

# Ameren Clears the Way

## For Increased Renewable and Distributed Energy with Siemens SVC PLUS<sup>®</sup> STATCOM Technology

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The generation mix in the U.S. is changing. There is less coal and more renewable and distributed energy resources coming online. In 2020, renewable energy has outproduced coal within the first four months of the year. It is possible that by 2021, for the first time, renewables will generate more electricity than coal.

At the same time, the electric grid is changing faster than expected. The volatility of the electric system is increasing. There are more variable resources and two-way flows on the grid. As a result, the grid is more susceptible to voltage fluctuations and potential service disruptions.

However, St. Louis-based Ameren is well ahead of the need to stabilize these potential grid fluctuations before they become problems. After considerable research in 2017, Suzanne Pohlman, Ameren's transmission project manager, says the utility considered surge protective components (SPC), storage battery systems (SBS) and static synchronous compensator (STATCOM) solutions to help it comply with regulations and provide the transient voltage recovery capability it needed.



### STATCOM Best Option

"As we began to close our old coal fired plants, we knew we had to account for the reactive power provided by the generators," Pohlman says. "As we considered possible vendors, our engineers agreed that Siemens Energy STATCOM technology, known as SVC PLUS<sup>®</sup>, could provide the support we needed for transient voltage recovery."

Pohlman admitted that she was sceptical that Siemens Energy's STATCOM system would live up to the high

expectations to stabilize Ameren's grid as its coal-fired plants are phased out. She adds, compared to other technologies, it had fewer components, a smaller footprint and a less complicated design.

On top of that, Siemens would manage the entire installation and commissioning. A tall order for a utility that takes great pride in its long-established transmission engineering, procurement and construction (EPC) capabilities that she oversees. „There are small boxes inside a control building that produce reactive power and push and pull energy around where we need and don't need it," she says. "Does this STATCOM system really do all that? For me, anything that's intangible always yields a bit of scepticism. „Many of Pohlman's questions were answered when an Ameren engineering team visited Siemens testing facility in Erlangen, Germany. The utility also retained an independent consultant to evaluate the design of the system, concluding "Siemens is at the top of their game with this technology," Pohlman says.

"Our Ameren team could tell that Siemens's STATCOM design was nearly 10 years ahead of the competition," Pohlman continues. "The design had fewer components and material which means less maintenance. It also was the only company with redundancy built into the system, so it could never completely go down. That was impressive."

The components Pohlman refers to include industrial class insulated gate bipolar transistors (IGBT), reactors and capacitors. By using static var compensator (SVC) technology based on Siemens modular multilevel converter (MMC) design, it gives Ameren economical and technical flexibility, as well as a 50 percent smaller footprint, when compared to conventional SVC installations.

## Phased Installations Support Green Growth

Siemens Energy Account Manager John Rodriguez says after the competitive bids were evaluated and lengthy reviews were completed, Ameren selected Siemens to build four +/- 250 Mvar reactive power STATCOM systems. The first STATCOM was completed in Illinois next to Ameren's Stallings substation. That STATCOM was built to provide voltage support due to a plant closure in 2017.

The second was also installed in Illinois next to Ameren's Fargo substation in preparation for the retirement of another coal-fired plant scheduled for 2022. Slated for completion in 2021, the two remaining Ameren STATCOM projects are the utility's Meramec, Missouri, and Beehive, Illinois, substations to prepare for the planned retirement of the Meramec coal-fired plant also in 2022.

"The area already has enough generating capacity, so it doesn't make sense to build, say a combined cycle power plant, just to provide VAR support," Rodriguez says. "STATCOMs make the most sense to provide that much VAR support. They are cost effective and are the most efficient choices.

"The control system is very sophisticated as well," Rodriguez continues. "The converters react very quickly. So, within a few cycles during an undervoltage or an overvoltage situation, it is already doing what it needs to do."

The Stallings Substation project was the first STATCOM installation at Ameren. Pohlman says timing and budget were important considerations. And even though the Stallings installation proved to be a learning experience for both Siemens Energy and Ameren, expectations were met. She adds that success also hinged on a well-established communications plan with the team that set a clear direction and managed expectations.

"Siemens committed to delivering on a very, very tight scheduled timeline for the first installation," Pohlman says. "This aggressive schedule was certainly a challenge because Siemens had recommended no less than 15 months of construction. In the end, they could do it between 10 and 11 months. From the budget side of things, anything that came across my desk from a change order perspective has been fair."

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Suzanne Pohlman, Ameren's transmission Project Manager

## Looking Ahead

To date, the full voltage regulating potential of the STATCOM's have yet to be tested at the Stallings and Fargo Substations and construction is on schedule for the Meramec and Beehive locations.

"During the initial testing phase, it has proven it can provide the 250 Mvar," Pohlman says. "Currently, the STATCOM's have been maintaining a quarter to half the capacity of the regular settings to support load settings in the grid. Today, the Stallings and Fargo are sitting under bright clear skies pushing and pulling energy across the Ameren grid as designed and constructed."

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**Transmission**  
Freyeslebenstraße 1  
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Germany

**Transmission**  
4601 Six Forks Road  
Raleigh, NC 27609  
USA

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