



Understanding your application and your business objectives.

Every substation is an *application*. Substation engineering has become more critical as power quality issues such as harmonic attenuation, power factor correction and other complex electrical needs arise. New site requirements add other challenges, such as aesthetics and environmental constraints. Substation automation and plant-wide systems automation also have become major concerns. Studying and understanding your application is an engineering strength in which GE is an acknowledged leader. This is a qualitative difference that will benefit you and your application.



Conceptual designs at the proposal stage are fundamental to the discussion. You, the customer, will derive the greatest benefit from these in-depth exchanges because the engineering can be tailored to your needs. Conceptual designs are the foundation of design and economics. Feasibility studies can be done to demonstrate the interplay. GE's experience in all phases of substation economic studies, including financing, gives us unique strengths in helping you determine the economics of your application.

The GE design and engineering process includes modularizing certain substation design elements without standardizing inappropriately. The result is true application engineering with implementation efficiency, a benefit to you. Modularization capitalizes on our people's wealth of experience, education and training, and enhances innovation and refinement. You, the customer, are involved throughout the

design process to ensure that all technical needs are met. GE has found that this substation design process results in the most cost-efficient design and, ultimately, the most cost-efficient substation.

Everyone starts with the same engineering

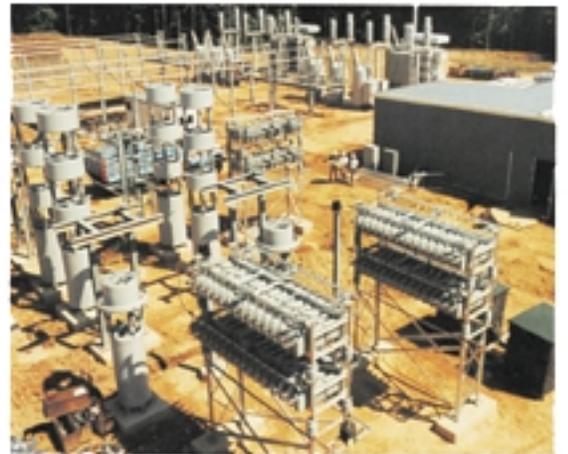


Some notable examples of GE substation engineering solutions.

Substations are not just islands of chain link fence, gravel and grey shapes. Siting of substations can be a real issue. The way in which power arrives and leaves, and is protected in-between, gets intricate. Transmission lines can be costly, and their cost can be altered by the substation design. The following three examples illustrate GE solutions to unique problems, and showcase the level of concern and depth of expertise that we will bring to your project.

✦ **Electrical engineering challenge:** A major northeast railroad needed to convert a utility's 230 kV 3 ϕ , 60Hz ac power to 138kV 1 ϕ , 25Hz. The \$15 million dollar project was awarded to GE because of the electrical complexity of the problem and proven performance of the GE substation project business.

✦ **Scheduling and site challenge:** An industrial customer needed to increase incoming power from 34.5kV 15 MVA single feed to 115kV 30 MVA dual feed. Project requirements included the same footprint (size *and* place), isolation of project personnel from the live 34.5kV line, and a new 4800V distribution line between the utility dead end and the new substation. The project had to be completed with *no outages* during plant production hours. GE built a temporary substation that solved the isolation and downtime situation while the new substation was built



game plan — the difference is qualitative

“over” the old substation. Equipment included two 15 MVA transformers with SF6 switches, and 4800v Power Vac switchgear. A GE-equipped control house was built, and work requiring shutdown was completed on holidays.

✦ **Gas insulated substations for special sites:** Extremely small sites or stringent appearance standards have created the compact — but complex to engineer and build — gas-insulated substation. To date, we have designed and installed more gas-insulated substations in the United States than any other constructor.



1st

GE project managers are highly trained, know state-of-the-art equipment, and are field experienced. They are supported with the latest tools and can make their decisions confident of the backing of company resources. Training includes courses in business, labor relations and, of course, overall project management. When you work with a GE Project Manager, you should expect the best in a professional, productive approach.

2nd

GE has focused its substation management and design expertise in a dedicated organization called the Power Equipment Projects business. This team supports the project manager with all required drawings, bills of materials, and customer interfaces. The entire GE substation team knows how to handle the expected and unexpected.

3rd

... is depth of resource. GE has many highly qualified project managers, and we can call upon field engineers from a worldwide network of GE offices. In addition, if difficult problems arise, GE can bring to bear other resources to solve technical or logistic problems.

The evolution from quality engineering to



With the engineering approved, project management takes over - and when projects are well run, the intended quality is maintained or even enhanced. Good project management also builds a relationship of mutual confidence that promptly solves unforeseen yet inevitable problems. GE project management instills customer confidence with proven techniques, attention to detail and excellent communications. And we believe we deliver the highest quality substation you can buy.





GE has been in the substation project business for 20 years and has completed over 150 successful substations. Customers choose GE for precisely the reasons you might expect:

- ✦ Permanent and dedicated engineering expertise and depth to tackle the largest and the most technically complex substations.
- ✦ GE project management staff to run the largest substation projects, technically and organizationally, to meet your schedule.
- ✦ Proven leadership in the manufacture and application of substation equipment, as well as a network of GE service centers to provide ongoing support.

Sometimes the least tangible reasons to choose a turnkey supplier are the best ones.



substations ultimately cost the least

Responsibility. If we are the single source design/builder, GE will accept project responsibility and will employ the most cost-effective design and materials that meet the application needs. Our contract will clearly define the guarantee on our work. GE has earned the reputation of having the resources and attitude to make good on promises made.

Customer orientation. GE's experience in manufacturing substation equipment is a significant design strength, and the quality of our equipment will meet or surpass any need. But if another manufacturer's equipment better fits the application or delivery needs of the project, that will

be considered. This is but one example of our customer orientation. There are many other valuable reasons to choose GE. Test us.

