Power Grid Engineering's (PGE) engineering team is experienced in engineering, project management and commissioning in various types of substation and switchyard projects. Our substation, project management and engineering teams complete custom designed projects within budget and on schedule for various clients. PGE is a proven leader of full-service substation construction and engineering concept design, economic evaluations, physical design, civil/structural engineering, ground grid design and equipment specifications.

PGE is committed to high quality services using a combination of internal and strategic external resources, and is ideally suited to the engineering, construction and design of power substations. We value long term relationships with our customers and exceed expectations by completing projects expeditiously and safely.

SUBSTATION ENGINEERING SERVICE OFFERINGS
www.powergridengineering.com/substation-engineering-services

ELECTRICAL ENGINEERING
• Substation and Switchyard
• Electrical System Planning & Studies
• Ground Grid Design
  • CDEGS
  • WinIGS
• IEEE 80 Standards
• Substation & Switchyard Layouts
• Equipment Specifications
• Lightning Shielding Design & Analysis

CIVIL ENGINEERING
• Access Road Design
• SPCC Plan
• Civil Site Design
• SWPPP Preparation
• Bid Solicitation & Evaluation

STRUCTURAL ENGINEERING
• Structural Design
• Foundations (Steel, Reinforced Concrete, Wood)
• Investigations & Evaluations
• Geotechnical Reviews
• Code Analysis

PROJECT MANAGEMENT
• Access Road Design
• SPCC Plan
• Civil Site Design
• SWPPP Preparation
• Bid Solicitation & Evaluation

powergridengineering.com
### Substation Engineering Portfolio Highlights

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-Year 500/230/69 kV Substation Upgrade Florida</td>
<td>Multi-year/multi-phase project added two 4-bank 500/230 kV single phase transformers, and replaced a 230/69 kV three phase transformer. The design included a breaker and a ½ scheme for both 500 kV and 230 kV designs, adding four 500 kV breakers, 230 kV breakers and change out of 69 kV breakers and associated switches. Expansion also required new local and Florida Department of Environmental Protection (FDEP) permitting, along with new SWPPP and SPCC plans.</td>
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<tr>
<td>Greenfield Distribution Substation Designs Project Florida</td>
<td>Designed over a dozen greenfield 69/13 kV Distribution Substations in less than six years using the customers’ unique design standards. Civil designs included local, FDEP and Florida Department Of Transportation (FDOT) permitting.</td>
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<tr>
<td>Substation Interconnect Expansion Project Texas</td>
<td>Designed a 230 kV line terminal power plant interconnect addition. The addition was in accordance with Investor Owned Utility (IOU) requirements.</td>
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<tr>
<td>Custom Substation Expansion Project Florida</td>
<td>Expansion design of a 230 kV six position ring connection via Transmission lines, and converting the 230 kV to a breaker and a ½ scheme. The project included installation of a second 230/69 kV transformer, expansion of a 69 kV breaker and a ½ layout, and the design for a future breaker and a ½ scheme.</td>
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<tr>
<td>115 kV Substation Upgrade Project Kansas</td>
<td>Replaced three 115 kV 1200 amp OCBs with 2000 amp SF6 breakers. Project also included replacement of eight Gang Operated Air Break switches with new 2000 amp switches.</td>
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<tr>
<td>Standards &amp; Manuals Design Engineering Kansas</td>
<td>Engineered Substation Construction Standards and created Manuals that included customer specific requirements for design and arrangements for 138/13 kV Distribution Substations. The Standards and Manuals were subsequently expanded to include 230 kV and 345 kV structures.</td>
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<tr>
<td>Substation Capacitor Bank Design Engineering Various Locations</td>
<td>Designed capacitor bank installations consisting of 34.5 kV, 69 kV, 115 kV, and 230 kV ranging from 6 MVARs through 110 MVARs. Each of the installations included back to back switching arrangements. The designs included grounded/ungrounded banks, fused/fuseless/externally-fused designs, and various switching methods.</td>
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