exchanging information with the UPS. The battery storage system has operating temperatures of between 30°C and 86°F and is equipped with Vertiv’s battery management system (BMS). To support dynamic grid management, Vertiv has upgraded the EXL S1 standard DC/DC converter with improved capacitors for continuous charge and discharge without thermal runaway. Vertiv has also improved its controls for fast frequency response programs. Additional hardware, such as a grid controller, will be provided as an external module to be mounted near the UPS. The new UPS control system is designed to guarantee a quick reaction to these commands: the total response time between the frequency variation detection (the external controller to generate the command) and the moment the UPS reaches the specified power set point is less than 500ms.

The UPS’s primary purpose still is to protect the critical load required by the datacenter. Customers have the ability to set thresholds for DGS; for instance, part of the battery capacity can be kept for critical load reserve, and another part can be used for real-time grid support and to store additional energy. To support DGS, customers would generally need to add extra capacity, for instance, for an EXL S1 UPS with 1.2MW size, 6 HPL battery cabinets provide a datacenter with one minute of backup time. By adding two cabinets, it would be able to offer a one-minute backup time and five minutes of dynamic grid support. Depending on local regulations and utility contracts, Vertiv estimates an asset with 1MW flexible capacity could generate as much as \$120,000 annually in revenue. The company expects to be able to offer DGS capacity for the US market in Q4 2021.

Note that traditional VRLA batteries normally support 300 to 400 discharge/charge cycles, depending on the depth of discharge, whereas lithium-ion batteries support much more – 3,000-5,000 cycles – and have a longer lifespan. Due to this limited cycle ability, VRLA batteries are usually restricted to providing backup support during outage. The increased cycles available with lithium batteries enable the batteries to be used under more conditions; for example, to help shave peak load and regulate frequency without sacrificing battery life. Compared with a gas peak plant, batteries can discharge instantaneously to address short-term load spikes, which not only improves the utilization of the battery backup capacity, but also can ease pressure on the grid. The Vertiv solution uses lithium batteries and includes optimization features developed to prevent battery aging when working in grid operation mode.

Competition

In the datacenter technology market Vertiv primarily competes with Schneider Electric and Eaton, both featuring similar technology. Schneider Electric’s Galaxy VX/VM UPS with peak shaving mode allows power stored in the battery to provide power to meet peak load, while Eaton’s EnergyAware technology enables a lithium battery-backed UPS to track input frequency and response with charging or discharging battery power to balance the grid. Other competitors in this space include AEG Power Solutions, Huawei and Mitsubishi Power. With the addition of dynamic grid management to its Liebert UPS, Vertiv takes on a number of fuel cell and energy storage companies offering virtual powerplants and alternatives to UPS power backup such as Bloom Energy and Natron Energy as well as more traditional electrical engineering companies operating at the intersection of utility scale grid management and energy storage, including its former parent Emerson Electric and its competitors ABB, Hitachi Vantara, Siemens and Wärtsilä.

SWOT Analysis

<p>STRENGTHS</p> <p>The DGS allows datacenters to monetize their idle backup and fault ride-through (FRT) capacity while helping the utilities maintain grid stability.</p>	<p>WEAKNESSES</p> <p>While DGS comes to the aid of the Energy Transition in storing excess capacity from renewable energy resources, the use of minerals such as cobalt has a big impact on Social and Environmental goals.</p>
<p>OPPORTUNITIES</p> <p>According to the 451 Research Datacenter Knowledge Base, the utilized net UPS power for the global datacenter market is expected to grow from 18GW in 2020 to 29GW in 2026.</p>	<p>THREATS</p> <p>NMC batteries could face supply chain issues. Prices for cobalt and lithium have also skyrocketed due to growing demand during the last few years and could threaten availability. Because Vertiv also offers VRLA batteries, it is not likely to see an immediate impact on availability of the EXL series.</p>

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