Success Story:
Utilities study

Market Served
Utilities

Eaton supplements utility's in-house engineering to help meet goals

Location:
Southwest, U.S.

Segment:
Utilities

Solution:
Eaton's Electrical Engineering Services and Systems group was able to conduct a variety of power systems studies and provide supplemental support to aid the utility in achieving its goals.

Problem:
As the utility company sought to modernize its existing infrastructure with advanced grid strategies, it faced a lack of internal engineering resources needed to complete a range of tasks.

Results:
The utility's advanced grid initiatives will be completed years ahead of schedule, thanks to the support provided by the Eaton team.

"Without the help from Eaton, we'd probably be four years behind in our advanced grid initiatives because we just don't have the bandwidth to do it all ourselves. We view the Eaton team as a valuable extension of our internal engineering staff."

Utility representative

Background

Generating clean, reliable energy for approximately 2.7 million customers, this Southwestern-based utility company manages a service territory that stretches across the entire state. As the largest and longest-serving energy provider within the state, its 6,300 dedicated employees help power a vision of creating a sustainable energy future. The firm is proud to be among the top energy companies in the nation for reliable service.

"Advanced technologies are enhancing our ability to detect and respond to outages while maintaining a safe, more flexible grid," a company spokesperson said. "By continually investing in the energy grid, we ensure our customers have access to clean, reliable and affordable power whenever they need it."

Challenge

A cornerstone of that investment is the utility's ongoing commitment to implement advanced grid strategies, a transition expected to take 10 years to complete. However, like many modern utilities, the company lacked the level of in-house engineering support necessary to allocate dedicated resources toward the large-scale project. An additional challenge was its unique capacity of serving both urban and rural areas, as lengthy transmission and distribution lines increase the project's complexity.

During an on-site visit four years ago, an Eaton sales engineer recognized that the utility's distribution planning group was struggling to designate ample manpower to assess its existing capacitors, one of the initial steps in its smart grid modernization efforts.

"Prior to upgrading their equipment, they needed to complete studies to ensure that the capacitors on their distribution lines would be sufficient," explains James Walker, Eaton's lead power systems engineer. "But we noticed they were having trouble freeing up staffing resources within their engineering department so we asked if they'd like Eaton's Electrical Engineering Services and Systems group to help with project."

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Solution

While initially a bit unsure about how the proposed collaboration would work, the utility decided to give Eaton a shot, authorizing a small study of five distribution feeders for a Volt-Var Analysis. Traditionally viewed as a load flow study, the review assesses the state of an electrical distribution system and its ability to maintain nominal voltage at all points during maximum projected load conditions. Eaton's task was to evaluate whether the utility's existing capacitors could adequately achieve nominal voltage throughout the feeder. Then, if the existing capacitors were found to be insufficient, the Eaton team would recommend the placement of new capacitors on the line.

The utility was so impressed with the results of the initial study that it allocated a P.O. for the remaining 40 feeders. "We were amazed at the quality of Eaton's work," the utility representative reveals. "Our internal team quickly realized that Eaton wasn't attempting to take away any of their job responsibilities; rather, they were there to help us reach our goals."

The next project in the company's advanced grid initiative was to convert existing reclosers to Eaton's Form 6 controller. "With this move, it gave them the ability to bring in useful information from the field and access real-time data at various points in their distribution systems," Walker notes.

The utility contracted with Eaton to perform a Coordination Study, a review of the time-current characteristics of overcurrent devices with the goal of developing device settings that enable the closest device to a fault to operate first. The project also required collaboration with the utility's substation protection group to ensure that the quality of the studies would align with the strict requirements for substation protection.

"We took great care to first determine how the utility prefers to do their studies," Walker explains. "As a result, our end product has the same look and feel as if the utility employees had done the work themselves. They are able to easily and strategically filter through the data to get exactly what they need."

It is a detail that didn't go unnoticed by the utility. "It was amazing how Eaton worked with us every step of the way to ensure the desired outcomes," the representative shares. "We were also impressed with how they were able to execute everything so quickly. We definitely had some aggressive deadlines, and the Eaton team met each and every one."

The success of the studies has prompted the utility to request assistance from Eaton on numerous other projects. For instance, when it was preparing to replace an outdated version of distribution software, the utility chose to implement Eaton's CYME, a distribution system software that provides advanced network modeling and simulation capabilities while helping utilities to optimize capital investments. To assist the utility with getting up to speed on the new software, Eaton hosted an internal training on the solution.

Once the transition to CYME was complete, it made the utility's Volt-Var Studies significantly less cumbersome and time-consuming, as personnel were able to leverage the software's visual tools to present data in a more user-friendly format at a much faster pace. "They needed some guidance once they switched over and we were able to show them how to customize data blocks to be much more efficient," Walker explains. "Now it's much easier to complete and review our work."

Following the successful implementation of CYME, the utility once again turned to Eaton to help with feeder validations. Although primarily an internal process, Eaton worked with the staff to access the results and predictions from other modeling software and transmission systems, then compare that to the data being delivered from CYME. "They wanted to double check everything and verify that the models in the software matched their other system information," Walker explains.

Above all else, Eaton has enabled the utility to stay ahead of the curve with both the timeline and quality of its advanced grid initiative. "We have had aggressive metric goals but lacked the resources to execute that type of work at that scale," the utility representative acknowledges. "Thankfully, we've been able to rely on Eaton to supplement our own internal staff. We view Eaton as an extension of our own engineering team."

As part of its overall grid modernization process, the utility has also tapped Eaton to help with a variety of additional tasks and studies, including establishing recloser settings and developing setting sheets for underground distribution systems and padmount switches. Already on the agenda for next year are recloser coordination studies at 100 locations and an additional 300 capacitor controllers.

"We have weekly meetings to touch base with outstanding issues, assess what's coming up and provide any ongoing support they might need," Walker reveals. "We have a great working relationship with their team, which we expect will continue in future years."

The utility concurs. "Without the help from Eaton, we'd probably be four years behind in our advanced grid initiatives," the representative estimates, "because we just don't have the bandwidth to do it all ourselves. We view the Eaton team as a valuable extension of our internal engineering staff."

Results

Thanks to Eaton's Electrical Engineering Services and Systems group, the utility is now able to:

- Dramatically accelerate its grid modernization strategies
- Establish and achieve high goals for upgrades that otherwise could not have been met
- Execute tasks easier and more quickly
- Rest assured that the Eaton team will perform as an extension of their own internal engineering department, delivering both the quality and compatibility of work

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