100+ professional engineers, strategically located throughout the U.S, and collectively registered in every state to meet licensing requirements.

Schneider Electric Engineering Services
Power System Design & Upgrade Capabilities

We offer industry-leading expertise to address your design and upgrade challenges to help ensure safe, reliable and continuous power.

Our professional power system engineers will assess the condition of your power system, perform the necessary analytical studies, develop appropriate designs and implement the solutions that optimize your capital and operational expenditures and improve efficiency.

Whether you are looking for a turnkey solution, feasibility study or basic design consultation, Schneider Electric Engineering Services is your trusted partner for electrical system design and upgrades.

Expertise to Meet the Most Challenging Design & Upgrade Projects
Full-Scope Design & Commissioning Services
Project Portfolio

Any brand. Any industry. Any time.
Expertise to Meet the Most Challenging Design & Upgrade Projects

**Substation and Power Distribution System Design**
We have the expertise and resources to meet all aspects of substation construction, remodeling, and/or expansion needs for utilities and industrial facilities. In addition to our industry-leading products and services, our portfolio includes constructing multi-megawatt solar photovoltaic generating stations.

**Switchgear Modernization and Upgrade Design**
Modernization solutions minimize downtime, improve power system reliability and extend the life of your equipment by upgrading your switchgear or motor control centers to current technology. We provide a detailed scope of work to help ensure the optimum solution for your facility.

**Control and Protection System Design and Upgrades**
This turnkey solution - which includes data collection, analysis, installation and commissioning - is designed to improve reliability and operational efficiency. Applications: electromechanical relay upgrade, synchronous motor control package, automatic transfer systems and arc flash reduction technologies.

**Power Generation Design and Commissioning**
New installation or upgrade generator connection solutions for permanent and temporary (trailer mounted) generators. Design and commissioning of parallel generators for reliability improvement, peak shaving and islanding applications.

**Power Factor Correction / Filter Design**
Turnkey design engineering, procuring and installing the power factor correction and harmonic filtering equipment from 480 V to 345 kV.

**Grounding System Design**
Design and commissioning of switchyard and building grounding and lightning protection systems.
Full-Scope Design & Commissioning Services for Installations up to 345 kV

Concept / Feasibility Study
A well-executed feasibility study reduces the time and expenditure in developing the final design and assures a good balance between the project objectives and costs. This phase of the project evaluates alternatives, generates preliminary one-line diagram and physical layouts and formulates cost estimates. It develops an overall plan for the project that considers constructability, sequencing and project phasing in addition to cost, schedule, quality and impact on continuous processes. Issues pertaining to permitting and the requirements of local authorities having jurisdiction are identified early during the feasibility study.

Detailed Design Capabilities
Delivery of a complete final design, specifications and bid package for the project. Our specialized design teams include professional power system engineers, skilled construction personnel, and personnel experienced in power system protection. Our engineers utilize state of the art 3D modeling of your facility to optimize the electrical installation.

Project Management
Using our established and proven system, our experienced project managers are qualified to manage costs, plan resources and schedule multiple vendors to deliver a complete turnkey solution.

Commissioning Services
Start-up services verify the equipment has been properly installed and is safe to energize. Proper commissioning ensures the main power path as well as the controls, monitoring and protection systems are functioning to deliver the overall level of reliability stipulated in the system design. Our services include operator training and operation manuals.
For over forty years, our power system engineers have completed over ten thousand power system assessments, designs, and studies for a broad range of customers across many industries.

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Our Value to You

- We have established a proven project management system to help assure that each project is executed with utmost efficiency to optimize the project scope, cost and schedule.

- Our design experts utilize state of the art software and 3D visualization tools to assure the fit, form and function of our physical designs of the electrical infrastructure.

- We have established multiple regional engineering operations located strategically in the United States. Having a local power system engineer assures familiarity with authorities having jurisdiction, local codes and standards, utility systems and operations.

- We have been involved with standard-making bodies such as IEEE and NFPA, and have been on the forefront of implementing design enhancements based on upcoming changes to existing industry standards.

For more information:

☎ 888-778-2733  
🌐 www.schneider-electric.com
Replacement of a 161 kV power transformer supplying half of the plant's 40MW+ load to improve reliability and account for process expansion.

- Included significant modifications to the 161 kV structures and bussing, doubling the size of the existing substation to cover the facility's power needs for growth in the foreseeable future.
- Established the optimal size for the replacement transformer and the design of parallel transformer operation to optimize load sharing.
- Automatic load tap changers on each transformer were integrated in a common scheme for parallel operation and power factor and harmonic filtering capacitors were optimized.
Replacement of a 7MW power transformer with a new 10MW unit.

- The design work included a site geotechnical survey, foundation designs and grading plan.
- Provided equipment layout, along with all civil, structural, oil containment and seismic calculations.
- Project required consideration for the remote, harsh desert climate.
- A new recloser, voltage regulators and disconnect switches were installed to replace the existing equipment.
- Conducted short circuit, load analysis, power quality, time current coordination and arc flash analysis.
Design a medical center’s new data center, which included a transformer paralleling system to allow redundancy.

- Evaluated three UPS topologies of rotary and static design to select the optimum solution.
- Designed a voltage sag control system per Semi F47 standard for the MRI, X-Ray and CT scan equipment.
- Conducted site testing and verification of the system.
Schneider Electric Solar Station

Concept / Feasibility - Detailed Design - Project Management - Commissioning

1MW solar generating station designed for the dual purpose of renewable energy generation and research and development of new inverter technologies.

- Innovative equipment design allows flexibility in selecting the DC voltage; site is fully configurable for 600V DC or 1000V DC from solar arrays.
- This was the first 1000V DC solar field installation in the US under the jurisdiction of the National Electrical Code.
- Inverter installation provides flexibility to beta test new inverter designs.
- Complete design of the photovoltaic field included soil analysis, hydrology, grading, rack design and field combiner boxes.
Paper Mill  (Confidential Client)

**Detailed Design - Project Management - Commissioning**

Complete turnkey replacement of PCB filled transformer and substation equipment.

- Design, supervise installation and commissioning of the system.
- Extend the existing concrete pad and open a wall to remove the existing equipment.
- Supervise installation of new equipment which included:
  - Transformer differential relay testing and commissioning.
  - The application of a virtual main concept to reduce the arc flash energy on the 2400 V motor control center on the secondary side of the substation.
Goodyear Tire and Rubber

Detailed Design - Project Management - Commissioning

Engineer, procure and construct a 35 kV, 7.5 MVA distribution class substation.

- Complete physical design of the switchyard bus structure and supporting frames using three-dimensional CAD.
- Soil evaluation and grounding plan, civil and structural design of the footings and the control building.
- Arc resistant 2400 V switchgear equipment and a full protection relaying scheme designed to mitigate the effect of arc energy in case of an arc flash event.
Veteran’s Administration

Detailed Design - Project Management

**Turnkey project to demolish the existing medium voltage (MV) switchgear and design, install, start-up and commission the replacement equipment.**

- Replace aerial power poles, underground MV feeder conductors, site grounding and generator controls (field excitation, automatic start, human to machine interface graphics).
- Conducted short circuit, time current coordination and arc flash analysis.
- Developed algorithm for generator testing per the Joint Commission requirements.

Source: www.boise.va.gov/images

- The system was capable of operating automatically or manually in an open transition or closed transition mode in conjunction with a load shedding system on the feeder breakers.
- The power transfer and control system also interfaced with the building management system.
- Design and build a separate custom control panel to house the controls including the PLC, touchscreen and other control equipment.
- Hot Standby PLC equipment was used, along with a control power transfer scheme to achieve high availability and a redundant system.
Add standby generation to an existing system with two utility feeds and a tie breaker.

- Design and install an additional switchboard section to add the generator feed to the line-up.
- Design and build a separate custom control panel to house the automation components, including the HMI touchscreen.
- The system can operate in a manual or automatic mode in either open or closed transition.
Replace electromechanical synchronous motor field controls with solid state controllers on seven 1800 HP motors. Replace electromechanical relays on the motors’ supply circuit with solid state multifunction relays.

- The project required complex scheduling to assure that adequate pumping capacity was maintained during the retrofit construction.
- Re-traced all wiring to establish the existing configuration.
- Supervised removal of old components and the installation and wiring of new components.
- Revised protective relay settings to reflect the new capabilities.
- Performed commissioning tests to ensure proper functionality.
- Trained the station staff and provided a complete set of as-built drawings.
Chemical Plant (Confidential Client)

Detailed Design - Project Management - Commissioning

Upgrade relays for two main circuit breakers in 40-year-old 4.16 kV switchgear. Replace electromechanical relays and instrumentation in each main section with electronic transformer protection relays and power quality monitors.

- Generated demolition drawings to allow for the field modifications without interrupting critical parts of the protection system.
- Provided detailed installation drawings showing integration of the new relaying, control and instrumentation with the existing switchgear.
- Generated new door elevations so new switchgear cubicle doors could be fabricated and installed.
- Developed relay setting databases.
- Generated a detailed commissioning procedure that was used to field-test the relays and the overall control system functionality.
Power Generation Design

Replace existing 480 V diesel electric generators with new 12.47 kV equipment to provide 20% load growth. Design, procure, install and commission five new 1.5 MW medium voltage generators.

- New switchgear design included fully automatic controls for utility paralleling operation. Rerouted some medium voltage circuits for increased reliability and redundancy.
- Additional design scope included new switchgear relaying scheme, engine generator control system, fuel systems, enclosures, cooling packages, exhaust packages, structural modifications and load banks.
- Continuous generator run testing and personnel training were included in start-up and commissioning. Load monitoring, load flow, short circuit, time current coordination and arc flash studies were performed.
- System is capable of operating in full island mode, providing power for all critical and non-critical loads.

VA Medical Center (Portland, OR)

Detailed Design - Project Management - Commissioning

Source: www.portland.va.gov
Power Generation Design

Turnkey design project to install a new 800 kW engine-generator set, with automatic transfer capability upon loss of utility supply.

- Generator sizing, site survey, development of plans and specifications, and preparation of documents suitable for construction, permitting and review. Scope included sourcing all necessary equipment for the project.
- The diesel generator set was specified and designed to include reduction of NOX exhaust emissions, site sensitive sound/emission requirements, minimizing visual impact and fuel containment.
- Project was heavily weighted towards meeting fuel consumption metrics plus life cycle costs based upon expected time between overhaul of engines.

UPS (Coppell, TX)
Firestone Building Products

Concept / Feasibility - Detailed Design - Project Management - Commissioning

Turnkey project to replace old 4.16 kV switchgear with two new lineups of metal clad equipment, relocate a transformer, design the grounding system and re-design the electrical room layout.

- Replace existing conduit and wire system with a new cable tray system and armored cable.
- Design and install a new filtered capacitor bank.
- Provide remote mimic panels for circuit breaker control operations to minimize arc flash exposure of personnel.
Power Factor Correction & Filter Design

Design a 13.8 kV automatically switched capacitor bank to provide power factor correction at the facility.

- Performed harmonic distortion and loading measurements.
- Developed the specifications for required power factor correction equipment based on historical loading levels, the utility billing structure, and the measured distortion levels in the facility.
- Provided technical specifications for the capacitor bank configuration to accommodate harmonic-producing VFD loads, conducted an economic analysis to establish the project payback.
- Physical design of the filter bank and feeder and protection system design were included.
Grounding System Design

Replace existing 4.16 kV diesel engine generators with new 480V equipment and step-up transformers; design high-resistance grounding system.

- Demolish existing LV switchgear line-up at each location.
- Furnish and install replacement switchgear with two 300 kVA transformers.
- Installations included disconnect switches and high-resistance grounding.
- Provide temporary power to maintain facility operations until new equipment was commissioned.
Grounding System Design

The Solar Decathlon is a competition among 19 universities; each tasked with the design and construction of an energy efficient residential home (approx. 800 sq.ft). Temporary power was provided by a feed from the nearby facility.

• Designed and supervised the installation of the power distribution and grounding network to the entire site.

• The grounding system was designed to prevent shock hazards to the public, help quickly isolate ground faults, and be removable and not intrusive, given the national park setting.

• There were limitations on ground penetrations imposed by the park regulations due to the park being located on a peninsula between two bodies of water with a high water table. The design employed the allowable grounding electrodes arranged in a network that met the safety and protection requirements.

Source: www.solardecathlon.gov