

Problem:

Trinity Health could no longer rely on UPS batteries alone to keep its network up and running during power disturbances as the batteries - even longer life batteries - required continual replacement.

Solution:

David J. Filas, LEED GA, Data Center Engineer for Trinity, turned to the proven reliability of VYCON's flywheels that are the first line of defense against costly power problems, protecting connected equipment and prolonging the life of the batteries.



Trinity Health Keeps Data Centers, Network Closets and Biomedical Applications Up and Running with VYCON

Trinity Health is a nationwide non-profit healthcare system and an industry leader in electronic medical records (EMR). As the fifth largest Catholic healthcare system in the United States, Trinity Health is devoted to patients and strives for superior care, serving communities through a network of 46 acute-care hospitals, 379 outpatient facilities, 31 long-term care facilities, and numerous home health offices and hospice programs in nine states. Trinity Health draws on over 140 years of experience as well as state-of-the-art technology in 19 data centers throughout the country to keep operations running smoothly.

Electronic Medical Records Lead the Way

Electronic medical records are the driving force behind Trinity's large IT infrastructure. Extreme diligence in maintaining continuous operating power to health facilities is paramount. If there is a glitch in the IT infrastructure, medical records could be lost, diagnostic outcomes scrubbed or prescriptions altered. Keeping the computer servers up and running is a priority - regardless the state of the incoming utility power.

Battery Life Becomes an Issue

Typically in a data center, power protection comes in the form of a battery-based uninter-

ruptible power supply (UPS). If there is a power outage or if the power coming in from the utility is unstable, the UPS will generate smooth power from lead-acid batteries until the power comes back on or the generator comes online. Unfortunately, lead-acid batteries degrade every time they are cycled (used) and one bad cell in the battery bank can take out the others, rendering equipment useless. Moreover, batteries take up a lot of space, require expensive cooling and contain hazardous chemicals, making disposal an issue.

David J. Filas, LEED GA, Data Center Engineer for Trinity, realized that he could no longer rely on batteries alone to keep the network up and running. "We were buying five-year design life batteries and had to replace them every three years. We switched to 10-year batteries but generally, can't get them to last beyond five years."

Battery replacement is a costly problem and Trinity is not alone. According to the Electrical Power Research Institute (EPRI), power disturbances cost U.S. industry as much as \$188 billion per year in lost data, material and productivity. In order to minimize these losses, annual spending on backup power systems exceeds \$5 billion worldwide, according to industry analysts at the Darnell Group.

Benefits of VYCON's Clean Energy Storage Solution:

- 20x reliability vs. VRLA batteries
- High-power density, small footprint
- Parallel capability that allows for future expansion
- Fast recharge (under 150 seconds)
- Full monitoring for predictive performance
- No hazmat requirements
- Low maintenance
- 20-year useful life
- Simple installation
- N+1 redundancy options
- Quiet operation
- Wide temperature tolerance
- High efficiency

A Reliable Alternative

In reviewing backup power options, Filas decided to consider flywheels. Another form of power protection, a flywheel stores energy through rotation—similar to a sophisticated spinning top capable of generating enough energy to run the data center while backup generators activate. It's an environmentally friendly option, does not require cooling and the total cost of ownership is lower than battery-based UPSs. In addition, over a 20-year design lifespan, cost savings from a hazmat-free flywheel versus a five-minute valve regulated lead-acid (VRLA) battery bank are in the range of \$100,000 to \$200,000 per flywheel deployed.

The flywheel also allows for 30 seconds of runtime, which is plenty of time for the generator to start. The generator must come on line within 10 seconds in order to meet the NFPA 99 regulations for Emergency Power Systems and The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) requires that the generator must come on line within 12 seconds.

Working with UPSs from 40 kVA to 300 kVA, Filas has retrofitted seven UPSs at different Trinity hospitals and data center locations around the country with VYCON's highly efficient VDC-XE flywheels. With space being a substantial concern for Trinity's retrofit application, Filas decided the compact flywheels were the most effective solution. The retrofit assures the highest level of power protection, plus saves on expensive cooling and maintenance costs, since VYCON's technology utilizes maintenance-free magnetic bearings.

Flywheel technology differs from manufacturer to manufacturer, with some requiring bearing maintenance and replacement to the tune of nearly \$10,000 for each flywheel every few

years. Plus, bearing maintenance requires the system to be shut down for six to eight hours. VYCON's UPS systems take advantage of higher speeds and full magnetic levitation – packing more green energy storage into a much smaller footprint.

“VYCON's flywheel systems are the most efficient and effective solution on the market,” said Filas. VYCON's flywheel systems are the first line of defense against any incoming power variations and help to prolong the life of the UPS' batteries. Moreover, the highly-efficient storage systems can completely replace batteries; Filas has deployed both scenarios. “It is our intention to slowly retrofit any existing battery systems with flywheels as the batteries come up for replacement. For every battery replacement, Trinity is using batteries and a flywheel system, but it is possible to go battery-free with future UPS systems. We do that now at our Maryland data center for the centralized UPS systems that protect the network closets in the hospital.”

In addition to data centers, Trinity's UPSs and flywheels are used in other areas, including IT-centric applications such as a centralized UPS systems for network closets, and non-IT uses, like biomedical related applications such as a blood lab robotics line.

The Results

Recently, when the company's Michigan location experienced weather-related outages and issues from unreliable utility transformers, the VYCON flywheels performed admirably. Filas has been pleased with VYCON's technology and support and looks forward to continued retrofits for a more reliable and greener data center infrastructure.



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