+ Waterpower

HATCH

"[Hatch's] support with engineering, project concepts and energy modeling, estimating and scheduling, environmental and contract development, and negotiations has been instrumental in getting us to this point."

R.J. Jessop | Project Director, Ontario Power Generation

Powering progress

Efforts to address climate change are spurring heavy investment in renewable energy all around the world. At the same time, developing nations are searching for new sources of electricity to meet the needs of their growing populations.

There are still plenty of waterpower sources available to be harnessed. However, much of the remaining potential is in remote locations and in more technically challenging conditions. We must develop innovative approaches and cost-effective solutions to overcome these challenges and harness the power of these remote sites.

We partner with developers and operators of waterpower facilities in both the private and public sectors to provide full engineering design, procurement, and construction management services. We create value by providing innovative designs, optimized and environmentally friendly solutions, and cost-efficient facilities and structures that can help you obtain financing, select the best sites, secure permits, meet safety standards, manage risks, make informed rehabilitation or replacement decisions, decrease capital costs, and reduce operating expenditures.

In other words, our goal is your goal: to bring the project concept to reality and optimize return on investment, not just for today but for the life cycle of the plant.

Lower Mattagami River project, construction phase, 2012

Global presence local focus

- Hatch offices
- Selected waterpower projects

1 Keenleyside Dam
British Columbia, Canada

As part of an ambitious plan to upgrade the reliability of spillway systems at BC Hydro's fleet of dams, the spillway structures, and associated ancillary equipment was improved at the 48-year-old Hugh L. Keenleyside dam. We acted as owner's engineer and provided design solutions meeting the risk-based approach.

2 Keeyask
Manitoba, Canada

This new hydroelectric generating station will add 4,400 GWh of clean, renewable power to Manitoba's power supply. The project is remote and in a severe northern Canadian climate, requiring innovative solutions.

3 Glen Ferris Rehabilitation
West Virginia, USA

Complete rehabilitation of a 115-year-old hydropower station, including restoration to all eight Francis turbine units. The rehabilitated plant generates 38,000 MW hours per year of renewable power, or enough electricity for 45,000 households.

4 Palo Viejo
Municipality of San Juan Quetzal, Guatemala

This 85 MW hydro project included an innovative design to overcome the challenges of the complex, mountainous natural setting. One innovation included unique 100 m tall siphons, spanning valleys as wide as 250 m and slopes as steep as 60 degrees. The project won a Canadian Consulting Engineering Award of Excellence.

5 Kpong GS Retrofit
Ghana

The Kpong generating station in Ghana is being retrofitted to modernize the entire facility. Kpong is responsible for a significant portion of the country's power production. We are now providing EPCM services following study and front-end work for Volta River Authority.

6 Asahan Hydroelectric Scheme
Indonesia

Technical assessments have been completed on three hydroelectric dams for P.T. Inalum, the owner and operator. The scheme consists of the three dams, two power stations, and a trunk transmission line that provides power for an aluminum smelter as well as for public use.

7 Kariba South Extension
Zimbabwe

The capacity of the Kariba South generating station will be increased by 300 MW to meet national demand. To do so, a new, separate underground powerhouse is being built to house two 150 MW units, each with its own individual penstock and intake arrangement. We're acting as owner's engineer of behalf of Zimbabwe Power Company.

8 Lower Mattagami River Project (LMRP)
Ontario, Canada

The largest hydroelectric project undertaken by Ontario Power Generation in the last 40 years, LMRP added 500 MW of hydro capacity by replacing the Smoky Falls generating station and upgrading three other stations: Little Long, Harmon, and Kipling. The project was delivered on budget and ahead of schedule.

9 Forrest Kerr
British Columbia, Canada

Owner AltaGas was experiencing serious design issues during the construction phase and called upon Hatch to help. We overhauled the design and completed the project on time. The project went on to win a Canadian Consulting Engineering Award of Excellence and the Tree of Life Award.

10 Oxec I & II
Guatemala

Oxec I & II will add 81.5 MW to Guatemala's ongoing program to develop renewable power in the country. To complete the projects, a number of challenging geological conditions had to be overcome, including landslides and flash floods. We're helping Solel Boneh Guatemala with the conceptual study and engineering for Oxec II after successfully completing the detail design for civil components and supporting construction for Oxec I.

11 Chaudière Hydro Revitalization
Ontario, Canada

A project is under way to revitalize and reenergize the Chaudière Falls hydroelectric station, one of the oldest in Canada still in operation. A new 29 MW generating station is being built underground and the existing aboveground space is being reimagined into a public viewing area to be enjoyed by all.

12 Blue Lake Expansion
Alaska, USA

The City of Sitka, Alaska, was looking for ways to better meet the increasing demand for energy without reliance on expensive diesel generation. To meet this demand with clean hydroelectric power, the capacity of the Blue Lake hydro facility was increased by raising the concrete arch dam by 83 feet. By doing so, 100% of the city's power is now produced by hydroelectric power. The project was recognize by Engineering News Record with an Award of Merit in the Northwest region's Energy/Industrial category.

13 Santo Antônio do Jari
Brazil

Santo Antônio do Jari is a 373.3 MW hydroelectric project on Brazil's Jari River. The plant's spillway is one of the world's longest at 1,500 metres. Construction of this large hydro project, which was built in three stages, required six upstream cofferdams. Hatch provided the design for this project, owned by EDP.

Converting core strengths into custom solutions

No two hydroelectric projects present the same challenges. Every site is unique. Geotechnical risks vary. Logistical constraints and environmental regulations differ from place to place.

Trying to apply "cookie-cutter" solutions to such diverse geotechnical and hydrological conditions can result in significant problems later, ranging from operational disruption to catastrophic failure. That's why our waterpower specialists carefully examine the distinctive requirements of each engagement, combining proven capabilities with proprietary technologies and innovative thinking to deliver custom but cost-effective solutions—every time.

Greenfield hydroelectric developments

Many factors contribute to making a hydroelectric project successful: financing, selection and design of the best sites, permits, safety standards, and risk management. All these aspects must be considered, even as you determine the optimal installed capacity and limit operating and capital costs. We work with waterpower developers and operators in both the private and public sectors, providing full engineering design, procurement, and construction management services to minimize project risks and maximize profitability.

Redevelopments and rehabilitation

As hydropower facilities age, owners and operators work to extend their assets' lives, or responsibly and safely decommission them. Our professionals have the knowledge and experience in all types of upgrades and refurbishments. We conduct condition audits, and provide full life-extension and enhancement services. Tools like Grow 3D and proprietary software, such as Hatch's HydroVantage™ and *Vista* DSS™, can help identify risks to minimize and capital expenditures to prioritize.

Repowering and equipment upgrades

Risks and costs must always be weighed against the benefits of upgrading or replacing capital equipment. We've pioneered tools and techniques to measure the efficiency of turbines so you can determine the best plan for your operation.

Dam and public safety studies

You need up-to-date safety information and tools to prepare dam safety reports and assessments. The Hatch brand is synonymous with dam safety. In Canada alone, we've conducted over 300 dam-safety assessments and been instrumental in establishing industry best practices. We keep abreast of evolving dam safety regulations and engineering approaches, tools, and solutions.

Operational support studies

Operating a waterpower facility at optimum capacity while meeting all operational, safety, and environmental constraints is a delicate balance. We work alongside owners and operators, managing safety, equipment reliability, and output. Our *Vista* decision support software helps you derive the most value from your generating assets with superior forecasting, planning, scheduling, and dispatching.

Regulatory support, permitting, and approvals

We go where our clients are, and where we're needed. That's all over the world. We're familiar with a host of different regulatory requirements and can help you navigate the often-difficult laws, regulations, and permitting processes in almost any jurisdiction.

Due diligence services

Our services extend to all types of investment and business planning—the evaluation of business and commercial issues, technical processes, capital projects, and maintenance operations.

Investors, owners, and sponsors of proposed projects routinely come to us for thorough technical and economic due diligence and techno-economic appraisals. Our clients trust us to conduct assessments of some of the most important waterpower projects in the world.

Construction is under way at the Keeyask hydroelectric project, a massive $6.2 billion development in Manitoba, Canada

Project experience

Kariba South Extension

Kariba, Zimbabwe

Zimbabwe is a country that, despite power imports from neighboring countries, still experiences power outages and rolling brownouts. In an effort to increase its own generation, the national utility, Zimbabwe Power Company (ZPC), was mandated to expand its generation capacity. To do so, ZPC initiated the Kariba South Extension project to increase the capacity of the Kariba South power station by 300 MW.

We are acting as owner's engineer for the project. The new generating units will be housed in a separate underground powerhouse with new intake tunnels from Lake Kariba, which will use water from the Zambezi River to generate peaking power. Each 150 MW unit will have an individual penstock and intake arrangement. The draft tube tunnels will terminate in the tailrace surge chamber. From there, a common tailrace tunnel will discharge the water to the Zambezi River, downstream of the Kariba Dam.

Lower Mattagami River Project (LMRP)

Ontario, Canada

The LMRP is Ontario Power Generation's largest hydroelectric project in the last 40 years. The project added 500 MW of hydroelectric capacity to Ontario's electricity system by replacing the Smoky Falls generation station and upgrading three other existing generating stations: Little Long, Harmon, and Kipling.

The LMRP provided a boost to the local economy, directly employing 600 people, 70 percent of whom are drawn from surrounding communities. We acted as owner's engineer for the initial phases, developing the request for proposal process, designs, drawings, and specifications. Later, for the execution phase, we acted as owner's representative, providing oversight and monitoring of the design-build contractor to facilitate achievement of objectives related to cost, schedule, and quality.

Two new units will be added to the underground powerhouse at the Kariba power station to add 300 MW to the country's grid

The project was delivered on budget and ahead of schedule. All units were up and running by December 2015, just in time for the high-energy-demand holiday season.

Oxec I & II Hydroelectric Projects

Alta Verapaz, Guatemala

The Oxec I hydroelectric project was no small feat. The design team faced a number of challenges, including an unfavorable climate with extended rainy seasons, unstable ground with numerous landslides, frequent flash floods, high seismicity, and volcanic activity. The greenfield hydro project includes headworks, a dam, desander, conveyance system—including an open canal and two siphons—forebay, high-pressure steel penstock, and powerhouse. We completed the detail design for civil components, managed interactions with hydromechanical and water-to-wire subcontractors, and supported construction.

Oxec I was very successful, so much so that Hatch was asked to provide a conceptual study and engineering for Oxec II, which is immediately upstream of the Oxec I powerhouse. Oxec II is a relatively low-head generating station with a concrete dam and spillway more than 40 m high with an overall crest length of 200 m. The project is now in construction.

Together the projects will add 81.5 MW to Guatemala's ongoing program to develop renewable power.

Landslides and flash floods are just some of the challenges overcome to successfully deliver the Oxec I & II projects in Guatemala

One of Canada's oldest in-service generating stations, Chaudière Falls, is being revitalized to create a space for the public while producing clean, renewable power

Chaudière Hydro Revitalization

Ontario, Canada

The Chaudière Falls hydroelectric station is the oldest hydroelectric station in Canada still in operation. Just 1.4 km from Canada's Parliament buildings, Energy Ottawa hopes to reestablish Chaudière Falls as a landmark to celebrate Canada's First Nations and the industrial past of nearby Ottawa, the nation's capital city, while also creating a space to be enjoyed by the public and producing clean, renewable power.

We're helping turn vision into reality. The project includes constructing a new 29 MW generating station with an enlarged intake and discharge channel, and retiring the existing Ottawa No. 2 (6 MW) and Ottawa No. 3 (3 MW) generating stations from service. We're helping Energy Ottawa by providing full EPCM services for the design and execution as well as environmental services for the project.

Slated to be in-service by June 2017, the station will do much more than connect to the provincial grid and provide 20,000 homes with clean, renewable electricity. It will give the entire community a public space to enjoy, one that recognizes and celebrates Canada's First Nations and connects to the area's industrial past.

"Overall cost estimates for the Chaudière Falls Hydroelectric Redevelopment Project were provided in the early stages by Hatch and were supported by detailed and accurate documentation and drawings. This has led to a significant reduction in the construction risk as well as competitive pricing for civil construction."

Franz Kropp | Director of Generation, Energy Ottawa

Forrest Kerr

British Columbia, Canada

Eight months into the construction program for the Forrest Kerr Hydroelectric project, independent power producer AltaGas turned to Hatch to solve some serious design issues that threatened the viability of the project. Becoming prime consultant, we mobilized a team to complete the detailed design. The work included the development of innovative concepts that solved engineering challenges at both the headworks and powerhouse locations.

The 195 MW project involved not only multidisciplinary engineering coordination, but also First Nations collaboration and sustainability. The project had clear objectives: design and construct a 195 MW hydroelectric facility on time and on budget in a safe and environmentally responsible manner. The success of the Forrest Kerr project represents a triumph not only in multidisciplinary engineering coordination, but also in First Nations collaboration and sustainability.

The Forrest Kerr hydroelectric project won a Canadian Consulting Engineering Award of Excellence and the Tree of Life Award

About Hatch

Whatever our clients envision, our engineers can design and build. With over six decades of business and technical experience in the mining, energy, and infrastructure sectors, we know your business and understand that your challenges are changing rapidly.

We respond quickly with solutions that are smarter, more efficient, and innovative. We draw upon our 9,000 staff with experience in over 150 countries to challenge the status quo and create positive change for our clients, our employees, and the communities we serve.

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