

# Emerson Hydropower Solutions

## Improve Hydroelectric Power Plant Performance and Reliability While Reducing Costs

In today's competitive power generation market, hydro power plants play an important role in quickly and cost-effectively producing dispatchable electricity to the grid. However, aging plant equipment presents operating, maintenance and reliability challenges that may affect the commercial viability of these assets. Emerson's hydropower solutions modernize plant control systems and mechanical equipment to balance optimal power generation and water use for faster response to grid demands, reduced costs and adherence to compliance regulations. Ovation™ automation technology digitally transforms hydro operations by leveraging Industrial Internet of Things (IIoT) data to provide actionable information for better decision making. Skilled project teams apply hydropower knowledge and field-proven expertise to formulate tailored solutions for dam (impoundment), run-of-river (diversion) and pumped storage plants.



**Reliable**

Scalable solutions designed with power industry-specific control strategies that optimize plant performance, increase availability and improve reliability.



**Integrated**

A single platform centralizes data from control and business systems, PLCs and field devices to provide a comprehensive view of plant or fleet operations.



**Secure**

Native Ovation security features enhanced by dedicated cybersecurity products and services help meet compliance obligations and protect against cyber threats.



**Custom**

Plant-specific solutions, engineered based on unit characteristics and automation needs, are executed to meet schedule and budget requirements.



**Experienced**

Dedicated, experienced control and mechanical team provides full scope project services including expert design, management and implementation.



**Trusted**

Comprehensive products and services provided by a single, trusted vendor with a history of dependable, long-term customer service and support.

**OVATION™**

**EMERSON**

# Emerson: One Company Delivering Comprehensive Hydropower Automation

Tightly integrated Ovation control strategies and Emerson-designed mechanical equipment form a solution that increases accuracy, extends long-term reliability and optimizes plant performance. One Emerson team composed of power industry control and mechanical experts design, manage and startup each project. After commissioning, services personnel join the team to provide ongoing support and technical assistance.



The U.S. Department of Homeland Security has designated Ovation control solutions as Qualified Anti-Terrorism Technology. This Designation provides significant tort protection for claims arising out of acts of cyber terrorism as defined under the U.S. SAFETY Act. The Designation covers Emerson's Ovation control system, Power and Water Cybersecurity Suite and cybersecurity services. For more information visit <https://www.safetyact.gov>.

## Control Solutions

### Ovation Digital Governor Control

Mechanical, analog and digital governor upgrades provide immediate, accurate response to megawatt setpoint and frequency disturbances.

### Ovation Unit Control

Self-documenting, IEC-61131-compliant sequenced-based control with online diagnostics enables consistent unit startups and shutdowns.

### Distributed Automatic Generation-Load Control

Embedded industry-specific algorithms economically allocate power demand to generating units for faster and more accurate response to load changes.

### Plant/Fleet Optimization and KPI Calculations

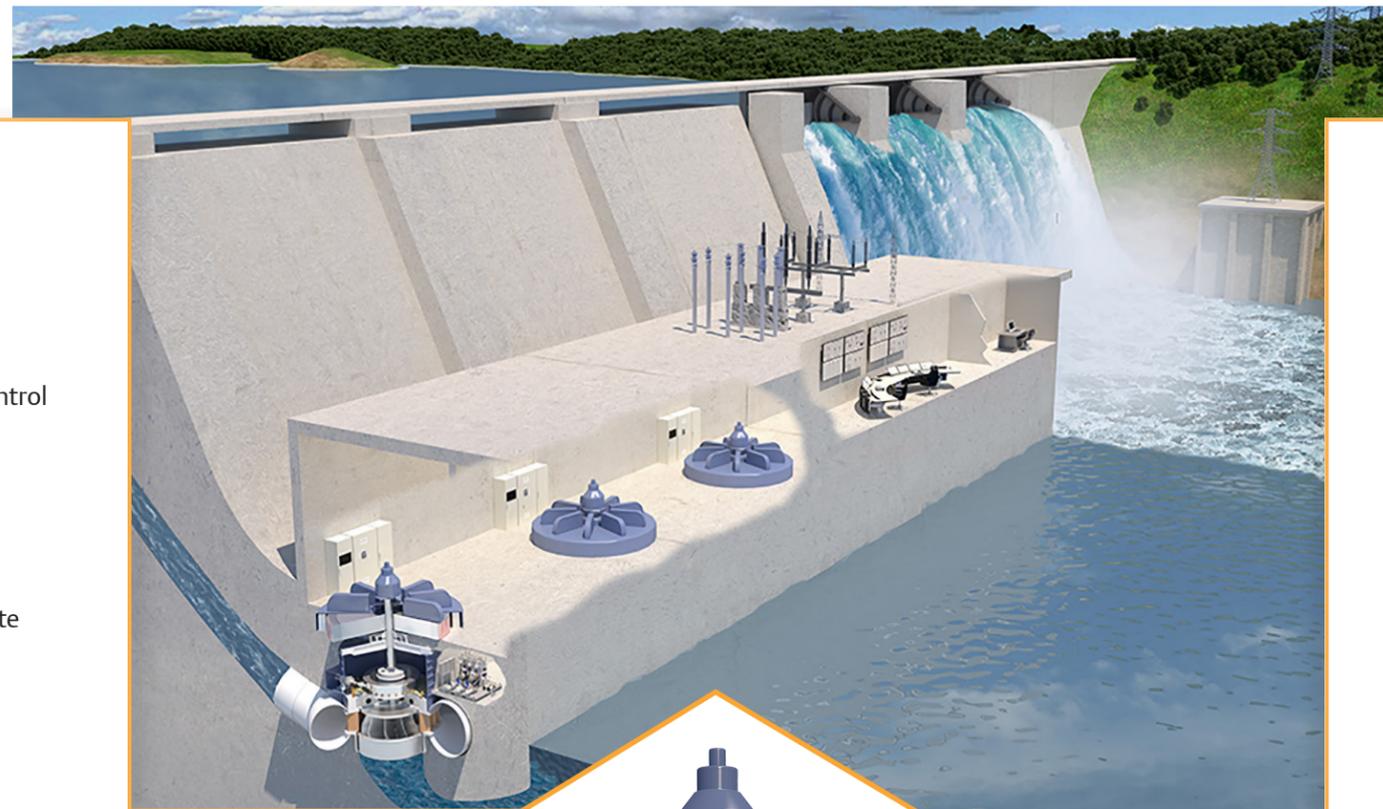
Advanced applications efficiently distribute load setpoints among available operating units or plants to cost-effectively meet demand while minimizing unit wear.

### Vibration Monitoring and Excitation

Integrated unit control, vibration monitoring and excitation on a single platform streamlines engineering, enhances operations and reduces maintenance costs.

### Simulation

Digital twin simulation implemented on the control system platform enables proactive testing of new control logic and 'what if' scenarios without disrupting live plant operation.



## Mechanical Solutions

### Digital Governor Interface

Ovation high-speed I/O modules interface to existing governor equipment, eliminating the need for interposing devices.

### Mechanical Governor Upgrade

Ovation digital governor control and mechanical/hydraulic instruments use accurate and repeatable logic that improves wicket gate control.

### Mechanical Governor Replacement

Fully modernized high-pressure electro-hydraulic equipment and controls decrease footprint, improve safety, optimize performance, increase reliability and simplify troubleshooting.

### Speed Sensing

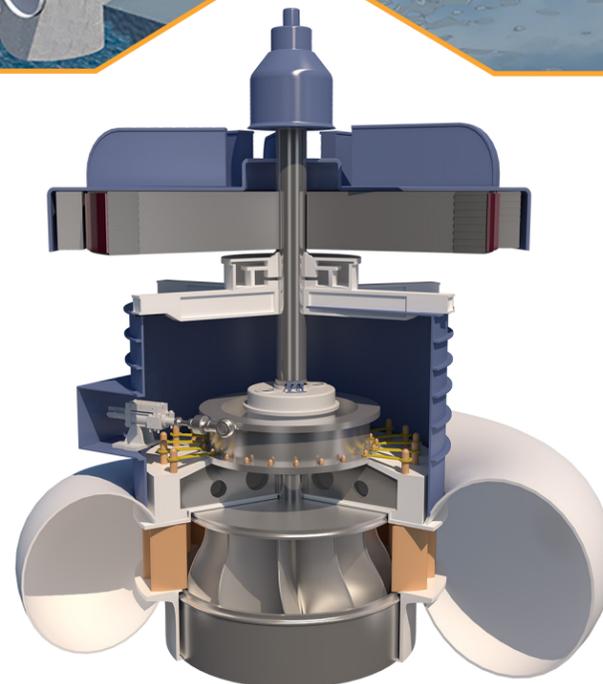
Precise control of speed and zero-speed in addition to creep detection and overspeed protection enable safe, continuous unit operation.

### Trip Upgrade

Online testing and 2-oo-3 voting increases reliability while simultaneously reducing the probability of a false trip that unnecessarily shuts down a unit.

### Plant Mechanical Solutions

Additional solutions are available for modernizing spillway gates and penstocks, upgrading vibration sensors and replacing vintage OEM parts using 3D laser scanning.



# Ovation: One Platform for Integrated Hydro Control & Monitoring

Emerson continues to evolve Ovation technology well beyond the boundaries of traditional SCADA systems to include native advanced applications for optimizing hydro power generation, integrated condition monitoring, generator excitation control, specialized turbine I/O modules and scalable footprints for small or distributed applications - all backed by Emerson's comprehensive support programs. Managing plant production with a single Ovation platform improves operations, simplifies engineering and reduces maintenance.

	FEATURE	BENEFIT
 <b>Operations</b>	Common HMIs	<i>Enhances operator decision-making by presenting a single, comprehensive view of all plant processes</i>
	Plant-wide/governor mechanical diagnostics and alarms	<i>Enables plant staff to quickly detect, troubleshoot and correct issues before they escalate</i>
	Common engineering tools	<i>Simplifies control changes and enables in-house maintenance</i>
	Self-documenting control logic	<i>Streamlines engineering by automatically tracking and documenting control updates</i>
	Sequence function charts	<i>Improves operator awareness of process progression</i>
 <b>Engineering</b>	Enterprise data solutions	<i>Provides secure, remote access to near real-time plant data</i>
	Fault-tolerant, built-in redundancy	<i>Bypasses faults for increased system reliability and availability</i>
	System backup & recovery	<i>Fully restores workstations after a cyber or other upset event</i>
	Cybersecurity solutions & services	<i>Automates security program management and helps meet NERC CIP obligations</i>
	High-performance control room services	<i>Drives increased productivity by simplifying how operators view, perceive and react to process data</i>
 <b>Maintenance</b>	Common hardware and software	<i>Reduces costs for maintenance, general support, field services, spare parts and training</i>
	Turnkey (EPC) and expanded scope services	<i>Decreases project risk and streamlines implementation</i>