

POWER PROFILE

Customer: Deseret Power

Location:

South Jordan, Utah

Customer Business Issue:

Grid firming

Solution:

Six G3520H gas generator sets
12,470V switchgear

Cat® Dealer:

Wheeler Power Systems



Cat® dealer Wheeler Power Systems supplied the generator sets and assisted with design and construction of Solomon Generating Station in St. George, Utah.

POWER NEED

With corporate offices in South Jordan, Utah, Deseret Power is a regional generation and transmission cooperative that owns 223 miles of transmission lines and 550 MW of generating capacity.

As a cooperative, Deseret is owned by its five member systems: Bridger Valley Electric, Dixie Power, Garkane Energy, Moon Lake Electric, and Mt. Wheeler Power. It also sells surplus power to municipalities, power marketers, and other wholesale electric systems in five states.

Deseret Power's cooperative organization, combined with its vertically integrated structure, enables it to provide member/owners, partners, and customers of all sizes with reliable power and stable rates.

Long-term drought conditions in the West have resulted in curtailment of hydroelectric power available from the Upper Colorado River Basin and accelerated the need for Deseret to develop additional sources of generation.

As part of a strategy to diversify its generating portfolio, Deseret Power broke ground last fall on a 15 MW solar project in Uintah County that will provide low-cost electricity to its rural cooperative customers throughout the state of Utah and the West.

"Deseret Power is a leader in affordable, reliable energy for our members," said Deseret Power CEO Dave Crabtree. "While solar energy does not provide 24/7 electricity, we were able to balance this project's output with our other energy resources to continue to provide reliable and affordable energy to our members."

The new solar project can power the equivalent of 10,000 homes when the sun is shining. This new resource will complement Deseret Power's existing supply of affordable electricity. Utah is a leader in low-cost energy, and was ranked number one among U.S. states for electric affordability, according to the annual Citizens Utility Board report.

As the demand for energy steadily increases, Deseret realized that it had a need for additional generating capacity that could come online quickly, says Eric Olsen, the utility's chief operating officer. Deseret contacted Cat® dealer Wheeler Power Systems for a solution.

"Deseret needed to add a source of generation that could help fill that void," said Shane Minor, a utility and governmental sales representative with Wheeler Power Systems. "As we talked with them, a natural gas engine power plant was determined to be the best option, so we went to work in designing and putting together a project that made sense."

SOLUTION

Commissioned in early July 2022, the new 15 MW power plant in St. George, Utah, is fueled by six Cat G3520H generator sets that run on natural gas. Solomon Generating Station is designed to provide fast, flexible power in a volatile energy market.

Wheeler Power Systems supplied the generator sets and assisted with design and construction. From initial construction to final commissioning, Solomon Station came online in nine months, representing the fastest construction turnaround to date by Wheeler Power Systems, which has sited a growing number of distributed energy plants for utility cooperatives in Utah and elsewhere.

According to Minor, the power plant serves three primary purposes:

- When weather conditions change, wholesale power prices react due to the decrease of renewable energy sources available on the grid. "A plant like this can be brought online quickly and help mitigate those changes in market pricing," Minor says. "System operators watch the market, and they're able to bring the plant up at the appropriate times."
- The second way the plant is utilized is in a reserve or ancillary market where the plant is viewed as a virtual, non-spinning reserve. A larger, investor-owned utility can work in tandem with Deseret to dispatch the plant when they see an overarching problem developing on the grid.
- The plant can also serve as an emergency power source when transmission goes down in the St. George area. A plant like Solomon Station is designed to fire up quickly in a black-start scenario.

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“Solomon Station was built to help bridge that gap by providing a needed resource,” Olsen says. “The benefit of a plant like Solomon Generating Station is to provide a quick response when more energy is needed on the grid.”

Observes Minor: “The utility industry is currently undergoing a transition from traditional sources of energy. And distributed power generation has become very important to bridge the gap between traditional technology and the recent emergence of more renewable sources of energy.”

RESULTS

A virtual power plant is a collection of small-scale energy resources which, when aggregated together and coordinated with grid operations, can provide the same kind of reliability and economic value to the grid as traditional power plants. As a largely unmanned facility, Solomon Station is operated remotely from more than 400 miles away at Deseret Power’s primary generating facility in Vernal, Utah.

“Solomon Station is an unmanned plant; the only time we have people come in is to do inspections or periodic maintenance,” Minor says. “The beauty of it is, there’s a very well-designed Human Machine Interface (HMI) screen on the Cat Switchgear, which is located in a room adjacent to the generators. The graphical interface shows the layout electrically, which makes it very comfortable for the customer to interface with it.

“Everything that a plant operator can do at the plant in St. George can be done seven hours away by a remote operator who is looking at an identical screen. And that’s the primary means of operating this power plant.”

As electric utilities experience the transition from traditional generation to renewable generation, Caterpillar is well positioned with distributed generation solutions that bridge the gap.

“The market is currently trending toward renewable energy, but traditional energy resources such as natural gas still provide a much-needed backstop when those renewable resources are not available,” Minor says. “Caterpillar is well positioned to fill that gap with fuel sources such as natural gas, hydrogen, percentages of hydrogen that can be blended with natural gas, and also renewable biogas.”

The G3520H generators run at 44% efficiency, meaning that if they are fueled by 100 BTUs of natural gas, 44% of that amount is converted to electrical power. The G3520H is designed for maximum performance on low-pressure pipeline natural gas.

“Because natural gas can be utilized at a much lower cost and is a cleaner source of fuel, it becomes an asset that’s very valuable to the utility,” Minor says. “We’re also able to apply emissions reduction equipment that cuts engine emissions by another 93% as it relates to NOx and CO, and a 70- to 80% reduction of formaldehyde.”

Caterpillar fast-response natural gas generators operate similar to a traditional diesel generator where a quick response is required, whether that be in a standby capacity or in peak shaving and utility applications where they are able to start fast and load very quickly.

“In a reserve market, the fast-response natural gas engines are another great asset,” Minor says. “This technology is innovative—we didn’t think we would see natural gas engines respond the way diesel engines do. Over the last few years, Caterpillar has developed that technology, and we’re very excited about it.”



“The benefit of a plant like Solomon Generating Station is to provide a quick response when more energy is needed on the grid,” says Eric Olsen, Chief Operating Officer for Deseret Power.