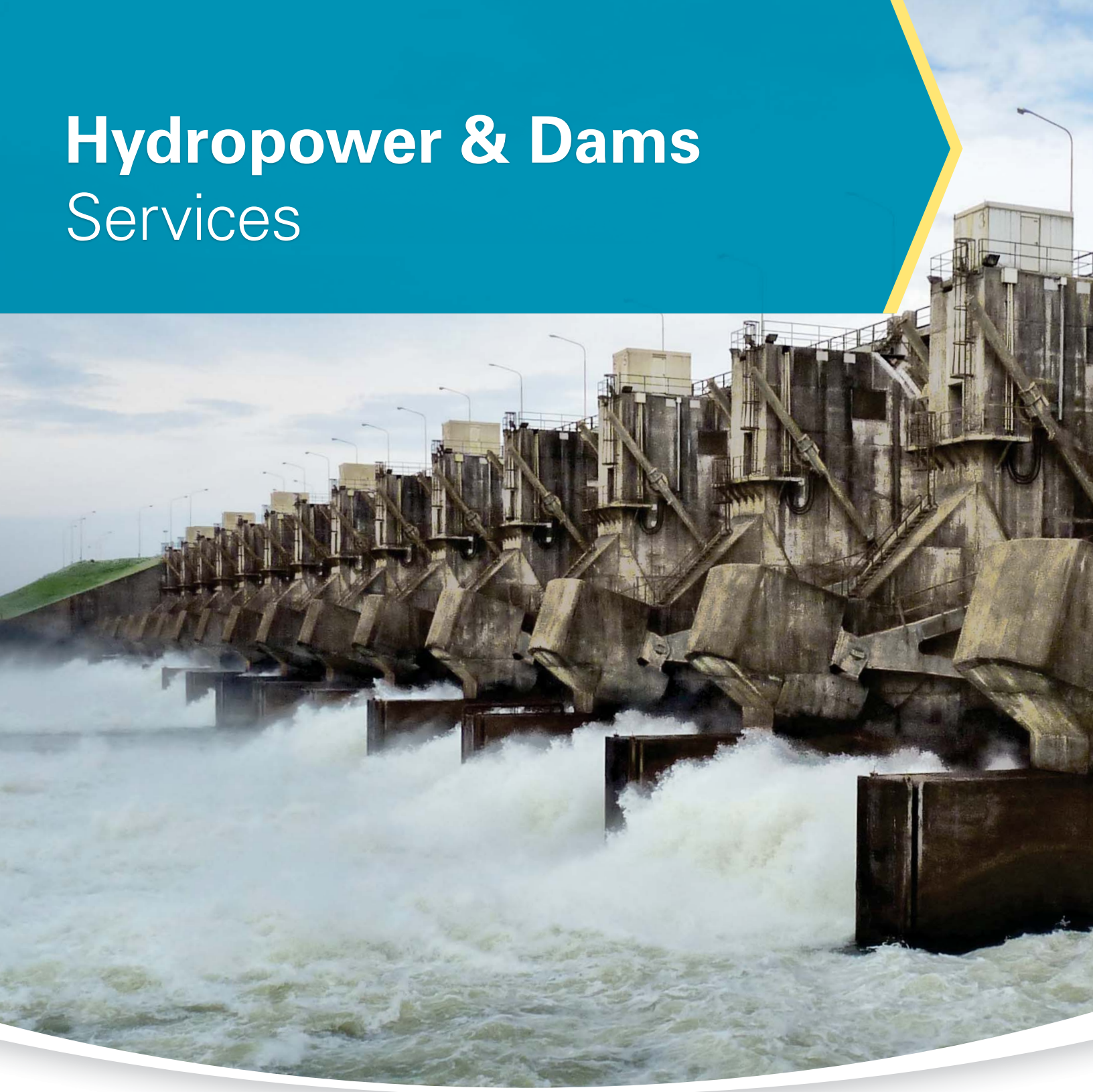
Hydropower & Dams
Services



MWH® now part of Stantec

We represent a world-class concentration of hydropower and dam expertise.

Since 1920, we have designed hundreds of new hydropower and dams globally, producing clean reliable energy and water storage solutions for millions around the world. Our first-class reputation has been earned by delivering projects in 35 countries on six continents.

Our focus is on providing sustainable solutions for our clients and society, whether through the construction of new facilities or improving the safety and efficiencies of existing projects. Our sustainable and economic solutions minimise the impact of hydropower and dam facilities on the environment and surrounding communities while providing owners with safe and reliable long-term performance.

MWH, now part of Stantec leads the industry in **all forms of water power generation**, and provides the consultation needed for clients to make the right, informed, long-term choice.

Pumped Storage

Pumped storage is a clean energy source that has the ability to stabilise energy grids when paired with other renewable energy forms. This partnership provides reliable energy to communities. Our experience includes all forms of pumped storage: single and multiple staged units, single and adjustable speed, and capabilities ranging from the world's largest pumped storage project in Bath County, Virginia producing 3,000 MW to small 40 MW projects. Our clients rest assured no matter the option that suits best, we can support them.

Incremental Hydropower

Currently 97 per cent of the world's dams do not produce power, leaving immense potential for power generation at existing dams. We can change the way the world receives power by utilising already existing infrastructure for hydropower generation. Our team has experience in the rehabilitation, repowering, and upgrade of existing hydropower facilities, as well as the ability to add hydropower generation to existing dams, water systems and treatment plants. Utilities can expect cost saving, sustainable capabilities from us.

Greenfield Hydropower

By leveraging our experience, clients are ensured to meet the environmental, social and international standards needed for a successful project. Our team has designed hundreds of greenfield hydropower projects of all sizes. Our planners and designers are attuned to the principles of sustainable hydropower development, working closely with clients and stakeholders to achieve project objectives in a balanced and responsible way.

Small Hydro

We understand the economics associated with small hydro plants. By providing cost-effective design solutions and knowledge in financing and procurement, our clients are delivered successful small hydro projects. Our engineering experience on new and re-developed small hydro plants over the last 20 years has led to an unmatched depth of understanding on the differences between large and small hydro projects. our experience translates to time and cost saving solutions for our clients.

We provide **services that span the life of a project** guaranteeing success from planning and design to decommissioning.

Regulatory and Permitting

The first step in a successful project is securing efficient, timely regulatory and permitting approvals and public acceptance. In the US, our regulatory team provides expertise in FERC licensing, and performs all the permitting tasks. Our international expertise enables us to provide environmental impact assessments and permitting services across the globe. Clients are confident that projects won't incur costly delays.

Water Intakes and Outlets

Our team of engineers design integral, free standing and multilevel withdrawal intakes for dam and hydropower projects. We meet seismic design criteria, provide selective reservoir elevation withdrawal and help regulate downstream water temperatures. Owners receive the benefit of stable, well thought-through, flexible designs resulting in significant return on investment over the long-term.

Powerhouses

Our global experts have designed powerhouses in all sizes and forms, from one of the world's largest Simon Bolivar (Guri) in Venezuela producing 10,000 plus MW of power to a micro-hydro project in Bulgaria. Our teams are experienced in complicated foundations, drainage improvement, foundation strengthening and remediation. Clients are assured a successful project backed by our expertise.

Water Conveyance Systems

Whether it is reducing head losses or increasing power generation, our water conveyance expertise can meet all project goals with demonstrated experience. The team has designed canals, pipelines and tunnels in a full range of capacity for the smallest to largest systems using a variety of construction materials and applications. With a service that spans the life of a project, we provide success from start to finish.

Dam Construction

Our reputation for innovative, quality engineering extends into all forms of dam design from earth and rock-fill to concrete, from hardfill to roller compacted to rubber. Our blend of expertise and cutting-edge technology delivers world-class results. Clients can rest confident knowing that the design and materials selected have been well vetted across all possible options when working with our team.

Dam Raising

The continuing need for safe reliable water storage has increased the global need for dam raises. With vast experience on dam raising spanning the globe, our team of engineers has the institutional knowledge and experience in the field. We specialize in staged development allowing for incremental completion to meet the ever-changing water and electric needs as well as the economic realities for our clients.

Spillways

Our engineers have provided solutions to resolve spillway issues for more than 300 dam projects throughout the world. We help clients develop practical programs to evaluate and address dam safety, operations and regulatory issues while minimizing costs and service interruptions.

Transmission

With more than 90 years of experience in transmission, we ensure the energy produced is delivered in a safe and reliable fashion. We are experts at building and upgrading substation and transmission lines safely, efficiently and effectively with expertise in transmission, substation and distribution studies, and planning and design analysis.

We ensure our clients **obtain optimal efficiency** throughout their projects' operation.

Asset Optimization

The long-term business objectives of hydropower and dam projects are met when needs are prioritized and the largest possible return on investment is delivered. The team helps prioritize spending while managing the life cycle of a plant in a safe, efficient and reliable fashion. Our team provides an unparalleled combination of engineers and consultants to help define and implement a risk-based asset management program that balances reliability targets and resource limitations, including staff and costs, delivering maximum returns on capital and operations.

Operation and Maintenance Services

Clients need reliable operation of their hydropower facilities in order to deliver optimal economic returns. Our team of engineers offers consulting to help sustain operations over the life of hydropower facilities, producing optimal performance and efficiency. We are available for emergency, quick response needs, as well as support through planned outages and maintenance activities.

Plant Rehabilitation and Upgrade

Rehabilitation and upgrade of current projects can drastically increase a plant's power generation and service life. Our engineers have experience on over 350 hydro rehabilitation projects. Our experience includes the modernization of existing powerhouses and generating equipment, replacing or improving equipment and control systems, providing better reservoir regulation, adjusting reservoir water levels or performing other hydraulic enhancements.

Proven Experience

Ohio River Hydroelectric Projects
United States

We designed and provided resident engineering during construction of four new hydroelectric projects on the Ohio River that will provide a new source of clean, renewable energy for more than 70 municipal electric systems in four states. The facilities are being installed at four existing U.S. Army Corps of Engineers locks and dams and have a combined generating capacity of more than 300 MW. We are providing a full range of multi-disciplinary services, including licensing support, preliminary engineering, hydraulic modeling, procurement, detailed design and resident engineering.

Tekeze Hydropower Project
Ethiopia

We provided design review, preparation of construction drawings, bid packaging and evaluation, and on-site construction management services for this world-class, 188 metre high dam and hydropower project located on the Tekeze River in a remote and mountainous region of Ethiopia. The project provides a clean, renewable source of power for a rapidly growing population and creates opportunities for sustained social and economic growth within the region.

Huanza Hydroelectric Project
Peru

We served as Owner's Engineer on this 90 MW project approximately 130 km east of Lima, Peru. Our scope of services included geotechnical investigations, hydrology and flood assessment, specifications of civil works and E&M equipment, detail design of civil works, steel penstock and miscellaneous steel structures, lighting, and HVAC; review of manufacturers' submittals; factory inspections and test witnessing; construction supervision and commissioning. The project is a run-of-river facility that is providing needed power to the growing Peruvian population.

San Vicente Dam Raise
United States

Our team provided final design and engineering services for the largest raise of a concrete dam in the U.S. and the first major raise of a concrete dam using roller-compacted concrete (RCC) in the world. The project raised the existing dam by 35 metres and added enough water storage to address the region's need for both emergency water storage and use during extended periods of drought, as part of the San Diego County Water Authority's Emergency Water Storage Project.

The MWH community, now part of Stantec, unites approximately 22,000 employees in over 400 locations across six continents. From initial concept and planning through design, construction, and commissioning, our work begins at the intersection of community, creativity, and client relationships. Visit mwhglobal.com and stantec.com, or find us on social media.

We provide responsive service and expertise from offices around the globe:

North America, Latin America, Europe, Africa, India, the Middle East, Asia and the Pacific

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