

POWER PROFILE

Customer: Caterpillar Tucson Proving Ground

Location:

Tucson, AZ, USA

Customer Business Issue:

Reduce power generation costs for off-grid mining test facility

Solution:

Cat® Microgrid Technology Suite

- 500 kW solar array
- Energy storage system with lithium ion and ultra capacitors

Cat® Dealer:

Empire Power Systems



Tucson Proving Ground consists of large open-air test areas for Caterpillar mining equipment, workshops and an office building.

POWER NEED

Nearly 25 years ago, Caterpillar opened a proving ground about 30 miles southwest of Tucson, Ariz. The facility consists of large open-air test areas, where Caterpillar conducts field trials of many of its large mining equipment before being brought to market. The proving ground site also includes workshops and an office building.

The Green Valley area outside of Tucson was an ideal testing location for Caterpillar's mining division, but the site is too remote to be easily connected to the local utility grid. To generate electricity, Caterpillar relied on three Cat C15 diesel generator sets that ran continuously all year long, using approximately 250,000 gallons of diesel fuel each year. It was clear the facility needed an alternate power solution to reduce costs and align with the organization's sustainability efforts.

SOLUTION

Launched in 2016, Cat Microgrid technology offers an integrated suite of environmentally friendly solar panels, state-of-the-art energy storage and advanced monitoring and control systems; along with Caterpillar's traditional line of power generation equipment, including Cat generator sets, switchgear, uninterruptible power supplies and automatic transfer switches.

At the Tucson Proving Ground (TPG), facility managers worked with local Cat dealer Empire Power Systems to install 528 kWp DC (500 kWp AC) of photovoltaic (PV) solar panels and 500 kW of short-term energy storage in the form of batteries and ultra capacitors to supplement the power generated by the existing generator sets. Empire Power Systems was the original installer of the generator sets at TPG and is responsible for complete microgrid maintenance at the site.

"With the declining cost of renewable energy sources and rapid advances in energy storage technology, the time was right to provide an integrated application for remote power at the Tucson Proving Ground," said Rick Rathe, general manager of new ventures for Caterpillar's Electric Power business. "Cat Microgrid technologies deliver an innovative, financially viable way to incorporate sustainable sources of energy into our existing portfolio of traditional power generation offerings."

In a hybrid microgrid – like the one at TPG – renewable sources of energy can account for any percentage of the load depending on conditions. Excess energy produced by renewables is stored for stabilization as well as for use during unfavorable conditions, such as cloudy days and nighttime. Generator sets supplement the system by powering the microgrid when energy from other sources is unavailable.

Located in a remote desert of Arizona, the sun conditions at TPG are ideal for solar power generation. The site has both fixed solar panels and tracking solar panels, which follow the movement of the sun throughout the day.

RESULTS

With the addition of solar panels and energy storage to its microgrid, TPG expects to reduce its diesel fuel use by 33 percent and its generator set operation by 25 percent.

Besides lowering fuel and operation costs for the facility, the microgrid at TPG is a real-world application of the latest Caterpillar technology for the commercial market. Available worldwide through the Cat dealer network, Cat Microgrid technologies can be purchased as turnkey installations or design-to-order solutions. This suite of technologies is ideal for a broad range of applications such

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as powering telecommunications towers, industrial facilities, mining installations, remote villages and islands, rural communities and off-grid sites like TPG. "The microgrid project has moved from concept to commercialization at an incredibly rapid pace, helping to bring sustainability to life here at TPG," said Dave Damerell, global director of product validation

for the Product Development & Global Technology division at Caterpillar. "It just goes to show you the power of collaboration and innovation. We can do big things when we work together." with older equipment, it's pretty impressive."

For more information, please visit cat.com/powergeneration



The Caterpillar Tucson Proving Ground installed 500 kW of environmentally friendly photovoltaic (PV) solar panels to help supplement power generated from on-site generator sets to reduce fuel and operating costs.