

# Borrowing Water for Power

## The Tla-o-qui-aht First Nation's Path to Hydroelectricity

By Mike New



Canoe Creek Hydro ribbon cutting by Dr. James Lunney, Member of Parliament and Tla-o-qui-aht Chief Elmer Frank. June 25, 2010.



An engineer surveys Canoe Creek for hydro potential.



Canoe Creek

**M**ention the term “hydropower” and you may get mixed reactions.

For some, hydropower means clean, inexpensive renewable energy. For others, it raises long-standing concerns about its effects on our lands and fish.

Indeed, some hydroelectric projects – especially some of the older, large dams – have negatively affected our

environment. But the Tla-o-qui-aht First Nation (TFN) on Vancouver Island has proven that hydropower can be ecologically friendly.

The Canoe Creek Hydro Project is TFN's first hydropower plant. 75% of the project is owned by the TFN, with the remaining interest held by Swiftwater Power Corporation, also based on Vancouver Island. Carefully integrated with the environment, the project creates a continuing stream of income for TFN through a 40 year purchase agreement with BC

Hydro.

The 5.5 megawatt plant was brought online in June 2010, and produces enough electricity to power 2,000 Vancouver Island homes. It is a truly “green” system that produces no emissions, consumes no natural resources, and creates no waste.

“This project will begin paying dividends to the Nation in its first year,” said Jamie Bassett, Economic Development Officer for TFN. “As the wealth created by this investment in Clean Hydro grows, it will be directed towards stewardship of the land and the betterment of the lives of the Tla-o-qui-aht.”

### The First Steps

To generate power, you need a combination of flowing water and “head,” which is vertical height. A lazy stream in your backyard probably doesn't offer much potential, but a raging creek plunging down a steep mountainside can be the perfect source for hydropower.

In mountainous Western Canada, there are many creeks and rivers that offer lots of head and flow – but not all are suitable for hydropower. A prospective site must offer adequate water during the dry season and be somewhat close to those who need electricity – or existing transmission lines. Fish habitat and other environmental issues must be carefully studied.

For help with selecting a suitable site, TFN turned to the Barkley Project Group, a BC consulting firm that evaluates potential hydro sites and manages new project development. Iain Cuthbert and John Ebell, principals at Barkley Group, are both biologists with backgrounds in environmental consulting. “We are strongly committed to the environment,” said Cuthbert “It affects everything we do.” Working closely with TFN, they analyzed several different watersheds before choosing Canoe Creek.

Barkley Group has developed a relatively inexpensive process for evaluating the hydropower generation potential of all the watersheds in a given area. In the case of Canoe Creek, it took about six months and was paid for through a grant from Indian and Northern Affairs Canada (INAC). In addition to Canoe Creek, the assessment identified other hydro opportunities in the TFN territory, which are now being considered given the success of the Canoe Creek project.

### Building a “Green” Hydro Facility

By its very nature, water is the ultimate renewable resource – the result of a never-ending cycle of evaporation and precipitation. The responsible use of this natural gift, however, requires careful planning and a deep commitment to preservation.

Canoe Creek is a “run-of-river” project; that is, there is no dam to store water. Instead, a portion of the available flow is diverted from the stream into a penstock, or pipeline, which then drops 474 meters to a water turbine and generator. The creek still gets first priority, however; sufficient water always flows down the creek to sustain the plants and insects that live there.

Once the water passes through the turbine, it is returned to Canoe Creek. Nothing is consumed, and the water is not changed in any way. In effect, it is simply “borrowed” to do a little work as it makes its way to the sea.

One important feature of Canoe Creek is that fish are not an issue. The entire project is located above a waterfall that creates a natural barrier to fish.

Care was taken at every step of the project. The intake, where water enters the penstock, uses a special Coanda-style wedge wire screen, which uses tiny slots that allow

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**Congratulations Tla-o-qui-aht Nation  
On the Canoe Creek Hydro Project**

The Canoe Creek 5.5 MW hydroelectric project is a stellar example of how renewable energy projects can benefit our environment.

Canyon Hydro is proud to have been selected to provide the generating equipment for Canoe Creek. For 35 years, we have dedicated our efforts to build efficient, reliable hydropower systems that help reduce our reliance on fossil fuels.

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Ribbon cutting at the Canoe Creek powerhouse



Canyon Hydro turbine inside the powerhouse



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**Tla-o-qui-aht  
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aquatic insects and debris to simply float over and continue downstream. The penstock is buried for most of its length, effectively removing it from the landscape.

The footprint was kept to a minimum by retaining the forest and managing hazard trees rather than clearing wide swaths. The use of reused and surplus penstock saved the cost and carbon footprint of manufacturing and shipping new pipe from China.

Construction was performed by workers from the local community, keeping the jobs and benefits at home.

**The Heart of the System**

The turbine and generator are the heart of a hydroelectric system, where the energy from the water is converted into electricity. Efficiency



and reliability are critical here, as they determine how much income the plant will produce.

The custom-designed turbine system was provided by Canyon Hydro, and has run non-stop since operations began. Known for premium quality turbines, Canyon is also able to provide rapid service because it is located just across the U.S. border in Deming, Washington.

The turbine, generator, and electrical controls are all contained in a beautiful powerhouse, crafted with cedar harvested from the site and sawn by the TFN .

Perhaps Saya Masso, Councilor of the TFN says it best. "The Canoe Creek project reflects a philosophy the Tla-o-qui-aht have followed for thousands of years. This is our 'Haa'huuthlii.' We are a part of nature. We borrow, we benefit, but we do not destroy." Hishuuk'ish Tsaawak (All Is One).

**Skilled Labour  
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people enrolled in apprenticeship programs in public post-secondary schools which saw increases of 118% in enrollment and the Aboriginal participation rate from 5.4% to 8.6% from 2006/07 to 2009/10.

There were several elements key to this success. ITA Aboriginal Initiatives Senior Lead Gary McDermott says, "Foundation programs have been beneficial to Aboriginal candidates giving them a chance to explore trades, make a career choice and get job placements. In addition, the support given to Aboriginal clients and the partnerships with employers have aided greatly."

Several Aboriginal organizations offer Aboriginal candidates skills assessments (like Test of Workplace Essential Skills TOEWs) and support with upgrading, certification, workplace safety and job readiness training, including what seems as basic as getting a drivers license, and provide a Job Coach liaison that facilitates employer-employee communications and provides guidance to the Aboriginal employee. Many of the Canada Employer programs too are available through these organizations.

A partnership between the Industry Training Authority (ITA) and the Canada-British Columbia

Labour Market Agreement (LMA) in 2010/11 supported seven projects province-wide to enable Aboriginal people to explore, prepare for and enter apprenticeable trades such as welding, carpentry, electrical, cooking, and piping. The LMA program helps Aboriginal people who do not qualify for Employment Insurance or who lack the skills to advance in their job to take training by covering the costs of tuition, books and training materials.

McDermott adds, "We're seeing a lot of success in the number of Aboriginal people becoming journeymen and Red Seal in BC, and partnerships between the Aboriginal community, industry, employers and training organizations are making this happen faster."

Discover Aboriginal organizations and how the ITA is working to build BC's skilled labour force: [www.itabc.ca](http://www.itabc.ca)

Established in 2004, the Industry Training Authority (ITA) is charged with the responsibility of managing BC's industry training system to develop the province's skilled workforce. As a provincial Crown agency, ITA works collaboratively with Aboriginal communities and agencies, industry, training providers, labour, governments and other stakeholders. *An Aboriginal Advisory Committee counsels the ITA on matters related to increasing Aboriginal participation in apprenticeship training. The ITA Aboriginal Initiatives are proudly supported by the Canada-British Columbia Labour Market Agreement.*

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