



EPE's Owner's Engineering Services Deliver Stability and Compliance to Texas Steel Mill

Background

A major electric arc furnace steel plant in Texas, required a more stable and efficient power system to handle its high reactive power consumption. Powered by a solar project that generates a net output of 80 MW, the steel mill's operations led to frequent voltage fluctuations, electrical disturbances like harmonics and flicker, and compliance issues with the Electric Reliability Council of Texas (ERCOT) at the Point of Interconnection Bus (POIB). To resolve these issues, EPE proposed installing two +/- 22 MVAR Static Synchronous Compensators (STATCOMs) to stabilize the power supply and ensure grid compliance.

Challenge

The mill faced a challenge that speaks to a broader issue across the energy industry: balancing the demands of large, reactive loads (like those from EAFs) while maintaining grid stability. Integrating renewables — in this case, solar — further complicates the situation because it introduces separate reactive power requirements to manage in tandem.

With the increasing number of decentralized renewables connecting to the grid, utilities, and industrial operators face more frequent congestion, voltage control issues, and capacity bottlenecks. Advanced technologies like STATCOM systems are critical for addressing these issues, as is having an experienced partner with a deep knowledge of various ISOs and their unique requirements — enter EPE.

EPE set out to design a solution that would meet ERCOT standards without compromising the mill's operation. This task required technical expertise in developing the STATCOM and careful planning to ensure minimal disruption during installation and commissioning.



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Approach

EPE began by conducting comprehensive engineering studies, analyzing power flows, voltage stability, and potential harmonics. EPE also worked closely with the client to prepare a detailed STATCOM specification and initiated a competitive RFP process.

The EPE team evaluated proposals from top-tier manufacturers using industry expertise to assess each bid's technical compliance, pricing, and delivery timelines to ensure performance and budgetary goals were met. Once the system design was finalized, EPE managed the installation and commissioning process, ensuring the STATCOM system was rigorously tested and compliant with all relevant standards.

Vendor Selection and Bid Evaluation: A clear recommendation after thoroughly evaluating and assessing vendors based on technical specifications, cost, delivery schedules, and compliance with ERCOT standards.

STATCOM Installation: Install two +/- 22 MVAR STATCOM systems at the 12.5 kV buses of the mill's substation to provide real-time reactive power control, stabilize voltage, and ensure unity power factor at the Point of Common Coupling (PCC) between the steel mill and solar plant.

Testing and Acceptance: A detailed testing and acceptance criteria exhibit outlining the performance and compliance standards for the STATCOM systems, along with factory acceptance tests and site commissioning tests.

Outcome

EPE's comprehensive solution for the steel mill delivered critical improvements to the power system and the overall grid. By installing two +/- 22 MVAR STATCOM systems, EPE ensured that the mill's power supply was stabilized, addressing the significant voltage fluctuations caused by the industrial load. The project successfully balanced the facility's reactive power needs and the renewable energy source, optimizing both systems' performance.

Power Factor Achievement: The STATCOM systems achieved and maintained unity power at the PCC between the mill and the solar plant, allowing it to provide maximum voltage support at its point of interconnection.

Voltage Stability: The STATCOM systems effectively mitigated the voltage instability caused by the mill's fluctuating power consumption, ensuring that rapid demand changes wouldn't negatively impact grid operations.

Compliance and Testing: The systems met the strict technical standards of IEEE and ERCOT's reactive power requirements, undergoing rigorous testing, including digital simulations and on-site verification.

EPE's solutions not only met the project's goals but also positioned the client for long-term success in an ever-evolving energy landscape. This comprehensive, holistic approach ensured that the client, the facility, and the grid were more prepared to meet future energy demands.

(512) 382-6700

contact@epeconsulting.com

epeconsulting.com

