



North America's aging hydroelectric plants due for modernization

North America's hydroelectric plants are aging and reaching the end of their lifecycle. Increased governmental regulations, not to mention the cost and time factors for building new to meet electrical demand, makes modernization of these plants imperative.

Modernization and automation projects can be complicated—with many vendors to manage, custom engineering, deadlines to meet and details to oversee. Often, projects extend past planned timeframes and budgets because of the difficulties in maintaining control of the operations.

With the expense and coordination that goes along with large-scale projects, it makes sense to have a dedicated, experienced engineering and project management team to ensure the project is built to last several decades longer and managed properly to meet deadlines and budget requirements.

Eaton Electrical Services and Systems' Project Operations Group offers full turnkey services to the hydroelectric industry, from water to wire. 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.

Services that Eaton can offer:

- Switchgear upgrade – 480V thru 345kV class
- Generator breaker upgrades with new Eaton generator class breakers
- Exciter replacement and/or modernization
- Complete generator control system modernization – PLC & HMI
 - Turbine / governor control upgrade & auto synchronization
 - Mechanical to electric governor installation
 - DC brush replacement
 - Bearing lube oil system upgrades
 - New gate control system
 - New protective relay design and implementation



There are over **79,000 Dams** in the **United States.**

- 2,066 of these dams have a primary purpose of generating electricity
- Thousands of others have a primary purpose other than generating electricity but still generate power as a secondary function.

Over **63,000 dams** were built before 1970.



Powering Business Worldwide



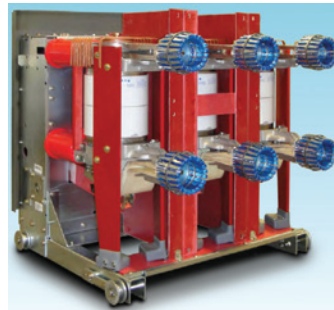
Additional offerings

- High resistance grounding
- Demolition and site renovation
- Substation yard upgrades
 - Transformer replacement
 - OCB's with vacuum replacement or SF6 breakers
 - Civil demolition and construction
 - Electrical demolition and construction
 - Conduits, cables, steel structures, equipment placement
- Design services
 - Equipment specification
 - Drawing development including civil design
 - All electrical power system studies including arc flash
- Commissioning services
 - Startup of all electrical and mechanical components
 - Commissioning of the entire system



3000A All Stainless Steel Construction OCB-VR

Eaton's vacuum-based generator breaker replaces older oil or gas-filled breakers in environmentally sensitive hydro locations.



Eaton Generator Breaker

Eaton's Drawout Generator Breaker employs innovative technology to handle high continuous AC current and voltage and then safely switch through extreme out-of-phase voltages and high-stress asymmetrical currents.

For more information visit www.eaton.com/EESS or www.eaton.com/utility.

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