

Application: Mission-Critical Power for Pharmaceutical Facilities

Success Story

Problem:

Actavis needed reliable, clean power for the manufacturing of its oncology pharmaceuticals. Battery-based power protection systems were not working when needed most.

Solution:

Bogdan Oghina, general manager for Actavis turned to VYCON for a more dependable power protection system. This caught the eye of FDA inspectors who said they were pleased with the flywheel power solution.

Not only was VYCON able to solve the power protection issues, VYCON's VDC-XE flywheel system - due to its small footprint - was able to be placed underground in Actavis' small power room - easily operating within the harsh environmental conditions.



VYCON Flywheels Solve Power Continuity Problems for Actavis – A Leader in Pharmaceutical Manufacturing

As one of the world's leading companies in the development, manufacture, and sale of first-class generic pharmaceuticals, Actavis needs consistent, clean power to manufacture its oncology drugs. Successful acquisitions have positioned Actavis among the world's largest companies in the industry. Founded in 1956, the Actavis Group has more than 10,000 employees operating in over 40 countries around the globe. Actavis' commitment to customers is to offer them a wide range of affordable and high quality generic drugs, covering all relevant therapeutic classes. Actavis Group's portfolio includes over 830 products with over 10,000 stock-keeping units (SKUs). In its 'Center for Excellence' division in Bucharest, Romania, Actavis, operating through well-known acquired entity Sindan Pharma, produces and sells its oncology products for distribution throughout Europe, Japan and the U.S.

In order to be in compliance with international health and drug regulatory agencies, Actavis must demonstrate that its generic pharmaceuticals are "bioequivalent" performing in the

same manner as brand drugs. Bioequivalence factors are scrutinized by the relevant authorities concerning active ingredient(s), quality, safety, dosage forms and strengths, performance characteristics and intended use. This strict adherence is a critical requirement for operations and delivering the highest grade products. Any glitch in the manufacturing process can cause havoc with meeting these requirements.

Taking No Chances with Power Quality

For its Bucharest plant, Actavis has multiple connections to several of the city's medium-voltage lines and two power transformers. For critical low voltage lines, electricity is supplied from the general electrical power station into the plant. If there is a power issue, power is automatically switched to an alternative city network power line. However, this switching process can take up to 10 seconds – causing momentary power gaps.

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
- 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

These gaps or “drop-outs” in power can abruptly stop Actavis’ clean room equipment, lab processes and other mission-critical power dependent manufacturing systems. If power is lost, Actavis can lose parts or even a full production batch of pharmaceuticals that can cost hundreds of thousands of euros if not properly mitigated. Power must be “always on” 24/7 no matter the weather or the state of the electric grid.

To protect vital systems against power outages, Actavis installed 20kVA to 40kVA battery-based uninterruptible power systems (UPSs). “The UPSs were not protecting all the critical loads and we found that whenever they were needed, they were not working,” said Bogdan Oghina, general manager of Sindan Pharma. “Dead batteries and burned out fans preventing the proper functioning of the UPSs’ inverters/rectifiers were just some of the problems we encountered.” Due to these problems, Oghina set out to find a more reliable and trustworthy power solution. In his search, he learned about flywheels. “The fact that flywheel systems are mechanical batteries was very interesting,” said Oghina. “Chemically-based batteries have too many issues and their reliability is always in question as we unfortunately found out.”



Flywheels – the Perfect Prescription

As opposed to chemically-based batteries, flywheel systems are a very predictable back-up energy source. If the flywheel is spinning, then not only is the user assured of the energy source, but based on the speed of the flywheel and the amount of load, the exact runtime can be calculated to the second. A flywheel never needs to be tested under a load condition, and never decreases its available energy based on age or usage.

Batteries have a finite life and are dependent on a number of discharges and the environment in which they are installed. A challenging characteristic of lead-acid batteries is that the more you use them, the weaker they get and the faster they wear out. A typical lead-acid battery will be exhausted after about 200-300 discharges. It is also extremely important in the application of UPS batteries to maintain the temperature of the string at or near 25 degrees Celcius (77 degrees Fahrenheit) in order to balance expected performance and life expectancy.

For each 10 degree increment above 25 degrees Celcius, the user can expect the life expectancy to be cut in half. Therefore, it becomes quite necessary to maintain a temperature-controlled environment – which adds more installation and operating expenses.

Since the flywheel does not use a chemical reaction to produce power, it can be deployed with operating temperature environments of up to 40 degrees Celcius. This means that the flywheel does not have to be installed in a precise temperature controlled environment. The VYCON

flywheel system saves on valuable floor space and reduces the cost of HVAC to cool the system – a significant advantage for Actavis' unique power room. VYCON's flywheel energy storage replaces the weak links associated with standard battery-based backup power with a reliable, energy efficient, instantaneous energy source. Due to maintenance and replacement costs, cooling and space requirements, the traditional operating cost of lead-acid batteries over a 15-year period is three to four times more than that of a VYCON flywheel energy storage solution. Over a 20-year design lifespan, cost savings from VYCON's hazmat-free flywheel versus a five-minute valve regulated lead-acid (VRLA) battery bank range of \$100,000 to \$200,000 per flywheel deployed.

"Flywheel technology will save us money by providing clean, reliable power for 15 to 20 years compared to the typical battery-driven technology life cycle of five to seven years," said Oghina.

Going Underground

Another key and unique element of Actavis' power infrastructure is that it's located underground. With no available space to dedicate to power systems within the plant, a small underground room, approximately 26 feet by 32 feet (8 by 10 meters), was built to accommodate power backup and switchgear equipment.



Oghina not only needed a new reliable power protection system, he needed one that could fit into the tight confines of the underground room and operate reliably in harsh environmental conditions. In the summer temperatures can reach as high as 104 degrees Fahrenheit (40 degrees Celsius), "The compact footprint of VYCON's VDC-XE flywheel was the perfect fit – literally. We had very little room for the power equipment. The wide operating temperature of the flywheel was also a major advantage as there was no way batteries would be able to withstand the environmental conditions. Moreover, when the FDA conducted their inspection of our facilities, they were pleased with the solution."

Since the VDC-XE paired with a 200kVA UPS (with no batteries) has been on the job, the power equipment has experienced over 50 power events with no affect to Actavis' plant operations. "Here in Bucharest, power outages can be from medium voltage underground lines hit by an excavator, weather related problems to overhead parts of the network (medium or high 110kV) voltage lines, overload or simply bad switching maneuvers done in the electricity distribution network. I couldn't imagine a system like ours (city lines switching) without such a mechanical battery to fill in the gaps in power, capable of delivering all of its energy in such a short time (seconds); anything more than 20 to 30 seconds of runtime would be a waste of space, temperature and maintenance. The cost and green aspects of the VYCON flywheel system came as a bonus."

About VYCON:

VYCON is an innovator in the design and manufacture of technologically advanced flywheel energy storage systems that enable a highly reliable, cost-effective and “green” energy storage solution for a variety of applications. The company’s REGEN flywheel systems, used in regenerative power applications such as container cargo handling crane applications and light electric rail, reduce power and energy costs to port and rail operators as well as provide a reduction in green house gasses. In addition, VYCON’s line of VDC and VDC-XE systems are deployed in mission-critical operations around the world protecting critical computing assets against costly power outages.

For more information on our innovative clean energy storage systems for your application, contact us at 714-386-3800 or visit our web site at: www.vyconenergy.com.



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