

POWER PROFILE

Customer: Fairmont Energy Station (FES)

Location:

Fairmont, Minnesota, USA

Customer Business Issue:

Produce reliable and flexible power to complement current wind generation efforts

Solution:

Four Cat® G16CM34 gas generator sets

Cat® Dealer:

Ziegler Power Systems

POWER NEED

Built in 1920, FES has long been responsible for delivering reliable and affordable power to 6,000 customers in southern Minnesota. As the prime source of backup power in the region, it is imperative that the system remain current through the frequent and methodical replacement of obsolete power generation equipment.

In 2011, the ownership and operational control of FES was transferred to Southern Minnesota Municipal Power Agency (SMMPA), which generates and sells wholesale electricity to its 18 non-profit, municipally owned member utilities.

At the time of the transfer, the system included six steam boilers and two dualfuel engine driven generator sets. SMMPA selected to decommission the antiquated boilers, which produced electrical power through the use of steam turbines coupled to an electrical generator.

While the antiquated steam generation system was able to deliver power up to 25 MW, it required long lead times to startup, which became problematic as more wind generation was installed in the area.

“Wind is variable. It’s either blowing fast or slow. The amount of wind energy that comes out of wind turbines changes constantly, so we required a more flexible and fast responding power source that could make up the difference,” said Peter Reinarts, manager of generation and operation at SMMPA.

SMMPA needed to replace the electrical generating capacity that was lost when the out-of-date and obsolete boilers were retired. A new solution would provide more modern, efficient and reliable power generation to the surrounding communities.

SOLUTION

In an effort to add operating flexibility and increase reliability at FES, SMMPA worked with Caterpillar and Ziegler Power Systems, the local Cat dealer, to implement a plan for generating 25 MW of power from four Cat G16CM34 generator sets.

“These new generator sets start quickly, like a car engine, and they can come up to full 6.2 MW load in minutes, with the full plant online in eight minutes. If the electrical grid needs extra power ten minutes from now – these generator sets can easily adjust to that need,” said Bruce Erickson, vice president at Ziegler Power Systems.

This newfound efficiency enabled the updated system to work in harmony with wind generation.

“With the new system, the generator sets can be promptly put on or offline to fill in the holes of the current wind generation. These two assets aren’t at odds with each other but instead work in a dynamic tandem,” Reinarts explained.

As natural gas internal combustion engines, they have a lower emissions profile and are also equipped with the latest pollution control equipment to further reduce nitrogen oxides and carbon monoxide.

In addition, Caterpillar was flexible in the design in order to meet the SMMPA’s operational needs such as the desire for an easily maintainable power plant. The generator sets were crafted to fit among adequate catwalks and platforms, so all major equipment could be seamlessly serviced.

“We’ve worked with Caterpillar and Ziegler Power Systems on several projects in other power plants. They understand our unique needs and, most importantly, they are willing to be flexible on the design. Other vendors just offer a set design,” Reinarts added.



Presently, FES provides electricity and related services to approximately 90,000 customers in communities of southern Minnesota.

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RESULTS

The updated power station helped strengthen FES's reliability with 25 MW of new power capacity in addition to 12 MW of existing diesel generation. As an intermediate load facility, the new system operates approximately 20 percent of the time and is absolutely essential for supporting wind generation as it starts quickly and easily adjusts its output when the wind generation varies.

"The new generator sets will ultimately run 1,000 to 2,000 hours per year. And by running more often, you're more fully utilizing your assets," Reinarts explained.

SMMPA is currently working with Caterpillar and Ziegler Power Systems to construct a new 38.8 MW power plant in Owatonna, Minnesota. The plant will replace a facility that was damaged by the Straight River flooding of 2010.

"The greatest testament to our satisfaction with Caterpillar is immediately selecting them as a partner in a similar power plant project," said Reinarts.

For more information, please visit cat.com/powergeneration



Four Cat® G16CM34 gas generator sets produce 25 MW of power to supplement power generated from wind sources.