Run-of-River

Run-of-River Hydro Power

What is It?

- Run-of-river encompasses small-scale hydroelectric projects that require no dam, reservoir or flooding to generate electricity – the natural flow and elevation of a river are used to create power.
- A portion of the water from a fast-moving river is diverted into a penstock or pipe that channels it to a turbine then back to the river leaving enough of the waterway’s existing flow so environmental values are protected.
- Run-of-river projects have a much small environmental footprint compared to traditional reservoir storage hydro projects.
- Project developers work closely with local communities and First Nations to thoroughly consider all their environmental, economic, and social concerns.
- Run-of-river projects require over 50 permits, licenses, approvals and reviews from over a dozen government agencies they can be built.

Why Run-of-River?

- As a readily available source of green electricity, run-of-river hydro will play a prominent role in helping BC achieve energy self-sufficiency by 2016 as mandated in the latest BC Energy Plan.
- The BC government is encouraging the development of renewable power generation sources in BC for several reasons:
  ◦ Eliminate greenhouse gas emissions
  ◦ Meet the province’s growing energy needs in a sustainable manner
  ◦ Reduce its reliance on imported, carbon-intensive, non-renewable energy.
- Run-of-river hydro projects are more environmentally friendly than many other types of electricity generation, such as hydro storage (large dams), nuclear, natural gas-fired plants and coal, because they:
  ◦ Use a renewable resource.
  ◦ Have zero greenhouse gas emissions.
  ◦ Displace energy produced by polluting (oil, coal, gas) sources.
  ◦ Do not require dams, reservoirs or flooding vast tracks of land.
  ◦ Are located at high elevations, usually above waterfalls, which act as a natural fish barrier.
  ◦ Have minimal impact on vegetation, bird or wildlife habitat.
  ◦ Have low visual impact.
  ◦ Typically use existing logging roads for access and transmission rights-of-way minimizing environmental impacts.

The Technology

- Unlike traditional hydroelectric facilities, which flood large areas of land, run-of-river projects do not require large storage reservoirs.
- Instead, some of the water is diverted from a river into a pipe called a penstock. The penstock feeds the water downhill to a generating station.
- The natural force of gravity creates the energy required to spin the turbines that generate electricity.
- The water leaves the generating station and is returned, unaltered, to the river.

BC’s Run-of-River Potential

- Small hydro projects have long been used throughout British Columbia to power mines, mills and towns.
- Today there are 35 independent run-of-river projects operating in British Columbia.
• Although there are countless rivers in the province not all are suitable for run-of-river projects. Potential sites must have nearby transmission access, undergo a comprehensive environmental assessment, at the developers cost, meet government guidelines and regulations and be commercially viable.

• Of the Water License Applications for Power-General; over 50% are for projects under 10 MW and less than 5% are for projects over 50 MW.

**Environmental & Regulatory Considerations**

• A typical 26 megawatt (MW) run-of-river power plant producing 80 gigawatt hours (GWh) of green energy annually would displace approximately 47,000 tonnes of carbon dioxide, the equivalent of taking 9,000 cars off the road.

• Most run-of-river projects have a small environmental footprint and tend to use pre-existing infrastructure like logging roads for site access, produce no greenhouse gas emissions, and do not require dams, reservoirs or flooding of large tracts of land.

• Every proposed run-of-river project must obtain land tenure and apply for a water license.

• Run-of-river projects must adhere to an extensive regulatory and review process before construction can begin.

• Water licenses issued by the provincial government are for a maximum of 40 years. Over this period, the developer pays a water rental levy as well as land lease payments to the government.

• When a water license expires, all infrastructure improvements along with the right to use the land and water revert back to the provincial government.

• Every run-of-river project goes through a stringent environmental review process that can take two or more years and involves more than 12 federal, provincial, local and First Nations authorities.

• Run-of-river proponents are required to consult with government, interested parties and stakeholders throughout the planning process. There are ample opportunities for First Nations, local governments and the general public to provide input and feedback on a proposed project before it is approved.

• If a project receives an Environmental Certificate, the proponent must comply with dozens of commitments and/or conditions, which are monitored by independent, third-party engineers and compliance officers to ensure a high standard of environmental protection and mitigation.

**Public vs. Private**

• Allowing private industry to develop run-of-river projects eliminates the need to spend taxpayer dollars on high risk, early stage project assessment and development of dozens of projects that ultimately may reveal some shortcomings.

• Any construction cost over-runs are covered by the IPP’s shareholders, not BC Hydro ratepayers or taxpayers.

• Tax dollars can be dedicated to public healthcare and education; instead of the risky business of resource prospecting.

• The land on which the run-of-river projects are built will remain in public hands, with land lease and water rental payments being made to the BC government.

• Provides new sources of green, made-in-BC energy for the benefit of all British Columbians.

• Typically one-quarter of electricity revenues received by run-of-river plants are paid back as taxes, water rentals and other levies to local, provincial and federal authorities.

• By encouraging competition and ingenuity in the marketplace, renewable energy development will stimulate economic activity, creating jobs and opportunities for British Columbians.

• Run-of-river hydropower is one of the most plentiful, environmentally sound renewable energy sources available in BC.

**Socio-Economic Benefits**

• Creates economic activity in remote areas.

• Provides training and employment opportunities for First Nations and communities through joint ventures.

• Generates tax revenue to support capital and community programs.

• Fights climate change by reducing our reliance on polluting, electricity imports.

• Provides a continuous source of clean, green renewable energy with minimal environmental impact.

• Ensures environmentally sustainable development of local resources.

• Helps BC become energy self sufficient.

• Provides power to BC Hydro at a fixed price, guaranteed for the length of the contract, eliminating fuel cost risk associated with thermal sources such as natural gas.