



Engineering services for hydroelectric power plant modernization

North America's hydroelectric power plants are aging and reaching the end of their lifecycles. However, the growing population, electrical demand and governmental regulations, not to mention the cost and time factor for building new to meet green electrical standards, makes modernization of these plants imperative.

Modernization can consist of several approaches including upgrading equipment and control and automation systems. As a power station equipment supplier, Eaton offers decades of experience working with large and small hydroelectric power systems to bring them into the twenty-first century and beyond. We offer exceptional, highly customized turnkey project management, electrical protection system upgrade services, along with our switchgear modernization program and hydro automation solutions to improve the efficiency, reliability and safety of your hydroelectric plant.



Project management and design solutions

Hydro automation and modernization projects can be complicated — with many vendors to manage, deadlines to meet and details to oversee. **Available turnkey services** simplifies project implementation. Eaton takes care of it all.



Modernize electrical infrastructure

Reliable switchgear systems are vital for facility operations, but completely replacing these units can represent a significant capital investment. Eaton's switchgear modernization offers **cost-effective renovation** to existing equipment, with minimal power interruptions and without total replacement.



Maintain safe, reliable and efficient operation

A properly designed and operated power system can save you money and increase productivity while meeting the growing and changing demands of your business. Eaton's portfolio of electrical studies and field services are designed to **update and revitalize** existing systems to achieve reliable, efficient and safe operation.

EATON

Powering Business Worldwide



Project management and design solutions

Eaton offers full turnkey services to the hydroelectric power industry for electrical infrastructure updates. Our expert engineers take your project from conception to completion, following rigorous execution and management processes. With our turnkey services, you'll have a single point of accountability and a reduced risk of project delays and failures. The result is a safer, more reliable and cost-efficient power system.

- Design services: equipment specification, drawings
- Civil, mechanical and electrical design services
- Switchgear upgrade — 480V thru 15kV class
- Generator breaker upgrades up to 6000A and up to 15kV with new Eaton breakers
- Exciter replacement and/or modernization
- Digital hydraulic governors
- Complete generator control system modernization — PLC & HMI
- High resistance grounding
- Power systems studies
- Power system protection and relay settings
- Demolition and site renovation
- Substation yard upgrades
- Startup and commissioning services
- Site assessments and evaluations
- Owners' engineers and consulting services
- Remote control and monitoring (SCADA)



Modernize electrical infrastructure

Our 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.

Low voltage air replacement breaker

- Eaton's Magnum DS breaker technology
- Available with arc flash reduction maintenance switch technology
- Designed for easy access, inspection, and minimal maintenance.
- Designed and tested to IEEE/ANSI standards

Medium voltage vacuum replacement breaker

- Vacuum replacement for outdated technologies
- Uses Eaton's VCP-W vacuum breaker technology
- Available with patented SURE CLOSE Technology
- Some models available maintenance free for 10 years or 10,000 operations, whichever comes first
- Over 200 designs currently available for most ANSI manufacturers

LV and MV breaker-to-motor starter replacements

- Solutions for systems that apply power circuit breakers as motor starters
- Drawout capability
- Switching duty life of 250,000 operations
- Current limiting fuses as primary fault protection



Maintain safe, reliable and efficient operation

Eaton's portfolio of electrical studies and field services are designed to help your system operate more reliably, efficiently and safely. With one of the largest and most experienced teams in the industry, Eaton offers a wide range of options to meet your hydro plant needs.

Power systems studies

- Arc flash studies
- NERC compliance study
- Coordination / short circuit/fault current studies
- Load flow and power quality study
- Grounding assessment and ground grid design
- Transient stability study

Outage support capabilities

- Preventive maintenance and testing of electrical equipment
- Inspection and emergency repair of uninterruptible power supply and emergency power generation systems
- Transformer and breaker oil analysis, maintenance and testing
- Partial-discharge testing and analysis
- Thermographic surveys
- Arc flash reduction solutions
- MV and LV circuit breaker maintenance, testing, and Class 1 reconditioning
- 24/7 emergency response

Safety solutions

- Arc flash studies, training and mitigation products
- Arc Quenching switchgear solutions
- Remote power racking system

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.

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