

Substation Engineering Services



Professional support and service from design through construction

- Thorough evaluations of existing site conditions set the foundation for success.
- Robust designs and experienced engineers facilitate timely permitting and reliable project scheduling.
- Agile construction support delivers your project on time with high quality.



Substation Engineering Services

SEL Engineering Services, Inc. (SEL) provides comprehensive solutions for power and substation design projects. We have built our reputation on providing quality solutions and outstanding customer service. Our capabilities include preparing detailed calculations, studies, analyses, plans, specifications, schedules, and cost estimates. We support your evaluation of different options during design, and we work to bring your vision to life during project execution. Our flexibility and capabilities mean that we can support steps from concept evaluation through construction or any subset of those activities.

Engineering services include conceptual design and evaluation, detailed substation design, request for proposal (RFP) engineering, and support of construction activities. These services ensure that each construction project meets all appropriate specifications, standards, and customer requirements. Detailed project management plans will ensure that the project's scope, schedule, and budget are controlled.

By combining electrical, structural, and civil engineering services, SEL provides turnkey substation solutions with a single source of accountability. This results in a more definitive scope of work, budget, and schedule that limits or even eliminates unexpected change orders. From design through construction, our cohesive multidisciplinary engineering services help ensure a project's optimum cost, schedule effectiveness, and overall success.

Conceptual Design and Evaluation

The development phase can begin with an initial or desktop study and site investigations to establish the basic site conditions and can also involve substation evaluations and planning. These are important because they will impact design considerations and constraints for the next phase. To help establish all of the necessary site conditions, SEL offers reports and drawings containing:

- Initial substation data and information establishment.
- Field surveys, geotechnical investigations, and existing utility and elevation layouts.
- Substation transmission planning, initial electrical studies, and analyses.
- Conceptual layout drawings and single-line diagrams.
- Desktop study report, site survey (digital and hard copy), and soil resistivity report.

This engineering information enables a precise understanding of current conditions and facilitates the new design. It will help determine the substation basis of design, including system loads and interconnection requirements. Once these conditions have been established, the project can progress to the next phase: substation design and permitting.



Substation Design

The design process can be complicated and must be customized to the particular site conditions, permitting agency, client specifications, and standards. Substation designs include:

- Below-grade—civil grading, foundations, and electrical conduits and grounding.
- Above-grade—civil structures and electrical equipment and cables.

SEL provides a clear path with the permitting strategies, timelines, and technical support needed to successfully complete a project. The design phase involves detailed engineering calculations, bills of materials (BOMs), studies, analyses, plans, specifications, schedules, and cost estimates. SEL provides complete substation designs, including:

- Civil engineering—site layout; demolition and removal; erosion and sedimentation controls; site work; utility layout; foundations; and steel structures.
- Electrical engineering—grounding; equipment (bus, CT, PT, etc.); cable and conduit sizing; lightning protection; wiring; and SCADA designs with analyses and studies (coordination, temporary overvoltage, harmonics, arc-flash hazards, etc.).
- Complete engineering, procurement, and construction (EPC) substation services.

SEL is familiar with many utility standards and offers CAD drawings electronically prepared in either AutoCAD® or MicroStation® format.

SEL best practices are incorporated into our designs. Our experience with integrating SEL and third-party intelligent electronic devices (IEDs) ensures a more comprehensive, fully integrated solution. This results in SEL projects requiring less field work and getting online sooner. The design and permitting phase needs to be completed before construction can begin and includes permitting support from local, state, and federal agencies.

RFP Engineering

SEL can provide vital RFP services needed to prepare construction documentation for bidding. We can prepare RFP packages, submit the packages for bids, perform bidder selection, and other activities to support the proposal process. RFP Construction documentation includes:

- Site information developed during conceptual design and evaluation
- Design documents
- Preliminary construction schedule
- Construction specifications and quantities



Construction Support

Construction support encompasses the quality assurance needed to maintain the specified technical design parameters as well as to ensure the successful execution and completion of a project. Meaningful construction services bring value, potential cost savings, and informed decision-making to the customer. For instance, this can be done by helping customers find the right balance of short- and long-term project considerations by looking beyond price to qualifications and experience. SEL is able to provide many services necessary for a project's construction and can serve as a customer advocate during the construction phase of a project by performing:

- Contractor prequalification
- Evaluation and contractor selection
- Equipment and building survey layout
- Construction oversight and inspection
- Construction management
- Testing and commissioning
- Construction startup and closeout
- Construction record documentation

This approach maintains industry standards and provides solid and reliable construction results that maintain the service life of a project. SEL also provides input into the construction's scope of work to optimize construction activities.

Visit the SEL website at www.selinc.com for additional electrical, civil, and protection and control engineering services information.



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