

POWER DELIVERY Substations

DESIGN

- > New Substation Design
- > Modifications, Additions and Upgrades
- > Site Work and Access Roads
- > Protective Relaying
- > SCADA Systems
- > Communication Systems
- > Automation Systems
- > IEC-61850 Migration

SUPPORT

- > Alternative Analysis
- > Siting Studies
- > Cost Estimating
- > Surveying
- > Geotechnical Evaluations
- > Spill Prevention, Control and Countermeasure (SPCC) Plans
- > Troubleshooting
- > Maintenance Programs

INSTALLATION

- > Material Procurement
- > Construction Administration
- > Construction Management
- > Construction Inspection
- > Design-Build
- > Testing and Commissioning

Leading-edge design

As demand for power system capacity and reliability grows, substations must be added, updated, modified, expanded or retrofitted to keep power flowing. Fast-track schedules, tight budgets and other constraints often complicate projects.

POWER Engineers can help you meet the challenge, with resources to get the job done and technical savvy to find design solutions that work for you.

We offer a full slate of substation services from concept through commissioning. We are also experts in extending the life of equipment through upgrades and expansions.



POWER designed the facility and yard for the SVC addition at St. George 138 kV Switchyard.



The new Sinatra Substation takes shape on the Las Vegas Strip. Using GIS technology, POWER's design accommodates 500 MVA of transformation in a 1.5-acre footprint.

Proven performance

Substation design has always been a core service at POWER. With thousands of substation projects completed, we have the versatility to design all types of substations from 5 kV through 500 kV.

We've worked in diverse locations and with a wide variety of client standards, needs and preferences. We bring solutions – from the practical to the creative – to the substation issues clients face today.

POWER DELIVERY

Substations

Areas of Expertise

OPTIMIZATION

> Innovative design solutions to enhance substation performance while minimizing costs.

EXPANSION

> Adding feeders, replacing underrated equipment, increasing ampacity, and designing generation interconnections, to handle new or increasing loads.

SPACE ACCOMMODATION

> Using gas-insulated substation technology and creative designs to make the most of a small space.

STABILITY

> Adding leading-edge technologies, such as reactive compensation (STATCOM, SVC) and battery energy storage (BES) to enhance power system performance.

MAINTENANCE

> Developing and executing substation maintenance programs to maximize investment return while extending equipment life.



Edison Mission 138 kV Muddy Creek Interconnect Switchstation.



Harry Allen 500 kV Substation shunt reactor addition

Project Examples

System-wide Expansion / Upgrades

- Oncor Electric Delivery: Long term upgrade and expansion of Oncor's electric transmission system. Includes new designs and upgrades of substations from 138 kV to 345 kV; 150-200 projects per year for 10-plus years.

Transmission / EHV

- NV Energy: 500 kV Centennial Projects. Conversion of a ring bus station to breaker-and-one-half. Also design of a new 14-bay 500 kV switchyard and a major substation expansion adding two 675 MVA phase angle regulating transformers.

Distribution

- Sulphur Springs Valley Electric Cooperative: Multiple distribution substation projects from greenfield to retrofits to expansions. Includes redesign of a mobile substation protection system. Voltages range from 69 kV high side to 24.9 kV and 12.47 kV lowsides with capacities in the 20-40MVA range. Also providing relay settings, testing/commissioning and energization support.

System Performance

- San Diego Gas & Electric: New STATCOM system for voltage regulation at the 230 kV, +/- 100 MVA Talega Substation. Technical challenges included closed loop cooling system and sound reduction barriers.
- GE / BPA: \$48 million EPC project to install 500 kV capacitor banks at 10 BPA substations, allowing BPA to maximize power flow over existing EHV transmission lines. Completed six retrofits and four new capacitor banks in two construction seasons in energized switchyards.

Special Situations

- NV Energy: New 230/138/12 kV GIS Sinatra Substation on the Las Vegas strip. Provides 500 MVA capacity in a space-saving design using two lineups of gas-insulated switchgear in a 1.5-acre footprint.
- Centcom: For power restoration in Iraq, fast-track design and field services for the 132 kV Burzurgan Substation, a five-breaker ring bus design at a new generating plant.