

Electrical Engineering Services & Solutions for Utilities

Line card—transmission, substation and distribution offerings

Powering tomorrow with grid modernization engineering services and solutions

Eaton helps to modernize utility grids to incorporate new technology, upgrade existing technology and support daily system needs.

- Investor-owned
- Municipal
- Cooperative
- Transmission
- Independent power producers

Energizing a world that demands more

Eaton brings new dimensions of expertise to help utilities improve reliability, drive operational efficiencies and reduce costs. Utilities rely on Eaton to assist them in protecting people and assets, processes and the environment with products and solutions that can enhance every aspect of their business—from safety to reliability. Through our grid modernization, design and build and substation automation and commissioning services, we enable our customers to achieve a safer, automated, secure and cost-effective substation and grid. Eaton delivers support in the wake of extreme weather conditions, aging infrastructures, workforce changes and stakeholder expectations, all while managing power, complying with local and federal government regulations and emissions standards, and providing solutions that help utilities make smart capital investments for the future.

Eaton's service team is one of the largest and most experienced teams of power system engineers in the industry, with industry-standard software and advanced modeling and analysis capabilities at their fingertips. Their comprehensive portfolio of design services includes safety studies and energy management, power quality and reliability audits. Eaton's extensive services offerings combine a geographically dispersed field organization to support testing, troubleshooting, maintenance and emergency needs with a dedicated turnkey projects organization to solve the most difficult power management problems.

Eaton understands your business requirements and sets strategies for your power system. With Eaton's help, you'll witness a range of business benefits, from reduced costs to a more effective use of assets. Our engineering and consulting services help you manage your power system as a strategic resource, providing cost-effective solutions to increase safety, reliability and efficiency.

EATON

Powering Business Worldwide

Our Electrical Engineering Services & Systems team provides tailored solutions for grid modernization to help you with every stage of a power systems life cycle. Our portfolio of services and solutions aligns with your operational goals to keep your power systems safe, cyber secure, efficient, reliable and ready for Internet of Things (IoT).

ENGINEERING SERVICES

Eaton's engineering team offers the expertise, proven design experience and support structure to successfully complete your project, from design to system analysis and simulation, for your transmission and distribution system. Our full range of advanced electrical system studies offer utilities the most focused and systematic approach to system changes, enabling you to enhance power system performance and identify potential problems before they impact your system. Eaton provides a full scope of design and construction management services throughout the project life cycle.

Substation automation

- Turnkey (EPC) solutions
- Engineering and design
- IED/RTAC/RTU
- Substation integration (EMS/SCADA/utility communication)
- Drawing packages
- Event recorders
- Testing, startup and commissioning

Protection and control

- Engineering and design
- Redundant protection
- IED/relay (modernize or replace, legacy electro-mechanical, digital technology)
- Power circuit breakers (recondition, upgrade or replace)
- DC control power/batteries
- CT/PT/CCVT
- Integration and communication

Embedded engineers and augmented staffing to support technical engineering

- Utility on-site support
- Commissioning engineers
- Equipment setup
- Equipment manufacturer agnostic

Distribution automation

- Includes technical support for capacitor banks voltage regulators and reclosers
- Volt-Var optimization
- Yukon™ feeder automation
- GridAdvisor™
- VaultGuard™

System design and monitoring

- New substation design and construction
- Substation ground grid design
- Protection and control design
- Distribution system design
- Dynamic simulation
- Training
- Generator, transmission and distribution system design
- Energy storage
- Station layout/upgrade
- Utility substation design criteria
- Power transformers, circuit breakers, station batteries, protection and control, metering
- Microgrid design, engineering and turnkey installation
- Alternative power generation design, engineering and grid integration
- Monitoring solutions: power quality and energy management
- Motor control center systems integration to parent system
- Control systems / power systems automation
- Programmable logic controller (PLC) automatic transfer schemes
- Power system design

Power system, safety and reliability studies and analysis

- Load flow analysis / power factor correction studies
- Switching transient analysis
- Ground grid analysis
- Power quality services: site surveys, power system investigations, power system audits, troubleshooting
- NERC compliance
- System impact / transient stability studies
- Microgrid feasibility studies
- Integration capacity analysis (DER impact)
- Insulation coordination studies
- Harmonic analysis
- Distribution systems reliability analysis
- Motor starting studies
- Short circuit analysis/equipment evaluation
- Protective device evaluation
- Protective device coordination
- Arc flash

Turnkey services

- Modular solutions—including modular integrated transportable substation (MITS) and padmounted reclosers
- Complete turnkey substation expansion and refurbishment
- Remote terminal unit turnkey replacement services
- Turnkey substation capacitor bank design, installation and commissioning
- Construction services including site, civil, electrical and structural
- Standardized documentation practices including scheduling, reporting and project closeout
- Installation services including subcontracting capability of all trades with on-site project management
- Turnkey synchronous condenser projects
- Mobile apparatus including substations, voltage regulators and switchgear
- Multi-vendor equipment supply chain
- Supply of the complete range of Eaton products
- Coordination and purchase of all third-party customer-preferred components
- Prefabricated control house
- Modular collector substation
- Utility grid management and monitoring systems
- Demand management



FIELD SERVICES

Eaton's engineering services focus on understanding your business requirements and setting strategies to ensure long-term, efficient and safe operation of your power system. Our engineers and consultants can help diagnose problems and identify ways to improve performance, or transform concepts into flexible, practical solutions that can improve productivity and capital utilization. Eaton can help keep power systems safe, efficient, reliable and up to date.

Startup and commissioning

- Acceptance testing and installation certification
- Ground fault certifications
- Interconnect confirmation and commissioning
- Warranty extension
- Installation support and supervision
- Startup and training
- Ground grid testing

Preventive and predictive maintenance

- Maintenance program design and implementation
- Periodic testing and maintenance services
- Thermographic surveys
- Troubleshooting/testing
- DC power systems
- Ultrasonic partial discharge detection
- Transformer oil processing
- Battery/cell testing
- Generator load bank testing
- Transformer/breaker oil testing
- Contact alignment

Maintenance and emergency services

- Complete scope of testing, repair and evaluation
- Short-/long-term maintenance contracts, 24/7 support at 1-800-498-2678
- Crisis response personnel dispatch

Direct results tests

- Insulation resistance
- Contact resistance
- Turn ratio testing
- Primary injection testing
- Secondary injection testing
- Dielectric withstand test—hi-pot (destructive)
- Breaker injection testing
- Protective relay testing and calibration
- Power factor
- Ground grid testing
- Transformer/breaker oil test and breaker time/travel test

ENGINEERED SOLUTIONS AND EQUIPMENT MODERNIZATION

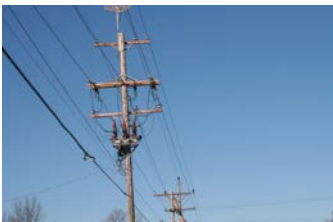
Eaton's engineered solutions and equipment modernization offer cost-effective renovation to existing equipment, with minimal power interruptions and without total replacement. Eaton's solutions extend the useful life of aging electrical power systems by providing safe and reliable reconditioning of existing equipment, as well as new replacement circuit breakers and other components that improve reliability and safety in existing power systems.

Switchgear modernization and upgrades

- Power breaker reconditioning and remanufacturing
- Low- and medium-voltage circuit breaker replacements
- Low- and medium-voltage breaker to motor starter replacements
- Upgrade meters, relays and trip units
- New switchgear doors and remote control panels
- RPR-2 remote power racking systems

OEM equipment services and upgrades

- Westinghouse®/Cutler-Hammer®/Eaton/Cooper®
- Square D®
- General Electric®
- ITE®/ABB®
- Allis-Chalmers/Siemens®
- Federal Pacific®/Federal Pioneer®





About Eaton's Electrical Engineering Services & Systems

Eaton's Electrical Engineering Services & Systems is one of the largest and most experienced industrial service organizations in North America. With more than 1500 highly trained professionals in 60 engineering service locations throughout the U.S. and Canada, Eaton's Electrical Engineering Services & Systems has complete local, national and international capabilities to provide a full range of electrical, civil and mechanical equipment services. This broad range of service capabilities has established us as a leader in the engineering service industry.

Contact your Eaton sales representative or call Eaton Care for more information on Eaton's Electrical Engineering Services & Systems' offerings at **(877) ETN-CARE** or **trc@eaton.com**

Emergency response line: **(800) 498-2678**

For more information, visit **Eaton.com/services**, **Eaton.com/utility** or **Eaton.com/gridmodernization**

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

© 2019 Eaton
All Rights Reserved
Printed in USA
Publication No. SA027015EN / Z23042
August 2019

Eaton is a registered trademark.
All other trademarks are property
of their respective owners.

Follow us on social media to get the
latest product and support information.

